AGGREGATE MEASURES OF OUTPUT IN TRANSITION ECONOMIES:
SOME PRACTICAL AND CONCEPTUAL DIFFICULTIES

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ACKNOWLEDGMENTS

DECLARATION

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Rachael Walker

July 2000

ABSTRACT

It has been widely accepted that aggregate output measures in transition economies were likely to be biased. The conventional view holds that GDP and industrial output indices understated growth. The major aim of this study is to investigate in more detail the causes and likely effects of the bias on aggregate output data during transition. The analysis of bias in aggregate output measures is important for ascertaining the relative performance of these economies; this then has consequences for economic studies of these countries' development, as well as for policy-making in the region.

This work concerns the effect on index numbers of profound structural change. Focussing on three countries, Hungary, Poland and Romania, the discontinuity caused by the changing nature of price determination is investigated. Central to this study is the relevance of Gerschenkron's work on index number relativity during periods of structural transformation. His methodology for assessing the extent and direction of bias in industrial output indices is applied here; the percentage deviations between the industrial output indices and output of individual commodities in physical terms are calculated for the three countries. The results show that industrial output indices understate the extent of decline; these aggregate measures are biased upwards.

The conceptual problems of using index numbers during transition are also explored. Looking at the criteria for Laspeyres and Paasche indices to act as bounds to the actual productive potential of an economy, the effects on these bounds of changing relative prices and structures of production are discussed. It is shown that as the use of aggregate output measures assumes competitive markets, which may be absent during transition, the core assumptions underlying aggregation are violated.

The bias to aggregative measures of output has generated misleading pictures of how these economies operate. Economic analysis, dependent on GDP measures, has presented distorted prospects. This is illustrated by the regression analysis of service sector shares of national output prior to and during transition. The catch-up effect expected from the growth of services during transition is disputed here. Data that has been adjusted for the low relative prices of services in these countries shows that there is limited, or no, scope for catch-up.

Although concentrating on statistical measurement, this study has implications for the way transition is viewed. It implies that our understanding of how these economies are changing has been biased by the measures used in the economic analysis of transition. Standing apart from aggregative measures of output provides a different assessment of these countries' progress.

LIST OF ABBREVIATIONS

AFC Adjusted Factor Cost

CEECs Central and East European Countries

CIS Commonwealth of Independent States

CMEA Council for Mutual Economic Assistance

CPE Centrally Planned Economy

CPI Consumer Price Index

EBRD European Bank for Reconstruction and Development

ECP European Comparison Programme

EU European Union

FTO Ministry of Foreign Trade

GDP Gross Domestic Product

GNP Gross National Product

ICP International Comparison Project

ILO International Labor Organisation

IMF International Monetary Fund

MTE Market Type Economies

n.a. not available

NMP Net Material Product

OECD Organisation for Economic Cooperation and Development

PPF Production Possibility Frontier

PPP Purchasing Power Parity

SBC Soft Budget Constraint

SOE State Owned Enterprises

STE Soviet-Type Economy

TE Transition Economy

TR Transferable Rouble

UN United Nations

UNECE United Nations/ Economic Commission for Europe

CHAPTER 1

INTRODUCTION

> ...the transition to socialism must, as a consequence of the levelling out of the differences in income and the resultant readjustments in consumption, and therefore production, change all economic data in such a way that a connecting link with the final state of affairs in the previously existing competitive economy becomes impossible. But then we have the spectacle of a socialist economic order floundering in the ocean of possible and conceivable economic combinations without the compass of economic combination. (von Mises, 1935: 110)

The collapse of central planning caused a level of disruption in economic data on a par with the period of transition to socialism referred to by von Mises. The statistical apparatus operating under central planning had the prime objective of undertaking calculations for the implementation of five-year plans. Material balances were constructed, physical outputs reported, and production planned on the basis of priorities determined by the authorities. Most importantly for this thesis, prices were determined by the central administration to fit the objectives of the plan. It is the collapse of this system, starting in 1989, that heralded the beginning of the period we refer to today as transition.

The assumption of economists working in this field is that these economies are moving from central planning along a defined path towards functioning market economies[1]. The definition provided by P.G. Hare and J.R. Davis sums up the conventional view of this process, "The transformation from centrally planned economies governed by one-party communist regimes into democratic, market-type systems is what we normally mean by *transition*." (Hare and Davis, 1997: 1) The literature on transition economics is littered

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[1] In other papers, I dispute the assumption that markets are being formed, using the case of Romania, (see Walker, 1998). Criticisms of the assumption that transition involves a pre-determined move to market-based economic systems have also been raised by Nuti, 1996a and Kolodko, 2000.

with references to transition in a similar vein. Thus, Marie Lavigne's (1995 and 1999) textbook is entitled, *The Economics of Transition: From Socialist Economy to Market Economy*; David Lipton and Jeffrey Sachs's (1990) seminal paper on transformation in Poland is entitled, *Creating a Market Economy in Eastern Europe: The Case of Poland*. Accepting this definition, the demise of central planning and the move towards market economic systems must involve an extreme dislocation in the flow of economic information. The central contention in this thesis is that this dislocation renders the standard measures of economic performance incapable of conveying the real changes that have taken place in these economies.

Measurement of Gross National, or Domestic, Product (GNP or GDP respectively) form the basis on which economists judge the relative performance of economies. The growth of economies is compared over time and between countries using these aggregates. Progress in transition is also measured using GDP and GNP aggregates. In the following figure taken from the European Bank for Reconstruction and Development's latest *Transition Report* (1999), real GDP for countries in the transition region is compared using 1989 as the base year.

Fig. 1.1

EBRD Index of real GDP

Index of real GDP
Weighted averages for selected country groups)

1989 = 100 per cent

Legend: Central and eastern Europe and Baltic states — CIS — Total

Source: Table 3.1.1.
Note:
The weighted average is calculated using GDP in US dollars at PPP exchange rates in 1989.
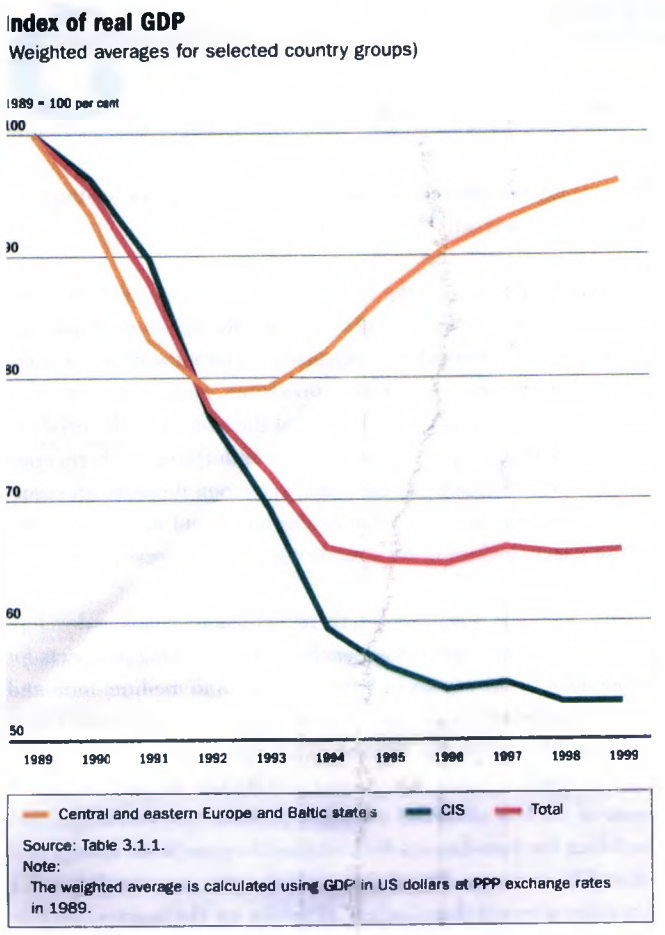
Source: EBRD, *Transition Report*, 1999: 58

The pattern that emerges, in the figure, is that all transition economies underwent an initial crisis with GDP declining in the first years of transition. There was then a significant recovery in the Central and Eastern European and the Baltic States while the CIS countries stagnated. It is precisely this view of the transition process, namely that the Central Eastern European countries are performing relatively better and have recovered more completely from the initial transition crises, that is used to justify the radical reforms applied there during transition.

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Studies of the relationship between reform and growth confirm the view that Central Eastern Europe is performing relatively better having undertaken rapid reforms. M. de Melo, C. Denizer, and A. Gelb (1997) undertook regressions of the average growth rate for 1993-94[2] against a constructed index of reforms (more on these types of indicators in a little while) which they call the "cumulative liberalization index", for 26 countries in Central and Eastern Europe and the former Soviet Union. Their results show a clear and distinct positive relationship between the two indices (de Melo, Denizer and Gelb, 1997: 29). Extending their analysis to a multiple regression for the average growth rate for a six year period, 1989-94, using the same 26 countries, led them to conclude that, "Cumulative liberalization has a positive association with output changes in CEE and FSU, within the overall context of a 'transitional recession'."(de Melo, Denizer and Gelb, 1997: 31) The latest EBRD *Transition Report* (1999) used the same general approach and classified the countries in the transition region into early, late and no liberalisation groups. Analysis of the relationship between these groups and growth led the EBRD to conclude that it, "confirms the strong association between early liberalisation and growth." (EBRD, 1999; 64) An IMF *Working Paper* extended this type of analysis to show the link between policies and growth, and in so doing, attempted to explain the differences in performance in the transition region. (Berg A., E. Borensztein, R. Sahay and J. Zettelmeyer, 1999). Again, they used an index of real GDP from official sources and the annual growth rate in their regressions against policy variables. Their conclusion showed that, "From the perspective of minimizing the cumulative output loss associated with the transition process, this [i.e. their study] would argue in favour of fast structural reforms; i.e. a gradualist approach does not appear to be supported by our results." (Berg, Borensztein, Sahay, and Zettelmeyer, 1999: 45)

What all these studies point towards is the close link between growth and policy-making. The results of the studies cited here have become a central tenet of the conventional approach to transition: Speedier reforms, fast liberalisation and deep structural reforms benefit growth in the transition region. This thesis has no dispute with the notion that policy-making and growth are closely intertwined. In fact, I would agree

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[2] They also undertook similar regressions using the cumulative liberalization index against the inflation rate. (de Melo, Denizer and Gelb, 1997: 31-35) Their results indicated that rapid reform generates low inflation.

with G.W. Kolodko[3] (1999) that, "The main argument in favour of transition was a desire to put the countries in question on the path of sustainable growth." (Kolodko, 1999: 234) Kolodko goes on to argue that growth is the goal that must shape policies pursued, "Therefore, true reforms, those that facilitate the public interests of many as opposed to the particular interests of a few, must always be thought of as a means to long-term targets, i.e. sustained growth." (Kolodko, 1999: 247)

Yet, these studies of the relationship between growth and pace of reform during transition assume that it is possible to attain an accurate measure of growth during this period. In using real GDP as the key variable in their regressions, they assumed it could be a reasonably accurate indicator of relative performance. I say 'reasonably', because in nearly all of the studies cited there is an acknowledgement, either tacit or explicit, that there may be deficiencies in the measurement of real GDP during transition. According to the IMF *Working Paper* (1999),

> …we use official GDP…which suffer considerable, well-known, measurement problems, and in particular are widely believed to overstate the initial decline by inadequately capturing newly emerging activities and by using pre-transition relative prices, which tend to give low weight to new activities. (Berg A., E. Borensztein, R. Sahay and J. Zettelmeyer, 1999: 19)

Yet, the paper still continued to use official real GDP measures as the basis of its study. This above quote from Berg *et al* (1999) also points to a second tenet that has become ingrained in the conventional wisdom of these economies, namely, that the extent of the initial decline during transition has been overstated by real GDP data. This assessment of the inaccuracy of GDP data has been based on a number of seminal studies.

First, concerning the inadequate coverage of newly emerging activities, A. Berg and J. Sachs (1992) used data from household surveys in Poland to attempt to generate a 'guesstimate' of the expenditure. They concluded that, "Using the methodology [i.e. household budget surveys]…we come up with an overall drop in GDP of 4.9% for 1990 [for Poland]" (Berg and Sachs, 1992: 147). When compared to the official calculation of an 11.6% decline in GDP in 1990 for Poland, this shows the extent to which Berg and

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[3] Kolodko also provided a critique of the conventional view (1999 and 2000), or as he called it, "the Washington Consensus", on the basis that the policies pursued in these programmes ignore the centrality

Sachs believe GDP is underestimated. That GDP has been seriously underestimated has also been argued by the EBRD. In its *Transition Report* (1995), the EBRD states that,

> One probable result of inadequate statistical coverage of the relatively dynamic, and rapidly growing, private sector is a negative bias in some countries' growth estimates for the initial years of transition…The resulting negative bias in series for growth of real GDP and gross output may be quite large. In some cases the magnitude of the officially measured decline in real GDP does not appear credible. (EBRD, 1995a: 181)

Drawing from surveys of the private sector activity and the hidden economy in Hungary (Arvay and Vertes, 1995), the widely-held belief is that the omission of output in these areas has led to a gross underestimation of Hungarian GDP for the early years of transition. Likewise, with Poland: "Studies published several years ago [i.e. in the early 1990's] with the backing (if not official endorsement) of statistical agencies in Hungary and Poland point to a need for substantial positive revisions to these countries' official data for GDP growth in the early 1990's." (EBRD, 1995: 181)

Second, changes in relative prices during transition generate bias in the GDP aggregate calculations. Osband (1992) showed that the Laspeyres base-weighted index of growth is biased downwards during price liberalisation. As the statement of Berg *et al* (1999) quoted above shows, it is commonly held that there is a profound downward bias in Laspeyres indices of growth arising from the low relative prices ascribed to certain fast-growing activities during transition results.

The conventional response to these problems is on the one hand to acknowledge the likelihood of the presence of these biases in official GDP data whilst continuing to use them in econometric analysis. This has been the response of the authors of the studies cited above. On the other hand, more weight may be lent to so-called transition indicators, such as those produced by the EBRD. These transition indicators survey a variety of reforms in these countries and ascribe a ranking from 1-4 with added pluses and minuses for the eight policy indicators. The eight indicators are listed in appendix 1.1 and include: extent of privatisation, both large- and small-scale; extent of price

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of building institutions. This, he argued, takes time and is undertaken gradually.

liberalisation, progress within the trade and foreign exchange systems, and enforcement and standard of competition policy; extent of financial sector reforms. Can they replace the GDP estimates as measures of progress in transition?

I would argue not. It has been argued that the transition indicators are themselves biased. Mario Nuti (1999) has undertaken a study whereby the EBRD scores for 1999 are converted to a 0-4.5 scale (the 0.5 taking the plus sign into account as a score). From his analysis he finds that "There is an implicit, necessary bias in the scoring system that assigns 1 out of 4.5 for 'little or no change'" (Nuti, 1999: 4). This bias arises in part because a country can be ascribed a score of 1, for 'little or no change'. The extent of the bias means that, "On average, original EBRD scores overestimate progress by over 20% and underestimate variability." (Nuti, 1999: 4) M. Nuti (1999) adds a further dimension to this bias when he states that there is, "...more generally, built-in bias in subjective scores by involved observers." (Nuti, 1999: 6)

Thus, the EBRD transition indicators are not free from bias themselves. But, in any case they cannot act as replacements for GDP estimates. The transition indicators are measures of the conduct of policy. To use them as alternative measures of progress of transition confuses means and ends. As Kolodko asserts, "Economic policy is not to be judged by the pace of privatization, but by its efficiency, measured first by the increase of competitiveness and budgetary proceeds, and *then by the increase in contribution to national income.*" (Kolodko, 1999: 246 – my emphasis) As stated above, the end goal of transition is sustainable growth. Pace of privatisation, extents of market liberalisation, and the like, are meant to be the instruments aimed at ensuring this end. Progress in transition should not then be judged by the instruments used, but by the outcome. The standard measure of outcome, i.e. the growth of an economy, is the use of GDP aggregates. This has been a convention used since the association between development and GDP per capita was first made.[4]

We are presented with a fundamental problem. To determine the progress of transition we need to undertake calculations of economic activity using aggregative methods. The central argument of this thesis is transition entails such an upheaval in the economic

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[4] See Kuznets (1965) for the linkage between progress in development and measures of GDP per capita.

systems of these countries that economic calculations based on aggregation will generate misleading results. Nor does this just effect the initial years of transition as suggested in the studies cited previously. 1989 was *not* year zero for these economies; we need to have a judgement of how these economies are performing relative to the period of central planning if we are to understand their development. Also, the disruption in the economic systems does not effect just the flow of information for the first couple of years, but makes all subsequent evaluations of GDP levels implausible (this echoes the point made by von Mises, (1935) in the passage at the head of this chapter). Can GDP provide an accurate indication of the relative performance of an economy undergoing transition? Answering this question is the main work of this thesis.

Chapter 2 examines changes in the price system during transition. The demise of central planning resulted in the collapse of the system of administered prices. If we are to ascertain the likely sources of bias in aggregation for national income measures, then the starting place must be to establish the key changes in the system of valuation for these economies. For it is this system of valuation that is used as the foundation for aggregation. Berg *et al* (1999) stated in the quote above that a source of downward bias for GDP is likely to be found in the low relative price weights used from pre-transition years for new activities. This view is based on presuppositions about the likely direction of changes in relative prices. Yet, surprisingly, there has been little research to establish the outcomes of price liberalisation, despite its important place in the transition process. Chapter 2 thus goes on to question the assumption of low price relatives for fastest growing sectors in transition. Although the relative price of *some* heavy industrial goods was high under central planning, others, such as cars and computers, were exceedingly high. These high-tech industries were the very ones that were meant to grow in transition. If the effects of rapid and persistent inflation and sharp devaluations are added, then the turmoil in the price system during transition is all too apparent.

A further avenue of enquiry in this chapter concerns the creation of market-determined prices during transition. The institutional school emphasises the primacy of developing institutions during transition. Many of the authors of this school point to the void left by the collapse of the institutions supporting central planning. Thus, Janos Kornai (1994) refers to the, "no-man's land where bureaucratic coordination no longer applies and

market coordination does not yet apply, and economic activity is impeded by disintegration, lack of coordination, and anarchy." (Kornai, 1994: 47) In a similar vein, O. Blanchard and M. Kremer (1997) have studied the breakdown in production processes in transition and its relationship to output decline. More recently, Kolodko, (1999 and 2000) has referred to the 'systemic vacuum' left by the collapse of central planning as "[t]he new institutional set-up must be founded on the basis of new organisations that did not exist, since they were not needed, under centrally planned state economy." (Kolodko, 1999: 250) In his view, the development of new institutions will only take place gradually, "By the very nature of this long-term and complex process, it cannot be carried forward in a radical way. It takes time and is costly in both the financial and economic senses." (Kolodko, 1999: 252) To fill the gap left by the collapse of many of the structures of central planning, other institutional forms may arise that may create some 'hybrid' type between plan and market, as suggested by Nuti (1996a). These 'hybrids' may prove enduring. If the institutions underpinning a functioning market system are not yet in place, what exactly is the system determining prices? The analysis contained in chapter 2 also explores this problem.

Chapter 3 examines the economic rationale for the use of index numbers. According to R.G.D. Allen, "...index numbers are an economic as well as a statistical construct." (Allen, 1975: 47) Aggregation based on value data has a clear theoretical basis – market relations. Estimates of national output are derived on the basis that the index numbers can represent some upper and lower bounds around the 'true' production potential for an economy. Index numbers can only perform this function if, "[t]he appraisal of production potential presupposes ideally the achievement of a partial economic optimum: The community is realizing its production possibilities." (Bergson, 1961: 31) This economic optimum is based on exchange relations. Again to quote from Bergson on this subject, "Where the concern is with production potential, prices conform ideally to the 'efficiency standard': The prices of any two products are inversely proportional to the corresponding 'marginal rate of transformation'." (Bergson, 1961: 26) Competitive market equilibria underpin the calculations of index numbers as observations of productive potential in an economy. Yet, again, these criteria do not fit the conditions pertaining to transition. In discussing index number bias during transition, I present an alternative view to Osband (1992). The analysis presented in chapter 3 shows that the change in productive structures has generated a significant bias but, given the

complexity of the changes, the best we can say is that we cannot deduce its direction *a priori*. However, the analysis presented there also points to another possibility, that the Laspeyres indices may well be biased, but upwards, as a result of structural change. In other words, growth may be overstated when using base-weighted indices as measures of aggregate output.

Chapter 4 discusses the problems of changing the statistical methods of calculating national income when moving from a centrally planned to a market-based system. Using the categories of value, scope and netness (first used by Kuznets, (1948) to examine national income in general) the difficulties of obtaining an accurate series of GDP data is analysed. A variety of data series - official, World Bank *Atlas*, International Comparison Project (ICP) and the European Comparison Programme (ECP) – are also compared for the period prior to and during transition. This leads on to a discussion of the difficulties of attaining an accurate measure of GDP using both exchange rate conversions, given the scale of devaluation, and purchasing power parities during transition. The conclusion of this analysis is that GDP measures will be subject to significant bias generated from a number of sources.

Interestingly, other measures of economic performance tend to suggest that rather than understating growth, the official statistics are either by-and-large correct, or that they may even overestimate growth - the decline in output during transition being even greater than officially estimated. Estimations of GDP from the expenditure side tend to show that growth has actually been overstated. According to the *Transition Report* (1994),

> Unfortunately, indicators of expenditure fail to support the hypothesis that currently available data on production tend to underestimate growth in all the east European countries. In fact, expenditure data for Hungary and Poland point in the opposite direction. (EBRD, 1994: 186)

And further in the *Transition Report Update* for 1995:

> …data for consumption and investment in Hungary and Poland in 1993 point to significantly weaker GDP growth than data collected from the production side. (EBRD, 1995b: 20-21)

This report and the work of K. Bartholdy (1997) point to a discrepancy between the expenditure and output estimates of GDP. Statisticians have attempted to reconcile these differences by attributing the changes to stockbuilding. Expenditure GDP measures suggests that the analysis by Berg and Sachs (1992) created a misleading indication of the direction of bias. Further evidence for the level of performance in transition economies has been provided by Istvan Dobozi and Gerhard Pohl (1995), economists working at the World Bank, who have also recognised the problems of measuring output decline during transition, and attempted to address them by measuring power consumption data. Their findings show that the average accumulated decline in electric power consumption between 1989 and 1993 was "in harmony" with the official estimated decline in Central and Eastern Europe. (Dobozi and Pohl, 1995: 17) This suggests that the estimated declines in growth in CEE have *not* been overstated. What is clear, is that different measures of aggregate performance are yielding conflicting results and that there is a high probability that GDP estimates are significantly biased during transition.

Chapter 5 presents a measure of the extent and direction of this bias using industrial output indices. I have returned to the seminal work of Alexander Gerschenkron (1947 and 1966) and present the case for using Gerschenkron's methodology, as well as the relevance of his theories of index number bias in transition economies. Because his study concerned economies (in this case the USSR) undergoing severe structural change I have argued that returning to his methods can shed light on bias during transition. His analysis made use of published physical output data for individual commodities. His main argument for using this data was that it was free of the distortions generated by Soviet prices. As transition entails upheavals in the system of valuation, data, which does not rely on prices, may yield results that are clearer indicators of changes in output. They also provide a database that is relatively consistent over the periods. I have used these data sets to calculate the percentage deviation between the industrial output indices and the physical output data using 1985 as the base year for three counties, Poland, Hungary and Romania. The mean annual output for each country's industrial sectors has also been calculated in order to provide a further indication of the scale of change. The results show unequivocally that the scale of decline has been dramatic in all three countries, that the industrial output indices are biased upwards, and that the

extent of deviation between industrial output aggregates and the output of individual commodities measured in physical terms is in fact growing.

The countries studied in chapters 2 to 5 are Hungary, Poland and Romania (although chapter 3 presents a general theoretical analysis of the use of index numbers during transition that may well be applied to all economies in the region). The reasons for selecting these three countries from the entire transition region are the availability and consistency of data series. A feature of the break-up of the Soviet-type economies has been the change of geographical boundaries. Czechoslovakia has broken into the Czech and Slovakian Republics; the USSR disintegrated into separate republics. The changing basis of nation states since the collapse of central planning has profound implications for the determination of *national* income statistics. Although attempts may be made to compute series of GDP data for individual nations that have undergone these splits, their value must be in question. Separate statistical offices did not exist for all of these republics. An example is that of Kazakhstan which until recently was reliant on the Russian central statistical office for its national income estimates. Again, alterations of the boundaries of these nations create a further source of dislocation in the flows of statistical information. I have purposely chosen three countries that do not suffer from the extremes of geographical disruptions. Hungary and Poland are judged to be the forerunners in making progress in transition. The studies cited above puts them at the top of the transition league table. They are also the most likely to be the first economies within this region to join the European Union when it enlarges eastwards. Thus, an evaluation of their performance and the likely sources and direction of bias in their GDP estimates has ramifications for both their domestic policies, as well as wider implications for EU membership. Romania is deemed to be a 'laggard' in the conventional view. This makes it an interesting comparator for this study of GDP bias.

Chapter 6 examines the changes in the service sector during transition. The conventional view is that transition entails a catch-up in service sector provision. Studies that attempt to measure this catch-up effect include those by Easterly, de Melo and Ofer (1994) and Dohrn and Heilemann (1996). Catch-up in the service sector rests on the notion that the centrally planned economies' suffered from a relative underdevelopment of service sector provision relative to market economies, a view supposedly verified by the seminal studies by Winiecki (1988), Gur Ofer (1973), and

the OECD (1986). These studies used the Chenery methodology for establishing a comparison between the share of services for different levels of GDP per capita in market economies.[5] The GDP data used is provided by either official sources or by World Bank *Atlas* tables. Using the benchmark 'norm' for market-type economies' share of services, the relative share of the service sector in GDP per capita is calculated for both centrally planned economies and transition ones. I have undertaken a similar analysis using the Chenery framework, but with a different GDP data set. In this study I have used estimates of GDP from the ICP and ECP projects. The ICP provided GDP estimates for Hungary and Poland only, so the analysis is for these two countries (Romania pulled out of the ICP project in the early 1980's). The results show that there is no evidence for the underdevelopment of services under central planning, and little or no scope for catch up during transition. It would support the theories of Kravis *et al* (1983) that the apparent underdevelopment of services in low-income economies, including centrally planned ones, arises from their relatively low prices. I also argue that the analysis that uses the Chenery methodology overlooks the nature of service provision in these economies. The interlinkage between services and industry, especially as regards the enterprise-based welfare services, is ignored in the Chenery-type analysis of these countries. Lastly, problems arise in the measurement of the service sector from the reclassification of service provision during transition. Many data sets, including that of the *International Labor Organisation* for employment figures, do not provide consistent classifications. This disqualifies a comparison of the pre-transition period and the transition period.

This then points to the uniqueness of transition. Severe dislocations, which have created discontinuities in the flows of economic information, have occurred. These make aggregation using market-based measures of performance extremely hazardous. On the other hand, these economies are also developing unique structures to fill the institutional gap created by the collapse of central planning. Here we have an element of continuity. To attempt to describe the complexity of these economic events with a single measure of performance is bound to create a misleading picture of their development.

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[5] As argued in the chapter, these studies used the Chenery methodology despite Chenery and Syrquin (1975) themselves warning that centrally planned economies were incomparable and so should not be used in this type of analysis.

Appendix 1.1

EBRD Transition Indicators 1999

Progress in transition in central and eastern Europe, the Baltic states and the CIS

Countries	Population (millions, mid-1999)	Private sector share of GDP in %, mid-1999 (EBRD estimate)[1]	Enterprises Large-scale privatisation	Small-scale privatisation	Governance & enterprise restructuring	Markets and trade Price liberalisation	Trade & foreign exchange system	Competition policy	Financial institutions Banking reform & interest rate liberalisation	Securities markets & non-bank financial institutions
Albania	3.2	75	2	4	2	3	4	2	2	2-
Armenia	3.7	60	3	3+	2	3	4	2	2+	2
Azerbaijan	7.6	45	2-	3	2	3	3+	1	2	2-
Belarus	10.2	20	1	2	1	2-	1	2	1	2
Bosnia and Herzegovina	4.3	35	2	2	2-	3	3-	1	2+	1
Bulgaria	8.2	60	3	3+	2+	3	4+	2	3-	2
Croatia	4.5	60	3	4+	3-	3	4	2	3	2+
Czech Republic	10.3	80	4	4+	3	3	4+	3	3+	3
Estonia	1.4	75	4	4+	3	3	4	3-	4-	3
FYR Macedonia	2.0	55	3	4	2	3	4	1	3	2-
Georgia	5.4	60	3+	4	2	3	4	2	2+	1
Hungary	10.1	80	4	4+	3+	3+	4+	3	4	3+
Kazakhstan	14.8	55	3	4	2	3	3	2	2+	2
Kyrgyzstan	4.8	60	3	4	2	3	4	2	2+	2
Latvia	2.4	65	3	4	3-	3	4+	3-	3	2+
Lithuania	3.7	70	3	4+	3-	3	4	2+	3	3-
Moldova	4.3	45	3	3+	2	3	4	2	2+	2
Poland	38.8	65	3+	4+	3	3+	4+	3	3+	3+
Romania	22.4	60	3-	4-	2	3	4	2	3-	2
Russian Federation	146.7	70	3+	4	2-	3-	2+	2+	2-	2-
Slovak Republic	5.4	75	4	4+	3	3	4+	3	3-	2+
Slovenia	2.0	55	3+	4+	3-	3	4+	2	3+	3
Tajikistan	6.2	30	2+	3	2-	3	3-	1	1	1
Turkmenistan	4.9	25	2-	2	2-	2	1	1	1	1
Ukraine	50.7	55	2+	3+	2	3	3	2	2	2
Uzbekistan	24.2	45	3-	3	2	2	1	2	2-	2

1 The "private sector shares" of GDP represent rough EBRD estimates, based on available statistics from both official (government) sources and unofficial sources. The underlying concept of private sector value added includes income generated by the activity of private registered companies as well as by private entities engaged in informal activity in those cases where reliable information on informal activity is available. Here the term "private companies" refers to all enterprises in which a majority of the shares are owned by private individuals or entities. The roughness of the EBRD estimates reflects data limitations, particularly with respect to the scale of informal activity. The EBRD estimates may in some cases differ markedly from available data from official sources on the contribution to GDP made by the "private sector" or by the "non-state sector". This is in most cases because the definition of the EBRD concept differs from that of the official estimates. Specifically for the CIS countries, official data in most cases refer to value added in the "non-state sector", a broad concept which incorporates collective farms as well as companies in which only a minority stake has been privatised.

Classification system for transition indicators [1]

Large-scale privatisation

1 Little private ownership.
2 Comprehensive scheme almost ready for implementation; some sales completed.
3 More than 25 per cent of large-scale enterprise assets in private hands or in the process of being privatised (with the process having reached a stage at which the state has effectively ceded its ownership rights), but possibly with major unresolved issues regarding corporate governance.
4 More than 50 per cent of state-owned enterprise and farm assets in private ownership and significant progress on corporate governance of these enterprises.
4+ Standards and performance typical of advanced industrial economies: more than 75 per cent of enterprise assets in private ownership with effective corporate governance.

Small-scale privatisation

1 Little progress.
2 Substantial share privatised.
3 Nearly comprehensive programme implemented.
4 Complete privatisation of small companies with tradable ownership rights.
4+ Standards and performance typical of advanced industrial economies: no state ownership of small enterprises; effective tradability of land.

Governance and enterprise restructuring

1 Soft budget constraints (lax credit and subsidy policies weakening financial discipline at the enterprise level); few other reforms to promote corporate governance.
2 Moderately tight credit and subsidy policy but weak enforcement of bankruptcy legislation and little action taken to strengthen competition and corporate governance.
3 Significant and sustained actions to harden budget constraints and to promote corporate governance effectively (e.g. through privatisation combined with tight credit and subsidy policies and/or enforcement of bankruptcy legislation).
4 Substantial improvement in corporate governance, for example, an account of an active corporate control market; significant new investment at the enterprise level.
4+ Standards and performance typical of advanced industrial economies: effective corporate control exercised through domestic financial institutions and markets, fostering market-driven restructuring.

Price liberalisation

1 Most prices formally controlled by the government.
2 Price controls for several important product categories; state procurement at non-market prices remains substantial.
3 Substantial progress on price liberalisation: state procurement at non-market prices largely phased out.
4 Comprehensive price liberalisation; utility pricing which reflects economic costs.
4+ Standards and performance typical of advanced industrial economies: comprehensive price liberalisation; efficiency-enhancing regulation of utility pricing.

Trade and foreign exchange system

1 Widespread import and/or export controls or very limited legitimate access to foreign exchange.
2 Some liberalisation of import and/or export controls; almost full current account convertibility in principle but with a foreign exchange regime that is not fully transparent (possibly with multiple exchange rates).
3 Removal of almost all quantitative and administrative import and export restrictions; almost full current account convertibility.
4 Removal of all quantitative and administrative import and export restrictions (apart from agriculture) and all significant export tariffs; insignificant direct involvement in exports and imports by ministries and state-owned trading companies; no major non-uniformity of customs duties for non-agricultural goods and services; full current account convertibility.
4+ Standards and performance norms of advanced industrial economies: removal of most tariff barriers; WTO membership.

Competition policy

1 No competition legislation or institutions.
2 Competition policy legislation and institutions set up; some reduction of entry restrictions or enforcement action on dominant firms.
3 Some enforcement actions to reduce abuse of market power and to promote a competitive environment, including break-ups of dominant conglomerates; substantial reduction of entry restrictions.
4 Significant enforcement actions to reduce abuse of market power and to promote a competitive environment.
4+ Standards and performance typical of advanced industrial economies: effective enforcement of competition policy; unrestricted entry to most markets.

Banking reform and interest rate liberalisation

1 Little progress beyond establishment of a two-tier system.
2 Significant liberalisation of interest rates and credit allocation; limited use of directed credit or interest rate ceilings.
3 Substantial progress in establishment of bank solvency and of a framework for prudential supervision and regulation; full interest rate liberalisation with little preferential access to cheap refinancing; significant lending to private enterprises and significant presence of private banks.
4 Significant movement of banking laws and regulations towards BIS standards; well-functioning banking competition and effective prudential supervision; significant term lending to private enterprises; substantial financial deepening.
4+ Standards and performance norms of advanced industrial economies: full convergence of banking laws and regulations with BIS standards; provision of full set of competitive banking services.

Securities markets and non-bank financial institutions

1 Little progress.
2 Formation of securities exchanges, market-makers and brokers; some trading in government paper and/or securities; rudimentary legal and regulatory framework for the issuance and trading of securities.
3 Substantial issuance of securities by private enterprises; establishment of independent share registries, secure clearance and settlement procedures, and some protection of minority shareholders; emergence of non-bank financial institutions (e.g. investment funds, private insurance and pension funds, leasing companies) and associated regulatory framework.
4 Securities laws and regulations approaching IOSCO standards; substantial market liquidity and capitalisation; well-functioning non-bank financial institutions and effective regulation.
4+ Standards and performance norms of advanced industrial economies: full convergence of securities laws and regulations with IOSCO standards; fully developed non-bank intermediation.

[1] The classification system is simplified and builds on the judgement of the EBRD's Office of the Chief Economist. More detailed descriptions of country-specific progress in transition are provided in the transition indicators at the back of this Report. The classification system presented here builds on the *Transition Report* 1994. To refine further the classification system, pluses and minuses have been added to the 1-4 scale since 1997 to indicate countries on the borderline between two categories. The classification 4* which was used up to and including 1998 has been replaced with 4+, though the meaning of the score remains the same.

Source: EBRD, *Transition Report*, 1999: 24 and 25

Appendix 1.2

Growth in Real GDP in Central and Eastern Europe, the Baltic States and the CIS

Growth in real GDP in central and eastern Europe, the Baltic states and the CIS

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Estimated level of real GDP in 1998
												(1989=100)
Albania	9.8	-10.0	-27.7	-7.2	9.6	9.4	8.9	9.1	-7.0	8.0	8.0	86
Bulgaria	0.5	-9.1	-11.7	-7.3	-1.5	1.8	2.1	-10.1	-7.0	3.5	0.0	66
Croatia	-1.6	-7.1	-21.1	-11.7	-8.0	5.9	6.8	6.0	6.5	2.3	-0.5	78
Czech Republic	1.4	-1.2	-11.5	-3.3	0.6	3.2	6.4	3.8	0.3	-2.3	0.0	95
Estonia	1.1	-8.1	-13.6	-14.2	-9.0	-2.0	4.3	3.9	10.6	4.0	0.0	76
FYR Macedonia	0.9	-9.9	-7.0	-8.0	-9.1	-1.8	-1.2	0.8	1.5	2.9	0.0	72
Hungary	0.7	-3.5	-11.9	-3.1	-0.6	2.9	1.5	1.3	4.6	5.1	3.0	95
Latvia	6.8	2.9	-10.4	-34.9	-14.9	0.6	-0.8	3.3	8.6	3.6	1.5	59
Lithuania	1.5	-5.0	-6.2	-21.3	-16.0	-9.5	3.5	4.9	7.4	5.2	0.0	65
Poland	0.2	-11.6	-7.0	2.6	3.8	5.2	7.0	6.1	6.9	4.8	3.5	117
Romania	-5.8	-5.6	-12.9	-8.8	1.5	3.9	7.1	4.1	-6.9	-7.3	-4.0	76
Slovak Republic	1.4	-2.5	-14.6	-6.5	-3.7	4.9	6.9	6.6	6.5	4.4	1.8	100
Slovenia	-1.8	-4.7	-8.9	-5.5	2.8	5.3	4.1	3.5	4.6	3.9	3.5	104
Central and eastern Europe and the Baltic states[1]	*-0.2*	*-6.6*	*-10.7*	*-3.6*	*0.4*	*3.9*	*5.5*	*4.0*	*3.6*	*2.4*	*1.6*	*95*
Armenia	14.2	-7.4	-17.1	-52.6	-14.8	5.4	6.9	5.8	3.1	7.2	4.0	41
Azerbaijan	-4.4	-11.7	-0.7	-22.6	-23.1	-19.7	-11.8	1.3	5.8	10.1	3.7	44
Belarus	8.0	-3.0	-1.2	-9.6	-7.6	-12.6	-10.4	2.8	10.4	8.3	1.5	78
Georgia	-4.8	-12.4	-20.6	-44.8	-25.4	-11.4	2.4	10.5	11.0	2.9	3.0	33
Kazakhstan	-0.4	-0.4	-13.0	-2.9	-9.2	-12.6	-8.2	0.5	2.0	-2.5	-1.7	61
Kyrgyzstan	4.0	3.0	-5.0	-19.0	-16.0	-20.0	-5.4	7.1	9.9	1.8	0.0	60
Moldova	8.5	-2.4	-17.5	-29.1	-1.2	-31.2	-3.0	-8.0	1.3	-8.6	-5.0	32
Russia	na	-4.0	-5.0	-14.5	-8.7	-12.7	-4.1	-3.5	0.8	-4.6	0.0	55
Tajikistan	-2.9	-1.6	-7.1	-29.0	-11.0	-18.9	-12.5	-4.4	1.7	5.3	5.0	42
Turkmenistan	-6.9	2.0	-4.7	-5.3	-10.0	-18.8	-8.2	-8.0	-26.1	4.2	17.0	44
Ukraine	4.0	-3.4	-11.6	-13.7	-14.2	-23.0	-12.2	-10.0	-3.2	-1.7	-2.5	37
Uzbekistan	3.7	1.6	-0.5	-11.1	-2.3	-4.2	-0.9	1.6	2.4	3.3	3.0	90
Commonwealth of Independent States[2]	*0.6*	*-3.7*	*-6.0*	*-14.2*	*-9.3*	*-13.8*	*-5.2*	*-3.5*	*0.9*	*-3.5*	*0.0*	*53*
Central and eastern Europe, the Baltic states and the CIS	**0.3**	**-5.0**	**-8.1**	**-9.5**	**-5.0**	**-6.0**	**-0.5**	**-0.2**	**2.0**	**-1.2**	**0.8**	**65**

Notes:

Data for 1989-97 represent the most recent official estimates of outturns as
reflected in publications from the national authorities, the IMF, the World Bank,
the OECD, PlanEcon and the Institute of International Finance. Data for 1998 are
preliminary actuals, mostly official government estimates. Data for 1999 represent
EBRD projections. Estimates for Bosnia and Herzegovina are only available since
1995 and therefore are not included in this summary table. Data for Bosnia and
Herzegovina are provided in the selected economic indicators at the back of this
Report.

[1] Estimates for real GDP represent weighted averages for Albania, Bulgaria, Croatia,
the Czech Republic, Estonia, FYR Macedonia, Hungary, Latvia, Lithuania, Poland,
Romania, the Slovak Republic and Slovenia. The weights used for the growth rates
were EBRD estimates of nominal dollar-GDP lagged by one year; those used for the
index in the last column were EBRD estimates of GDP converted at PPP US$
exchange rates in 1989.

[2] Here taken to include all countries of the former Soviet Union, except Estonia,
Latvia and Lithuania. Estimates of real GDP represent weighted averages. The
weights used for the growth rates were EBRD estimates of nominal dollar-GDP
lagged by one year; those used for the index in the last column were EBRD
estimates of GDP converted at PPP US$ exchange rates in 1989.

Source: EBRD, *Transition Report*, 1999: 73

CHAPTER 2

CHANGES IN THE PRICE SYSTEM

The operation [i.e. stabilisation of the macroeconomy] will be successful if it ultimately replaces the current arbitrary and, from an economic point of view, irrational price system with a rational market price system, in which prices carry meaningful economic information. (Kornai, 1990: 145)

The transition process is a seamless web. Structural reforms cannot work without a working price system; a working price system cannot be in place without ending excess demand and creating a convertible currency; and a credit squeeze and tight macroeconomic policy cannot be sustained unless prices are realistic, so there is a rational basis for deciding which firms should be allowed to close. (Lipton and Sachs, 1990: 99)

The architects of the transition programmes viewed changes in the price system as central to the project of moving from central planning to a market economy. Changing the price system was seen to be the 'cornerstone' of transition.

The consensus among economists at the start of transition was that the crisis and instability in the centrally planned economies was a direct outcome of an irrational price system, leading in turn to an inefficient allocation of resources and an inability to compete at a world level. Only the ending of the irrational price structure and adoption of competitive criteria for production would accomplish the transformation and stabilisation of these economies. Any 'third way', that is any attempt to combine central planning with more or less competition through partial reforms, could only lead to further distortions and instability according to this model of transition. Years of piecemeal attempts to include more market-orientated behaviour along side the main elements of central planning had been doomed to

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failure. According to this view, the collapse of the Soviet system was an inevitable outcome[1].

This section of my thesis aims to locate the transformation of the price system at the heart of the transition process and to raise questions about its nature. It is the central contention of this thesis that if the price system itself is undergoing fundamental change, then the system of valuation and measurement is radically altered at the same time. Serious dislocations in economic data occur as prices are transformed. Whilst later chapters deal with the effect changes in prices has on economic data, this chapter presents an analysis of the transformation of prices that has taken place in these economies. The central question raised by transition models is how can a 'rational' price system be formed out of an economy developed under central planning? To address this question it is important, firstly, to understand the operation of prices under central planning, for the economies developed under this system form the initial basis for the transition.[2] Later chapters deal with the effects administered prices have on index number formation and the consequences of changes in the price system for the derivation of aggregate estimates of output using the prices as weights.

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[1] The terminology adopted in the literature describing the price systems is heavily loaded. The market economies' prices are 'rational', with imperfections causing 'distortions'. Soviet administered prices are 'irrational', as they do not fit the neoclassical paradigm of competitive criteria according to cost structures. In the following discussion I attempt to stand apart from these terminologies as they involve a particular view concerning rationality that I believe can obstruct an objective analysis of what these prices actually were. Where I refer to rational or distorted prices, I do so only in relation to the way the price systems have been treated by various authors. As I will explain in the following sections, it is my view that the CPEs administered prices operated according to an internal logic aimed at rapid industrialisation and that transition involved shifting to a more market-oriented approach. Also, the Soviet-type economies were non-monetary economies in the sense that money did not determine the allocation of resources and prices played a different role to those of the monetary market economies. Hence, I refer to administered or centrally determined prices for the CPEs price system, transitional prices for the prices of TEs and market economies' prices as market prices. It is my view that this terminology permits a more impartial discussion

[2] The role of reforms to the price system of CPEs is important when discussing the comparative performance of the transition economies. The 'initial conditions' at the start of transition are thought to be an important influence on the economy's subsequent progress. Thus, Hungary is generally thought to have undertaken more reform prior to transition and so had developed more 'efficient' industries than say Romania where the reforms were far less pronounced. However, the extent of the reforms, even in the leading reforming economy, Hungary, is questioned later in this discussion and later chapters also deal with the unevenness within the 'leading' performers too. For although the reforms did allow for more decentralisation of decision-making amongst other changes, the fundamental nature of the Soviet-type system and its pricing mechanism was not altered. For a discussion of the impact of initial conditions on the transition see Kekic (1996) and EBRD, *Transition Report*, (1999).

Secondly, it is necessary to address the changes in prices that actually took place during transition and how the models applied in the former CPEs dealt with the creation of 'rational' prices.

The first question concerns the notion of rational prices - the predominant view that the Soviet-type systems had an inherently irrational price system can be traced back to the debate concerning economic calculation. How the prices of the CPEs are viewed is important today, for it underlies the treatment of these economies during transition. If the CPEs are seen to have operated an 'irrational' price system, then the task of transition is to create a more rational one. The main means to achieve this end in the literature discussed here is to import prices from market economies, jettisoning the previous administered price system as quickly as possible. But does the concept of economic rationality defined by standard neoclassical theory apply to the CPEs price system? If financial viability is used as the main criteria in determining the feasibility of production, then it can be said that the CPEs were irrational. But these economies did not determine production on the basis of financial viability; profitability and cost considerations did not determine production in many cases.[3] The main determinants of production were the priorities set by the central planners, and their express aim was to achieve rapid industrialisation, with emphasis on heavy industrial production. The production criteria of these economies were based on gross output targets, and the objective was to expand the heavy industrial sector using these targets. In the section below where the nature of the price system of the CPEs is discussed I attempt to show how the price system of the CPEs mirrored these growth objectives. Prices in the CPEs were biased in order to meet the objectives of the central planners. Raw materials, energy and many services had low prices when compared to their equivalent world market price, with a higher price for industrial products. If these economies are non-monetary, in the sense that financial considerations did not determine production, can these economies be judged on the basis of financial viability? It is questionable whether a concept of economic rationality based on financial considerations is applicable to the CPEs. Rather, it would be pertinent to ask whether these economies fulfilled the objectives set by their own

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[3] However, attempts at reforming the central planning systems did try to introduce financial criteria, but with limited success. An important constraint on the ability of financial criteria to operate in these systems was the maintenance of the priorities established by central planning.

criteria.[4] If prices were determined by the objective of industrial growth then it is possible say that they did have a rational basis, not only in a political and administrative sense, but in an economic one too.

The importance of this discussion today lies in the very project of transition - how are financial criteria to be introduced into former CPEs? Will the legacy of the previous system affect price determination during transition? It is argued in this chapter that despite the efforts to import a price system from market economies, prices cannot be separated from the real economy. The inheritance from the era of central planning were economies with little market infrastructure or traditions, and serious biases towards the production of industrial, particularly heavy, products. Although the extent of these biases may vary from country to country, what is argued here is that it was a key characteristic of all the former centrally planned economies and so presents itself as a factor for all transition economies. Added are the problems of attaining currency convertibility, with the initial devaluations in the currencies adding to the problems of price determination as inflationary pressures develop. These problems combine to seriously affect prices and the concept is developed in this discussion of a period when transitional prices will be in operation. The transition economies, standing between central planning and the market, will have prices that reflect this intermediate stage. Not only is the initial price setting problematical, but also the process of arbitrage, whereby the equilibrium price will be determined, may not take place as a result of the lack of market structures. Prices mirror the real economy, and the real economy of the transition economies was that developed under central planning, a non-monetary economy with an industrial bias. This raises serious concerns for economic policy and for the validity of price signals in relaying information about the economy.

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[4] It can be argued that the CPEs did not achieve these objectives. Critics of the Soviet systems have long held the view that although industrialisation was the main objective of the central planners, waste and bureaucracy bedeviled their attempts to achieve this aim. See Ticktin (1992), Harman (1974) and Kidron

2.1 Changing the price system – the project of transition

That centrally planned economies can only lead to inefficient, 'distorted' forms of production via the operation of an inherently 'irrational' price system is a view that harks back to the famous debates in the first decades of the last century concerning the problem of economic calculation. It was the view of the Austrian school, as elaborated initially by von Mises, that "Socialism is the abolition of rational economy." (Mises, 1935: 110) The centrally planned economies were incapable of undertaking an economic calculation that could lead to efficient decisions; "Where there is no free market, there is no pricing mechanism; without a pricing mechanism, there is no economic calculation." (Mises, 1935: 111) Socialist economies were unable to assess the achievements of economic changes, "There is only groping in the dark," according to von Mises (1935).

It is interesting that von Mises saw the transition from a competitive economy to a socialist economy as creating such huge dislocations in the economic data that comparison between the periods becomes impossible. It is this point about the inability to make economic calculations in periods of transition, but as regards the transition from 'socialism' to a market economy, (i.e., the other way round) that is a central point in this thesis.

Prices convey the information required by individuals to make 'rational' economic decisions, without them the decision-making process is doomed to merely guesses with the inability to judge the outcome. Hayek (1935) emphasised the importance of von Mises' (1935) analysis in his own essay contributing to the debate on economic calculation,

> The essential point where Professor Mises went far beyond anything done by his predecessors was the detailed demonstration that an economic use of the available resources was only possible if this pricing was applied not only to the final product but also to all the intermediate products and factors of production, and no other process was conceivable which would take in the same way account of all the relevant facts as did the pricing process of the competitive market. (Hayek, 1935: 33)

(1974) as examples of literature that provide a critique of the Soviet planning system from a socialist perspective.

The view that socialism was unable to function efficiently because it lacked a 'rational', market-derived price system became the dominant theory as regards the Eastern European economies as they spiraled into a deep and terminal economic and political crisis at the end of the eighties. Only a market-oriented system based on private property would overcome the distortions created by the CPEs system of production. Many economists now saw the debate over economic calculation as being resolved - von Mises and Hayek had been proven correct. As Leszek Balcerowicz (1995), the economist who helped devise the Polish shock therapy programme in 1990, states in describing the evolution of the transition theory; "Freedom to establish private firms and the privatization of state enterprises are the final product in the whole process, thus fulfilling Mises's ironic prediction." (Balcerowicz, 1995: 48) Although the position of von Mises and Hayek (1935) concerning the irrationality of centrally planned production arising from the absence of 'rational' prices was adopted, this does not to mean that the transition programmes rejected standard neoclassical theory in favour of an Austrian approach. As I aim to show, the formation of prices during transition was based on the paradigm of the Walrasian general equilibrium model. Economists such as Janos Kornai and Leszek Balcerowicz, who inspired the original transition programmes, may have taken the concept of the irrationality of Soviet prices from von Mises and von Hayek, (Kornai even entitled his book on transition *The Road to Freedom*, 1990*)*, but the actual project of forming rational prices from the ruins of central planning was distinctly neo-classical. What was rejected outright in the transition models was the idea that these economies could be reformed, that a form of market socialism was possible, or even desirable.

Oscar Lange's (1936) response to von Mises in the economic calculation debate concerned the role of the central planner as the Walrasian price auctioneer. By trial and error competitive prices could be established that simulated a market system whilst retaining central planning. Alongside the depiction of the socialist project as irrational and the claim

that its demise was inevitable was the notion that reforming central planned economies would only prolong the agony. Oscar Lange's argument that there could be elements of a competitive economy combined with central planning, a theory that underpinned the reform attempts in the centrally planned economies since the sixties, was rejected in the move to transition[5]. There was to be no 'third way'; only a wholesale shift to the market economy could resolve the problems of inefficiency in central planning. Central to this shift in the economy is the creation of 'rational prices'.

Thus, changing the price system lies at the very heart of the transition process. There had to be a fundamental shift from centrally determined, 'irrational' prices to market determined ones. This transition model,[6] applied across the former Soviet economies, involved the adoption of rational prices with the express aim of eradicating the serious disequilibria's caused by years of central planning and the creation of more efficient, competitive production.

What has been the effect of transition on prices? What can the price indices indicate about the changing price system for the period?

The table in Appendix 2.1 below shows the percentage changes in the consumer price indices for Romania, Hungary and Poland. There are three distinct features from the inflation

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[5] Leszek Balcerowicz (1995) rejects the notion that the CPEs embraced the Lange model. He states that; "...these schemes [i.e. the Lange model of price guidance under central planning] have never been adopted by the economists in the socialist countries as the basis for their reform proposals." (Balcerowicz, 1995: 45) However this rather literal interpretation of the role of Lange's model in the reforms ignores the influence Lange had on the belief that the CPEs were reformable and that the main thrust of the reforms should be in the direction of making prices more competitive whilst including more elements of decentralised decision-making. As Peter Murrell (1990) puts it when commenting on the seminal study by Berliner on these economies; "...this use of Lange is consistent with much of the literature on the socialist economies, which explicitly or implicitly uses the market-socialist model to identify the possibilities for improvement in the working arrangement of socialism." (Murrell, 1990: 9) This identification of the role of the Lange model in reform ideology explains in part the rejection of the Lange model today.
[6] I refer to the transition model in this discussion, for without ignoring the debates that occured over the sequencing and timing of reforms and the different approaches to individual policy initiatives in differing countries, a general model of transition has been adopted across the region. This general model embraces a view of the end-point of transition, functioning market economies, and that the means to achieve this end was via the creation of competitive criteria, namely competitive prices, private property and the institutions that ensure functioning markets. Whilst views differ over the particular western model to adopt and what the correct order and timing of policies should be, with some countries pursuing the shift to a market economy more rapidly than others, all share the fundamental goals and main tenets of transition.

data. First, the seventies was a period of relative price stability in all three economies, despite the rapid inflation experienced in the Western economies. Second, open inflation began to emerge in Poland in the early eighties, then rose dramatically in the late eighties and spiraled into hyperinflation at the onset of transition. In Romania and Hungary serious inflationary pressures really only emerged in the nineties, although a build-up was apparent in Hungary in the late eighties. There have been uneven inflationary pressures in the three economies; whilst inflation reached 256% in Romania in 1993, Hungary only experienced a peak of 35% annual average inflation in 1991. Third, inflation has remained persistently high, i.e. in double digits, in all three economies during the first five years of transition.

The changes in consumer price indices show that central planning was characterised by stable prices, but that inflationary pressures were a symptom of the growing crisis in the CPEs during the eighties[7]. Transition has involved sharp and persistent rises in inflation. What the price indices do not reveal is the fundamental changes in the nature of prices over the period. To analyse the transformation of the price system itself it is important to look beneath the price indices. There has been a radical alteration in relative prices in all these countries, but also a fundamental change in the very process of determination of prices. The following discussion will analyse the changing nature of prices from central planning to transition.

2.2 Price determination in centrally planned economies

The following account is by no means an exhaustive discussion of the pricing system under centrally planned economies. What is intended is an outline of the main features of the classical Soviet-type price system and how the reforms prior to transition affected price determination. The individual countries that are the focus of the thesis are discussed, but the main purpose of this section is to develop a general understanding of the operation of the price system in the Soviet-type economies. The idea is developed that the performance of the pricing system within the centrally planned economies was determined by the pursuit of

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[7] The inability of price indices to represent the actual inflationary pressures in Soviet-type economies has been well documented. Nuti (1986) discussed the problems of measuring price inflation, referring to 'repressed' and 'hidden' inflation in these countries.

rapid industrialisation in these economies, particularly in heavy industry. The price system was a direct outcome of the priorities set by the central planners. Another feature of the pricing system in the CPEs was its relatively autarkic character; the separation of domestic from world market prices is discussed along with the complex multiple exchange rate regimes.

The bias towards heavy industrial production created excess demand for consumer goods, and to offset the build-up of consumer demand, the black/grey market played an increasingly important role. The discussion in this section attempts to look at these economies as a whole, and to see how their inter-relationships are reflected in the pricing system. The view offered here is that the official pricing system can only be understood by looking at the nature of growth pursued in these economies. Also, that the black market has to be looked at in relation to state prices and the role it fulfills in plugging the gap in the official system. These are all pieces of a jigsaw, but they must be fitted together to see the overall picture.

2.2.1 The classical Soviet price system

As stated earlier, there is general agreement in the literature that the Soviet type system of price determination led to the creation of distorted prices.[8] The key feature of the pricing system in the classical Soviet economy was of hierarchical determination under the auspices of a central price office, although the actual form of this organisation differed between countries. Thus, "Pricing then becomes the province of a vast, multilevel, hierarchical apparatus." (Kornai, 1992: 149) Another characteristic of many prices was their stability over time; "In the enterprise sector the lengthy time period between price adjustments

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[8] Distorted prices are not unique to Soviet type economies, market economies, including the industrial ones, have varying degrees of distortions in their price system. The European agricultural pricing system is a case in point whereby prices are supported at a high level. There is also considerable literature on market failures where information is imperfect and asymmetric and the resulting prices will not be market clearing ones. Add to these points are the role of monopolies in pricing in market economies, and it can be argued that the market economies are far from the perfectly competitive model advanced by the neoclassical school. However, we are not measuring degrees of distortion when comparing market and Soviet prices. Price setting in the Soviet economies was determined by central planners or enterprise managers. Prices did not play the main role in determining the allocation of resources - they were non-monetary economies in this sense. To call Soviet type economies' prices 'distorted' suggests that they could be something else, i.e. market clearing, given a change in circumstances.

facilitates plan construction and helps in the monitoring of plan implementation; in the consumer sector it also helps to avoid inflation." (Marer *et al*, 1985: 121) The stability in price setting explains the relative constancy of consumer price indices in the seventies shown in Appendix 2.1 below.

One of the guiding principles for the determination of industrial wholesale prices was a 'cost-plus' formula. However, this was further complicated by the low prices (relative to world market prices) of essential inputs into industry. "Traditionally CPEs are characterized by relatively low prices of energy, raw materials, and spare parts." (Marer *et al*, 1985: 121)

The role of cheap energy inputs into industries was a vital link in the relationship between the former USSR and the eastern European economies and provided a key impetus to the whole process of industrialisation undertaken in these economies. The study by Marrese and Vanous (1983) indicates that the USSR was 'subsidising' east European economies when the relative price of Soviet oil in terms of eastern European machinery is compared to the world price of oil relative to Western machinery. Gros and Steinherr (1995) claim that the world market price for energy was 150 per cent above the domestic price of the former Soviet Union. (Gros and Steinherr, 1995: 118) This indicates that the price was significantly lower than the world market price even after the demise of the Soviet Union.

The price system within the CMEA system contained an inherent bias towards industrial products, with cheap raw materials and energy products being supplied. This bias was not just limited to CMEA trade, but was true of domestic pricing within the Soviet-type economies as well. As Paul Marer *et al*, in a World Bank study notes with regard to pricing practices in one of the most 'liberal' economy of the region – Hungary, "A very important feature of the Hungarian price system is that the price levels of services, agricultural commodities, and consumer goods are relatively low and industrial products are relatively high." (Marer *et al*, 1985:147)

This slant towards industrial products within the pricing system replicates the bias within the development process mapped out by the central planners themselves. Soviet industrialisation emphasised the growth of heavy industry at the expense of light industry and agriculture. Stalin argued that, "industrialization is understood above all as development

of heavy industry, especially machine building." (quoted in R. Bidelux, 1985: 117) This bias within the Soviet-type economies has been well documented and I do not intend to repeat all the studies on this issue here. What is important, however, is the relationship between Soviet prices and development. The pricing system mirrored the bias towards heavy industry and provided the basis on which extensive growth could be pursued.[9] There is an interrelationship between the dynamic of growth pursued in the Soviet-type economies and its price system; cheap raw materials, labour and energy provided the basis for extensive growth and its bias to heavy industry.

This relationship mirrors itself in the relative prices. However, it was not just 'heavy' industrial prices that were priced relatively highly to that of consumer goods etc. This depiction of the Soviet system of relative price bias generally overlooks the high relative price of certain consumer goods, such as cars and personal computers. Commenting on the Soviet computer industry, Martin Walker, the *Guardian* newspaper's correspondent in Moscow for fifty years, notes that, "The Soviet computer industry was still unable to mass-produce its own [personal computers]...The Agat [the Soviet's first microcomputer] cost almost 4000 roubles, or $5200 at the official exchange rate, about ten times the cost of a comparable machine in the West." (Walker, 1986: 61) A further example of a high-priced consumer durable is that of cars,

> In the Soviet Union, where house purchase is less common, buying a car is the biggest single financial outlay the average Soviet family will ever make. Car prices are kept artificially high on the home market, but still supplies do not begin to meet the growing demand. The cheapest car, the obsolete and questionably safe Zaparozhet, costs some 3500 roubles, or eighteen months of average wages. It is understandably unpopular. The most common private car, the Fiat-based Zhiguli (known in the west as the Lada), costs just under 10,000 roubles, or four years of average earnings.(Walker, 1986: 75)

These examples are for the Soviet Union, but can readily be extended to the relative prices of cars and computers in Eastern Europe, where buying a *Skoda* or *Trabant* was equally

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[9] By 'extensive growth' is meant the pattern of growth whereby more and more inputs are utilised. The definition is given as, "'Extensive growth' refers to the accumulation of the factors of production (labour, capital and land) and 'intensive growth' to increases in productivity of production factors." (Gros and Steinherr, 1995; 61)This growth has been the subject of many studies, Gomulka (1986), Bergson (1989) and Ofer (1987) to name but a few.

costly for the average household. Thus, the bias in relative prices is complex, with certain consumer durables being priced very highly. When the change in relative prices and its effect on index number bias during transition is discussed in the following chapters, the significance of this skewing of prices towards industrial products is examined.

Another feature of Soviet prices was a 'myriad' of subsidies throughout all stages of production. The government's use of extensive subsidies and taxes on prices further weighted the bias outlined above and divorced the final price of a product from its cost. As regards Hungary, "Computations carried out just before the New Economic Mechanism was introduced revealed that there were unusually large and economically unjustified differences between the structure of consumer prices and the structure of costs of producing those goods." (Marer *et al*, 1985: 149)[10] Subsidies and taxes were prolific throughout the economies, including foreign trade, which further separated domestic and foreign prices.

Labour was 'subsidised' by cheap, or even free, services such as housing, health care, kindergartens. As Paul Marer notes, "Educational and health services (their expansion is often cited as one of the most impressive achievements of CPEs) are typically offered free or at highly subsidised prices. This phenomenon in turn is a factor in the relatively low wages and salaries typical in CPEs." (Marer *et al*, 1985: 122) These cheap or free services under CPE will be important in the discussion of changes in the service sector during transition. For present purposes it is important to note that CPEs were characterised by low prices in the service sector. Thus, the World Bank's *International Comparison Project* found that, "...services are extremely low priced in the CPEs; only the poorest of all countries included in the project (such as India, Kenya, Pakistan, and Thailand) have services that are priced relatively low as in the CPEs, in part because in the CPEs more services are provided free." (quoted in Marer *et al*, 1985: 132)

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[10] In a study of the distributional impact of price changes during transition in Hungary, David Newbery (1995) suggests that the system of taxes and subsidies on consumer goods effective during central planning had a distributional rationale aimed at shifting wealth towards the poor. However, his analysis goes on to show that removing subsidies at the start of transition had little redistributive effect, which he suggests is a result of Hungary having already abandoned the indirect tax system as a mechanism for redistribution in the early eighties. The system had instead become "...more concerned to retain the political support of the majority of middle income earners, and to support the ailing state enterprises via subsidies while taxing the more profitable enterprises, as the economic situation deteriorated." (Newbery, 1995: 862)

The retail prices facing consumers were far from market-clearing prices. "The price setting [for consumer goods] is more strictly centralised than it is for most producer prices, since it rightly counts as far more of a political matter." (Kornai, 1992: 153) Retail prices also differed from the structure of costs by a complex system of turnover taxes and subsidies.

Although the reforms in the Soviet-type economies, aimed at enhancing the efficiency of production, did make some corrections in the bias of the pricing system, they did not overcome the basic pricing practices which led to a vast system of subsidisation of inputs into industry, resulting in higher prices for industrial goods. If anything, this pattern became more accentuated in the eighties as industrial output slowed and the CPEs felt the effects of shocks such as the oil price shock, albeit delayed. To maintain the system of pricing where many consumer goods and industrial inputs were held at relatively low prices, the CPEs had to expand the system of subsidisation, placing extremely heavy burdens to the economy in the process. Whilst the mounting pressures are shown to some extent in the official consumer price indices, (accounting for the rising inflationary pressures witnessed in the eighties especially in the case of Poland) the use of subsidies and official price indexing techniques meant that the growing pressures on prices were not fully captured by the indices. Repressed inflation became a growing problem for the CPEs in the eighties. (see Nuti, 1986 for a full discussion of repressed and hidden inflation on price indices).

2.2.2 Linkage between foreign and domestic prices

One of the main features of Soviet trade and exchange rate regimes were that they operated to insulate domestic prices from world market prices through the state monopoly of foreign trade. The plethora of exchange rates, the complexities of taxation, the subsidisation of foreign trade and strict state controls, all resulted in currencies that were both inconvertible and misaligned with respect to convertible currencies. In this section I will briefly outline the exchange rate regimes and their affect on the relation between domestic and foreign prices. In later chapters, notably the chapters on GDP estimates and services, I will develop further

the relationship between purchasing power parities and the affects of distortions from exchange rate conversions on measurement.

Domestic prices were effectively insulated from world market prices by the operation of two functions of the state monopoly of foreign trade. 'Foreign trade price equalisation' ensured that the Ministry of Foreign Trade (FTO) would sell an imported product at its equivalent domestic price to the domestic user, and that exports would be sold by enterprises to the FTO at domestic prices. The FTO would then sell exports in foreign currency, any difference between the domestic and foreign prices being accounted for in the state budget. The other function was the complex system of taxes and subsidies that operated in foreign trade.

The exchange rate regimes themselves operated under a system of multiple exchange rates, including official rates, internal rates, black market rates, tourist rates, commercial rates and a variety of conversion rates for intra-CMEA trade. The system of official exchange rates used to convert into dollar values were often arbitrary, "...the official exchange rates of CPEs became, and still remain, arbitrary, notional values with little economic content or practical significance." (Marer *et al*, 1985: 29) Table A.2.4 in the accompanying appendix illustrates the deviation between the tourist (non-commercial) rate and the commercial exchange rate. The official exchange rate from 1985 onwards is presented in table A.2.3.

CMEA trade was conducted via the 'transferable ruble' (TR) but the various conversion rates in convertible currencies and national currencies expressed in terms of TRs did not match - the various cross rates for conversion were highly inconsistent. Thus, in the case of the Forint, the Forint/dollar cross rate was inconsistent with the Forint cross rate from the TR conversion into dollars. Marer *et al* noted (1985) that the Forint/dollar rate tended to be 'high' because of the low prices of convertible good exports, whereas the Forint/TR rate was 'low' due to the high price of exports within the CMEA. (Marer *et al*, 1985: 54), thereby forming another mechanism through which the USSR subsidised Eastern Europe. The difficulty of obtaining consistent cross rates raises major problems for the measurement of trade flows and for GDP conversion as a whole.

The reforms attempted to simplify the complexity of the exchange regimes, with steps taken to unify the exchange rates. In Hungary, for example, the commercial rate and tourist rate

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was merged in 1981, and used as the basis for conversion into convertible currencies. Yet, the unified rate was still based on the foreign trade multiplier (FTM) developed in 1968. Marer *et al* (1985) concluded that although the Hungarian system in 1985 was meant to have the strongest linkage between domestic and foreign prices of all the CPEs, there was still a large discrepancy between the FTM and the PPP, creating serious problems for meaningful conversions into convertible currencies. In Poland, a unified exchange rate for the Zloty/dollar was introduced in 1982, but this did not apply to raw materials and certain intermediate goods. The value of this rate was seen as a political compromise, indicating the arbitrariness of the exchange rates.

The exchange rate regimes reinforced the bias within the CPEs and despite attempts at reform were resistant to fundamental change. This provided a challenge for policy-makers during transition; what exchange rate regime should be adopted and at what rate? Introducing a convertible currency at the start of the transition arose from the arbitrary and autarchic nature of the previous regimes.

2.2.3 Black market prices

In his seminal paper on inflation in CPEs and the problems of measuring it, Mario Nuti identifies the CPEs as "two-tier economies". (Nuti, 1986) On the one hand, there was the official segment of the economy, directly controlled by the central planning authorities, with their priorities determining production and the prices meeting these goals. However, these priorities gave rise to increasing shortfalls in the consumer sector and strained the capacity of the intermediate sectors to meet the requirements of the expanding industrial sector. As shortages in the official sector mounted, and to meet the shortfall in the consumer sector arising from the bias to industrial production, the informal sector became increasingly important. Hence, the development of the unofficial economy as the second tier of the CPEs[11].

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[11] Hewitt (1988) in his analysis of the Soviet economy also distinguishes between two differing, but complementary, aspects of the economy. He identified the division in the economy between how "it was designed to operate" and the "*de facto*" system; the official, planned economy requiring an increasing informal sector to avoid bottlenecks and shortages.

Integral to the analysis of the CPEs as two-tier economies is an understanding of the complementary nature of the relationship between these parts. The existence of a black or semi-legal market, in consumer goods took some of the pressure off the demand for high quality consumer products, a demand that arose from the state's official sector supplying cheap, low-quality consumer goods. The role of barter and illegal/semi-legal practices by enterprise managers to acquire additional inputs again prevented some of the bottlenecks to production arising from the official, rationed system.

This analysis of the second market has important consequences for how one should view the prices derived in that market[12]. Some studies (Nuti refers to Culbertson and Amacher's (1972) estimates of the 'true' inflation rate in STEs equate the black market price with an equilibrium price suggesting that the black market price should be seen as the 'true' price of a good/service determined by the 'free' market. But Mario Nuti argues, "...no black market price in a two-tier market black/white market can be regarded as an equilibrium price; it is usually higher than the equilibrium price but not necessarily by the same proportion at different times" (Nuti, 1986: 52)

The importance of the analysis of the secondary market for the present discussion arises from attempts to measure the secondary economy both pre- and post- transition. If we do not know the size of the secondary economy prior to transition how can we know the extent of its growth during transition? How can the essential and complex relationship between the official and secondary economies (a relationship that is distinct from the price system) be captured using prices to measure the value of production?[13] The problem of measuring this sector both prior to and during transition is taken up in more detail in chapter 4 of this

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[12] This analysis also has important consequences for the notion of a shortage economy with a build-up of excess demand in the consumer sector as characteristic of the crisis inflicting these economies. As Nuti points out, "Consumers are indeed quantity-rationed in the state sector but they are not subject individually to overall quantity constraints since they can always spend their money in the secondary economy." (Nuti, 1986: 69) As the project of shock therapy concerned the eradication of what was seen to be a crisis of excess demand, Nuti's contribution concerning the role of the secondary economy suggests the problem is much more complex than indicated by much of the literature concerning macroeconomic stablisation in former centrally planned economies.

[13] The danger in using an analysis based on market theories is that the results of any study would be misleading, as it would ignore vital aspects of the functioning of the economy. Free services would be omitted; the value of a product would be either unattainable or deceptive if the product was not produced on the basis of competitive prices; the role of the secondary, especially the illegal, economy would be misrepresented.

thesis. Another matter arising from the secondary economy is the role of black market prices in the determination of so-called equilibrium prices during transition. Should these prices be used as an indicator of a 'free' market price and so used for initial price determination in transition? Mario Nuti's analysis of black market prices would suggest not.

2.2.4 Changes to the price system during the reforms of the eighties

> There followed, throughout the area, three distinct periods;...a period of falling prices from the time of stabilisation roughly to the late 1950s; a period of remarkable price stability until after the first oil shock and often well beyond it into the late 1970s (thanks to the delayed impact of oil price rises within the CMEA trade, the initial absorption of imported inflation through state budget subsidies, and the rise of external borrowing); and a period of open inflation, fueled by the gradual diffusion of oil price rises, the mounting cost of price subsidies, the slowdown and occasional fall of external finance and the rising pressure of wages. (Nuti, 1986: 45)

Here Mario Nuti identifies the problems in the price system, including open inflation, with the slowdown and crisis of the CPEs that started in the late seventies and continued unabated into the period of the eighties. Countries differed in both their responses to the growing problems in their economies and in their experience of the price instability. However, with the possible exception of Ceausescu's iron rule in Romania, a common feature of all the economies was an attempt to reform the planning system with an orientation towards exporting to Western markets. The aim was to improve efficiency; the hope being to reverse the slowdown in growth and overcome mounting disparities in production that was leading to severe bottlenecks and shortages. One aspect of these reforms was to try to develop competitive forces in pricing policies. A decentralisation of pricing was the express aim in many of the economies.

Hungary was widely considered to be the most advanced reformer. As a consequence, this section concentrates on the changes that took place in Hungary. The 1968 New Economic Mechanism abolished compulsory plan targets for enterprises and ordered that costs be more fully accounted for in pricing procedures. In 1980 a new price system was introduced with

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four main rules for price setting; import-based, export-based, which together were classified as 'competitive prices', proportional; and cost-plus. (Marer *et al*, 1985: 144) These rules reflect the growing importance of trade with the West; two categories, the import-based and export-based prices, are seen as a more competitive system of pricing. Regarding import-based pricing, Marer *et al* state that, "Because actual import competition is limited, however, and the hypothetical world market price for Hungarian manufactures is difficult to establish, domestic prices of manufactures are *de facto* determined by one of the subsequent price rules." (Marer *et al*, 1985: 145) The export-based pricing that was meant to simulate competitive pricing was limited in practice, "Simulating foreign competition, however, is very difficult and results in a great deal of bargaining between enterprises and the authorities about the implementation of the complex cost and pricing rules." (Marer *et al*, 1985: 146) Added to this, the trade westwards was not immune to CMEA trade, through the importation of low priced raw materials and energy from the USSR essential to the production of industrial products comparative advantages could be manipulated. Thus, Western trade and their corresponding export prices were influenced by the domestic and CMEA system. In 1988 and 1989, further attempts to liberalise the pricing system took place, especially in the consumer sector, and prices were classified according to state prices or regulated prices which were officially referred to as 'free' prices.

Wim Swann (1991) studied the pricing system in Hungary during the reforms of the eighties and into the transition period itself. His study focused on the manufacturing sector and it shows the level of direct intervention in price determination for the various branches of production in 1989. What is clear from Swann's study is that despite reforms to liberalise price setting, total direct intervention in price determination was still a dominant feature of the Hungarian economy up until 1989. This is particularly true of the first stage of production. As Wim Swann states,

> Previously [i.e. up until 1989] the dominant principle was that prices should be determined directly by the authorities in at least one stage of the production process, either at the start (producer prices of raw materials) or at the final stage (consumer prices). In other stages it was then sufficient to control prices by the various

regulations...This appeared to be an important regulatory innovation, which increased the efficiency of official effort as compared with the orthodox system of having most prices directly determined by the authorities. *It did not, however, really decrease the role of the authorities in setting prices.* (Swann, 1991: 511- my emphasis)

Thus, the reforms of the price system that were hailed as increasing liberalisation throughout the eighties meant in reality that, "The actual practice of price consultations did not imply any essential deviation from the system of indirect bureaucratic control as it developed from 1968." (Swann, 1991: 518) By direct or indirect intervention in the price setting of the first or final stage of production, the state was able to retain its overall influence on prices in Hungary right up until the period of transition. This had important consequences for the conditions existing at the starting point of transition. Even in one of the most liberal of the CPEs, bureaucratically determined prices were dominant. The pervasiveness of the central planning system of prices despite numerous attempts at reforms in eastern European economies created a challenge to the theorists of transition - how can a new price system be created?

2.2.5 Summary – The nature of prices in the CPEs

The discussion in this section has pointed to the bias in the CPEs towards the industrial sector and its consequences for the price system. In order to advance the heavy industrial and military sectors of the economy the pricing policies pursued by the central planning authorities followed a pattern of charging low prices for inputs into industry with a higher price for industrial products. Nowhere can this be seen more clearly than in the case of energy products where the domestic USSR and intra-CMEA price was far lower than the world market price. This pricing policy was in line with the extensive growth pattern, whereby industry pulls in more and more inputs in order to expand output of final products.

Prices of goods and services played a secondary role under socialism. For consumers, prices were set to penalize certain purchases and subsidise others. The subsidized elements included household essentials, for which queues and rations

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were used to hold demand to available supply. Among firms, prices were rigged to stimulate certain lines of investment. Both enterprises and households were provided energy cheaply in comparison with international standards. (Amsden, Kochanowicz and Taylor, 1994: 20)

The consequence for the consumer sector of the bias to heavy industry by the central planning authorities was that the light industrial sector tended to produce cheap, but low-quality consumer products, but production was often erratic as enterprises were frequently faced with a shortage of inputs. Mounting shortages and bottlenecks accompanied the slowdown in growth. This was compounded by the very high prices charged for certain consumer products, the examples presented here was for cars and computers. Open inflation and rising subsidisation of production became rife in the eighties. To fill the gap in the consumer sector, the secondary economy played an increasingly prominent role. An informal economy also developed to counteract the growing shortages of inputs into enterprises, with enterprises taking part in legal or even illegal dealings to attain essential goods.

If the Soviet-type system of pricing is to be judged by neoclassical criteria, then it certainly was irrational, in the sense that the costs of production exceeded prices in many cases. However, if the pricing system's rationale is seen as fulfilling an end, an objective determined by the central planners, then there is a case to be made that the price system had an economic reasoning. The objective set by the authorities was for rapid industrialisation; prices were set to achieve this end. However, it is arguable whether the system did actually fulfill this purpose.[14] Also questions arise as to whether this rationale fits the entire period of Soviet-style central planning; what may have been appropriate in the initial phase of industrialisation may not suit later stages, adding to the growing crisis.

What has been developed in this discussion is the notion that there was logic to the pricing system of CPEs, a logic that cannot be captured by either the neo-classical or Austrian schools' definition of pricing. This rationale can only be understood in relation to the economy as a whole. Only when we address the nature of growth as the pursuit of rapid

industrialisation, along with the objectives set by the central planners, does the pricing system make some sort of economic sense. However, it must be added that such policy can, and did, lead to a crisis of underproduction in the consumer sectors and the growth of a *de facto* economy. But are these symptoms of a growing crisis in an economy equivalent to signals of irrationality?[15] By dismissing these economies as inherently irrational the underlying dynamics of production and pricing procedures in CPEs is overlooked.

Why is this important? Surely the CPEs have been demonstrated by actual events to be inefficient and doomed to failure? Transition aims to develop 'rational' systems out of the ruins of central planning. The importance of how the nature of the pricing system in CPEs is assessed lies in its relationship to the development of the Soviet-type economies, for it is these economies that were the starting point for transition. How is a price system to be created on the foundations of economies developed by Stalinist methods of industrialisation? The following discussion attempts to provide an indication of how this question was answered in the theory of transition.

2.3 Creating a rational price system during transition

2.3.1 Forming rational prices

Price liberalisation was central for the transition from the CPEs to functioning, market economies. The acceptance of the project to establish price systems based on world market prices was so universal that little debate or analysis of the mechanisms and meaning of changes in relative prices, or changes to the price system as a whole, has taken place. The literature on the development of a pricing system out of the ruins of the CPEs is sparse.[16] As

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[14] Critics of the Soviet system have pointed to the inability of the state-controlled system to achieve industrialisation. Ticktin (1992) argued that the waste production characterised Soviet production, with a massive diversion of resources into repair and maintenance of equipment.

[15] If economic crisis is the main justification for defining an economy as irrational, then most of the economies this century should be defined as illogical.

[16] Debates have occurred concerning the speed and sequencing of the reforms. McKinnon (1991) raises questions concerning the liberalisation of foreign trade and the possible consequences for industries deemed to be producing negative value-added. Others have raised questions over the advisability of rapid liberalisation of prices in conditions of monopoly production and the advisability of sequencing the reforms. (Swann, 1991); (Newberry 1991). Overall, the consensus is that the end project, the creation of rational

their textbook on transition economics by Gros and Steinherr states at the start of the chapter on "Price Liberalisation";

> " *Price liberalisation is the cornerstone of all internal reforms*, and there is broad consensus on this point. Only market-determined prices send out the scarcity signals that enable a market economy to work properly. This is now so much taken for granted that there is no longer any serious discussion about this issue." (Gros and Steinherr, 1995: 113 - my emphasis)

Most authors on transition are content to state that prices should be liberalised. In his paper, *Understanding Shock Therapy* (1994), Professor Jeffrey Sachs lists the first of six core institutions of a market economy to be, "A monetary system based on a stable, convertible currency." (Sachs, 1994: 17) To meet this end, Sachs nominates price liberalisation, along with external liberalisation, as the starting point of the 'comprehensive reforms' seen by him as a 'seamless web'. Thus;

> Currency stabilization, price decontrol, and international convertibility take precedence, and are to be achieved at the very start of reforms. This is for economic reasons (even a rudimentary division of labor in market economy requires a working currency and prices set by supply and demand), and for political reasons (high inflation is so demoralizing that it puts the rest of social stability in question) (Sachs, 1994: 29)

Price liberalisation, according to Sachs, should come at the start of transition, proceeding even restructuring and privatisation. A functioning price system was key to determining the subsequent changes to the 'real' economy that would ensure efficient production following changes in relative prices. Sachs assumes that once prices are decontrolled the market infrastructure[17] necessary to establish equilibrium via demand and supply is already in place.

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prices, is not in doubt. These authors raise few questions about the ends of transition, which is assumed to be a functioning market economy, only the means.

[17] Market infrastructure includes not only the physical infrastructure that enables products to be exchanged, such as transport structures, but also the co-ordination mechanisms by which agents in the market, i.e. consumers, managers etc., can both receive price signals and have the ability (including behavioural) to respond. The Soviet system did not develop these channels for market forces, as production was not determined by monetary considerations. Developing the key institutions and infrastructure necessary for the operation of the market is an important aspect of the transition itself. A discussion of the literature on the development of market institutions will be included later in this chapter.

How are equilibrium prices to be established in former CPEs? I shall start by examining the texts that were essential 'guides' to transition, playing a key role in influencing the proposals for economic policies at the start of transition by Janos Kornai (1990), Jeffrey Sachs and David Lipton (1990).[18]

Firstly, prices must be deregulated. If state intervention was the cause of the 'irrationality' of the previous systems, then this should be the first point of departure from central planning. Allowing markets to determine the prices for goods and services, unfettered of the state's intervention, was essential to the creation of prices that reflected scarcity values and consumer preferences. Thus, "Prices should be deregulated quickly, in parallel with the macroeconomic austerity program, because the proper relative prices are crucial for all the necessary resource reallocations." (Lipton and Sachs, 1990: 100)

But, this still leaves open the question of what initial price should be set. If prices are suddenly made 'free', what should be their initial price level?

Janós Kornai in his seminal book, *The Road to A Free Economy*, (1990) does address the question of how a rational price system should be formed. He acknowledges the problem of determining the level of the initial price at the start of transition, especially as regards the existing state sector. The solution he proposed for Hungary was to 'import' a price system from market trading partners using the exchange rate to convert domestic prices following decontrol.

> ...there should be no dramatic difference between the foreign and domestic price systems - i.e. the price ratio of various products, for instance electrical appliances in Vienna and Budapest, of meat in eastern Austria and western Hungary, or of cars in Munich and Budapest. (Kornai, 1990: 148)

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[18] Primarily I focus on the various works of Janos Kornai (1990), Jeffrey Sachs (1994), and the paper presented by both Jeffrey Sachs and David Lipton, (1990) *Creating a Market economy: The Case of Poland*. The reason I have concentrated on these authors, even though others have discussed this problem (albeit rather sparsely), is that they have been specific in addressing the problem of creating a rational price system,

The initial price setting for Hungary's state sector was to be based on the foreign prices of matching products as these were deemed to be market determined prices;

> ...now the basis for price formation should be the relative prices of contemporary capitalism rather than Hungarian prices of the past. For example, the firms could take present-day Austrian or West German prices as their starting point...these Austrian and West German prices are at least genuine prices."(Kornai, 1990: 149)

The basis for the initial price determination was to 'import' a price system from the West, which should be one of the main trading partners, for example West Germany. Foreign competition was a key component in the formation of the new price systems in the former CPEs. The price structures of the western trade partners were seen as more closely fitting a rational system, so these prices should be adopted. As the prices of the previous centrally planned regimes that were seen to be 'irrational', and the cause of the economies' ills, they should be jettisoned. The new, rational price structure was, at least in theory, to be a market oriented one, using price signals from international competition.

However, there was still the problem that the 'real' economies developed by the methods of central planning were both highly monopolistic and biased to heavy industry. There was a danger that the monopolistic structure of the economy would influence the price system. To overcome this foreign competition was seen as the means by which the monopolistic structure of the former CPEs would be opened-up to competition. From their seminal paper on *Creating A market Economy in Eastern Europe: The Case Of Poland*, David Lipton and Jeffrey Sachs (1990) suggest that;

> Free trade instantly brings to bear on domestic firms the competition of the rest of the world. Even if the domestic production structure is highly concentrated when viewed internally, markets may be highly competitive if foreign producers are allowed to import without restriction. (Lipton and Sachs, 1990: 101)

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and because their texts were so influential to the development of economic policies for the transition, the authors acting as advisors to governments at various times.

Hence, foreign competition and the importation of foreign prices were seen as the key competitive mechanism in creating market economies in the former CPEs. Initial prices were to be based on their foreign counterparts, and foreign trade used to create competitive pressures.

Janós Kornai's (1990) model for creating a rational price system is suggestive of the Walrasian general equilibrium model, only here the price auctioneer is replaced by foreign prices[19]. The first step in attaining prices that eliminate excess demands was the initial price setting that had to be established. Only once the initial price has been determined can the forces of demand and supply operate to create general equilibrium free of excess demand. With foreign prices taking the place of the price auctioneer, Kornai recommends that,

> ...starting out from the following calculation: At what price could a particular product be sold or bought in Austria or in West Germany? This price should be converted into forints using the exchange rate effective at the moment of the operation...The result would be the domestic price with which the state seller enters the market at the start of the operation. (Kornai, 1990: 149)

Kornai also pointed out the importance of the private sector in establishing initial relative prices, which in turn could be used by the state sector to determine its own price level. Overall, Kornai's model for determining relative prices in Hungary was composed of; "Foreign prices and domestic private market prices might provide orientation in determining the relative prices of various products and services." (Kornai, 1990: 150)

But the previous economies system of pricing, and even their very products, was so far divorced from the world market system that there was a high probability that the initial

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[19] Kregel (1994) points out in his paper on the transition that; "The basic problem which has occupied economic theory for the past half century is to determine the minimum conditions necessary for the existence of a set of prices which provide equilibrium in the sense that there is no excess demand for any single good and there is no alternative combination of exchange which would be preferable to the participants in the exchange process." (Kregel, 1994: 124) He goes on to equate this problem with the Walrasian general equilibrium model; "The initial fundamental problem goes back to Walras, who modeled his solution on the process of price determination on the Paris Bourse." (Kregel, 1994: 124)

prices would be conjecture. Kornai acknowledges that these initial prices may just be guesses,

> But even if there are guiding posts assisting the firm in determining its price, when it finally enters the market - brought to life by the operation - it is to some degree forced to make a leap in the dark in picking its initial price. (Kornai, 1990: 150 and 151)

According to the Walrasian model, after the initial price is determined, the forces of supply and demand eradicate any excess demand or supply. The equilibrium price is then established; "What happens then [i.e. after the initial price is chosen] should be determined by the free play of demand and supply." (Kornai, 1990: 151) But what is still unanswered is where the channels for supply and demand originate from in former CPEs. This model assumes that the infrastructure and institutions vital to market coordination was in place at the start of transition. If the initial prices were 'guiding posts', with a significant probability of being misleading, the role of market forces in correcting prices is essential for attaining equilibrium prices. Yet, it was left unexplained where and how the institutions and infrastructure of market coordination were to develop. As Jan Kregel puts it concerning the use of the general equilibrium model for the formation of markets, "But, as such, it can tell us nothing about how markets are to be created, and it thus follows that it can tell us nothing about the reorganization of production as intertemporal exchange." (Kregel, 1994: 125)

The basic assumption of the transition model was that the market infrastructure and institutions evolved spontaneously from the deregulation of prices. But is this a realistic assumption? How can the institutions and channels required for market coordination originate from an economy developed by the methods of central planning? If the mechanisms required for market coordination were not present, then the process of correcting initial prices cannot take place. Unless the whole complex system of market institutions and channels of coordination are developed simultaneously with the changes in prices, then the emphasis of this model falls on choosing the 'correct' initial prices. But as Kornai pointed out it was highly likely that these prices would be mere guesses.

Thus, two major questions arise from the foregoing analysis of the transition model. Can a price system be 'imported' from a foreign trading partner and then implanted into a system of production developed under very different conditions? How can the channels and institutions of market coordination develop both spontaneously and simultaneous to price changes? I shall start by looking at the first question, how feasible is an imported price system?

2.3.2 Problems of using foreign prices for initial price-setting

The model prescribed for forming a 'rational' price system in the former CPEs leaves some vital questions unanswered. What about goods and services that are non-traded, how are their prices to be determined? What of the goods that were produced specifically for the Soviet market - how can they be matched to Western products? Earlier it was noted that there existed a relationship between the USSR and Eastern Europe within the auspices of the CMEA whereby the USSR supplied cheap energy and raw materials in return for industrial products from Eastern Europe - how are these industrial products to be valued at world market prices?

First, concerning the non-traded sector, Lipton and Sachs (1990) suggested that where there is little or no foreign competition the private sector should play the role of introducing competitive market forces, "For some non-tradeables industries, such as food processing in Poland, the private sector should be able to compete effectively with the state sector in a matter of weeks." (Lipton and Sachs, 1990: 101) However, they then proceeded to acknowledge that, "...the private sector will emerge only if the *proper* price signals exist." (Lipton and Sachs, 1990: 101 - my emphasis) It would seem that this model is caught in a vicious circle. On the one hand, the private sector is essential to the establishment of market forces, and hence competitive price levels when products are not traded. On the other hand, for the private sector to be established, the 'correct' price levels (i.e. equilibrium determined ones) are required! There was an essential contradiction at the heart of the analysis of how the private sector and prices inter-related. Lipton and Sachs (1990) go on to suggest that

'transitional prices' may be established a result, a concept I come back to in a moment.

How prices are to be set for goods that were Soviet specific[20] is left unanswered. There were no equivalent products on the world market to match-up prices with. The problem arose that these products were deemed to have little or no value (or even subtracted from value) when judged by world market criteria. However, there are two concomitant problems involved here. First, how can prices, equivalent to world market ones, be established for the final products produced under Soviet specific conditions, especially in the industrial sectors? Second, if these products had been produced using cheap imports of raw materials from the USSR, is it not inevitable that when these imports are then set at world market prices the final products will be either of very low, or even deduct from, value? These seem to me to be vital questions; for they raise concerns over the whole change in the process of valuation that occurred when the economic systems changed. Several authors have raised doubts over the feasibility of using world market prices to establish the values of these products. Ronald McKinnon (1991) suggested that if valued at world market prices many industries would be deemed to be producing at a point where valued- added was in fact negative,

> ...no matter how the exchange rate is set, most manufacturing and food processing industries need not be viable under free trade at pre-existing combinations of factor inputs: in the short-run they might well exhibit negative value added at world market prices...(McKinnon, 1991, 96)

Goods and services that developed under the CPE system of pricing described earlier were based on the use of cheap, even free, inputs. Extensive growth methods also entailed the use of cheap products with little regard to the intensity of their use. When these are suddenly valued at world market prices, it would seem that many industries would be judged to actually subtract value from the system. Yet, this must raise doubts over the entire feasibility of using world market prices to value a system of production that was not developed on the

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[20] By Soviet-specific I mean the products that were produced only for CMEA trade and were not traded on the world market. Earlier I outlined the relationship between the USSR and Eastern Europe, whereby the USSR supplied cheap raw materials in return for manufactured goods. Industrial enterprises exporting from Eastern Europe to the USSR produced goods of both qualitative and technical specification for Soviet

basis of world market prices, or even on the basis of a price system at all. When the price system itself is in transition, when industries are suddenly opened to international competition and are not provided with the resources to adjust to the very new conditions prevailing, how can an evaluation of the values of their production be ascertained? Kornai admitted that we,

> ...are very much in the dark about which firms show a genuine loss and which only run pseudo-losses. The calculation is relatively easy in the case of the mining industry...The same calculation, however, is practically impossible when it comes to the manufacturing industry, whose costs are affected by the spillover of a myriad of input prices, which in turn are influenced by a maze of subsidies and tax exemptions. It would not be surprising if a number of the state-owned firms that are considered loss makers today turned out to be clear of this charge after the operation. It would not be surprising either if the opposite happened, i.e. if other state-owned firms that today qualify as profitable turned out to be unprofitable once the accounts began to include realistic costs and tax burdens. (Kornai, 1990:154)

In other words, the correct value of production cannot be known in many cases; opening up to the world economy and liberalising prices does not overcome the problem of creating a price system that can value products developed by a different system of production. As Amsden, Kochanowicz and Taylor put it,

> ...the idea of specializing based on a factor-price comparative advantage makes no sense at all in a semideveloped country, defined as already having a broad base of industries, especially mid-tech industries, and a stock of accumulated human skills. (Amsden, Kochanowicz and Taylor, 1994: 9)

It is assumed by many in the field that the loss of Soviet specific goods and services was a necessary step in eliminating inefficient and low quality production for which there was little demand. It was a painful, but necessary, step in the process of creative destruction. However, the danger arises, from this analysis of changes in prices, that output was lost in the severe recessions experienced by all the transition economies because the system of valuation itself was, and is, highly misleading.

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consumption. In many cases they did not meet, or match up to, standards, including technical ones, set by world trade. For a discussion of Soviet specificity of production see Bergson (1989).

But what of the products for which there is a direct foreign equivalent, surely it makes sense to match the prices of these products to their foreign counterpart with the result that prices closely approach their competitive equivalent?

The first problem concerns the exchange rate used for conversion. Central to the idea that a rational price system could be imported into former CPEs is the simultaneous development of a convertible currency. If prices were to be matched to their foreign equivalents then the exchange rate used plays a crucial role. But determining the 'correct' for the exchange rate was highly problematical at the start of transition. As Kornai puts it,

> ...a market-clearing exchange rate is required. There is no telling exactly what that rate will be, as it depends largely on how the other parts of the stabilization operation progress, and on how the inflation rate moves in the period up to the operation. (Kornai, 1990: 156)

There was also the problem of determining the relationship between the actual market exchange rate and the equilibrium exchange rate. It was highly unlikely that the equilibrium exchange rate could be ascertained at the beginning of transition. Not only were high levels of inflation experienced, even hyper-inflation in the case of Poland, but the previous multiple exchange rate regimes concealed very unstable conditions. As Dariusz Rosati noted, "But to arrive at a reasonable estimate of the equilibrium exchange rate is a very tricky task under the conditions of a transforming command economy which had remained in disequilibium for decades." (Rosati, 1996, 163) All in all, it may be impossible to know what the equilibrium exchange should have been in the initial period of transition. As Oblath put it, "...there is no solid ground for assessing what constitutes an equilibrium exchange rate for an economy in transition."(Oblath, 1994, p34)

Second, the transition programmes across Eastern Europe were initiated with steep devaluations.[21] In Poland, the currency was frequently devalued. After an initial devaluation of 31.6% on January 1st 1990, the imposition of a dollar peg, followed by the use of a system of crawling peg to a basket of currencies in 1991, there was a series of devaluations

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[21] The official exchange rates per US dollar for the period 1985-97 are presented in appendix 2.3. The table shows the significant devaluations in the exchange rates experienced during transition for all three countries.

including a monthly devaluation of 1.8%, lowered in small steps to 1.0% in 1996. In Hungary the Forint was pegged to basket of currencies and again frequently devalued. A crawling peg was introduced in March 1995, initially with 1.9% monthly devaluations, gradually reducing to 1.2% in July 1996. Romania has operated a managed float on the basis that it lacks the foreign reserves to defend a fixed or crawling peg, and this floating rate has led to substantial depreciations of the Leu. In the recent 'shock therapy' programme, initiated in February 1997, the Leu suffered a dramatic slide against the dollar, falling from Leu4000:$ in January 1997 to Leu9000:$ in mid-February, although it did recover somewhat to average Leu7,168:$ for the year. Romania has continued to have a managed float of the Leu, although there have been recent suggestions that a crawling peg may be introduced via a currency corridor.

The nominal rates were initially under-valued, with respect to purchasing power parities, the real wage and real effective exchange rates. The extent of the initial undervaluation when fixed exchange rates were used as nominal anchors led to further misleading signals,

> Gross undervaluation distorts the short-run profitability of foreign trade with respect to longer-term opportunities. Therefore, it provides no guidance for capacity restructuring; encourages distress exports (i.e. unprofitable in equilibrium) especially in association with restrictive monetary policy; disrupts patterns of production and trade, which would be viable at a sustainable rate. (Nuti, 1996b: 144)

Nuti (1996b) goes on to argue that undervaluation also had inflationary consequences as imports became uncompetitive relative to exports; "Gross undervaluation must be regarded as one of the factors responsible for the initial price hike into an inflationary spiral, as the effects of undervaluation were diffused throughout the economic system."(Nuti, 1996b: 144) Undervaluation gave a further impetus to inflationary pressures as foreign prices were used as guides to prices in the former CPEs simultaneously with the steep devaluation of the currencies seen to be necessary to achieve convertibility.

The inflation differential, in turn, gave rise to real revaluation starting around the middle of 1992. The evolution of a real revaluation for the currencies had important implications for

the economies' competitiveness,

In conditions of a fixed exchange rate, or of a peg which depreciates less rapidly than labour costs, this means a real appreciation of the currency and an erosion of the advantages of domestic over foreign labour for foreign investors. In this case all that a fixed, convertible exchange rate achieves is to give a subsidy to imported goods. (Kregel, 1994: 134)

In other words, using a devalued exchange rate at a fixed rate or crawling peg results in real appreciation when there is higher domestic inflation relative to the main trading partners. This 'scissor-like' movement between the nominal and real exchange rates has been characteristic in all three economies studied here. As Mario Nuti points out,

Real revaluation was achieved mostly via differential inflation with respect to reference currencies, i.e. via nominal devaluations smaller than domestic inflation...Thus, fixed exchange rates have not fulfilled the function of nominal anchor assigned to them in most stabilisation plans. (Nuti, 1998)

An initial jump in inflation was expected at the onset of transition following the deregulation of prices, but both the size and persistence was significantly underestimated. Yet, given the nature of the former CPEs, it should not have been that surprising that inflation was persistent, and still remains a problem. First, the monopolistic structure of production added to the inflationary impetus when prices were freed. Second, there was a problem with using foreign prices for initial price setting when accompanied by steep devaluations. The increase in inflation in the former CPEs meant that the inflation differential vis-à-vis their main trading partners resulted in real appreciation. To offset the consequent loss of competitiveness, there must be further devaluations, and so on (unless there are rapid improvements in productivity or sharp cuts in labour costs[22]). A vicious cycle developed

[22] Rosati (1996) differentiates between real appreciation resulting from the inflation differential on the one hand, and efficiency improvements on the other. His view is that productivity gains during transition are likely to be so large and 'across-the-board' in character that these will underpin the subsequent real appreciation. (Rosati, 1996) Whilst capturing some of the effects the reduction in real wages had on the real exchange rate, I believe that his analysis overlooks the difficulty faced by firms in restructuring production given the misleading signals generated by the changing price system and gross undervaluation at the start of transition. Further research is required to verify which effect is the greatest. See appendix 2.5 for data on labour markets, including changes in nominal wage rates during transition.

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with the danger of a trade-off between devaluations, inflation and competitiveness developing. The size of the exchange rate hikes gave rise to increasing pressure to raise prices, even for non-traded goods and services,

> Underestimation of inflation rates is a common feature of IMF stabilization packages in developing countries...but the errors in the case of Eastern Europe are striking. Two reasons are usually advanced to explain why price forecasts under post-socialism have been so wrong. First, the monopoly power of state enterprises was not taken into account in the initial price calculations. Second, the devaluations that initiated the programs sent clear messages to all sellers, from dentists up to the largest state-owned firms, to raise their own prices in the same proportion as the exchange rate hike. (Amsden, Kochanowicz and Taylor, 1994: 35)

Using the exchange rate to establish a domestic price system under the conditions existing at the start of the transition process was like aiming at a moving target in the dark. It added to the problem of attaining meaningful estimates of the value of production and added further inflationary pressures.

Lastly, there is question of quality competitiveness of Eastern Europe in relation to the West; can prices generated under the conditions of transition reflect the relative quality of products? Kregel (1994) argues that the low quality of products in the CPEs meant that their products would always be out-competed by the products of western markets, irrespective of the relative prices. Thus,

> In the transforming economies a convertible and fixed exchange rate under conditions of free and open markets, it is argued, provides an easy method of 'importing' the correct international price structure as well as providing foreign competition for monopolistic domestic producers. But here, the problem is not so much price competition as product quality. Foreign products are not price competitive, but they are quality competitive and this appears to be true irrespective of their prices relative to domestic goods. Again, the theory assumes the operation of relative price elasticities which are not present in reality. (Kregel, 1994: 134)

The whole question of how changes in quality are to be reflected in price determination is raised here.[23] The assumption of many commentators, included that of Kregel, is that the CPEs only produced low quality products. Whilst, this was in many cases true and there is ample evidence of the shoddiness of some products, some products may have been of high quality, particularly in the military sector where certain lines of production were both innovative and judged to be world leaders. Yet, the research capabilities were also very high in a number of different sectors. Thus, according to Martin Walker,

> Western smugness about the technological backwardness of Soviet science is dangerously misplaced. There are entire sectors of Soviet excellence unrelated to the high-profile space programme or the defence industries...Perhaps the best know example..is the Paton welding institute in Kiev, which engages in contract research for specific projects such as the Siberian pipelines and the submersible oil rigs of the Caspian Sea." (Walker, 1986: 66)

I am not disputing the low quality of many products, and indeed the earlier analysis of CPEs prices pointed to the generation of low-price, low-quality, consumer goods. The point is that the price system during transition was not likely to be an accurate arbiter of the relative qualities of products. With all the difficulties of attaining meaningful prices outlined in this discussion (gross under-valuation, problems of importing prices, and the lack of market infrastructure necessary for price determination) it was likely that prices also gave misleading signals over the relative quality of goods and services.

To summarise, this section has raised doubts over the ability of the CPEs to import a foreign price system as the first step in creating a functioning market economy. What the transition model discussed above implies was that the legacy of the CPEs was to be ignored (it was irrational so cannot be part of a functioning market economy) and that a fresh pricing system was to be put in the place of the old one. However, questions arise concerning how this new price system would be developed. If foreign prices were to be used as initial prices there was a serious problem of how to attain values, not only of non-traded and Soviet specific goods and services, but of production built on an entirely different system of economic calculation. Another, was the problem of conversion at a nominal exchange that was grossly undervalued

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[23] I will return to the problem of capturing quality changes when looking at index numbers in the next

- this only added to the inflationary impetus and created even further problems in establishing prices that conveyed meaningful information.

All these factors cast doubt over the feasibility of the shock therapy project's endeavour to create a rational price system. This analysis has pointed to the difficulties associated with importing a price system. But, as we saw earlier, even if the initial prices were wrong, neo-classical theory tells us that market forces should eradicate excess demands and establish equilibrium. I have already suggested, and I will now go into more detail, that the necessary infrastructure that channels these market forces will not be in existence in these economies. Thus, equilibrium cannot be attained unless the initial prices were correct, and the previous analysis indicates that they were not. Also, this is a very static view, for transition must by definition be a dynamic process, with restructuring and fundamental changes in the economy leading to changing equilibria. Without the institutions and channels that support the market mechanism of coordination, changes in the real economy cannot be transmitted through the price system. There will be a period during transition when prices are not market determined, nor planned - a halfway house of a price system is formed. The formation of such 'transitional prices' is the subject of the next section.

2.3.3 Forming transitional prices

The severity of the recessions that followed the implementation of the shock therapy programmes, accompanied by the higher than expected levels of inflation, raised questions concerning the efficacy of transition models to create functioning markets in the former CPEs. Writing in 1994 on the recessions that had beset all the transition economies, Kornai put forward the notion of 'transformational recessions',

> Many people had the naive idea that the elimination of central planning and bureaucratic coordination would be followed immediately and automatically by the appearance and operation of market coordination. *In fact there is a curious no-man's land where bureaucratic coordination no longer applies and market coordination does not yet apply, and economic activity is impeded by disintegration, lack of coordination, and anarchy.* (Kornai, 1994: 47 - my emphasis)

chapter.

This raises a fundamental problem for transition; if neither a system of planning, nor a market determines production, then what does determine it? The equilibrating mechanism of supply and demand must be in doubt if market co-ordination does not yet exist. Kolodko (1990 and 2000) also discussed the institutional gap left by the collapse of central planning. (See also Kozul-Wright R. and P. Rayment (1997)).

The initial transition models did not explain how the market mechanisms, necessary for equilibrium to be established, were to be created. They merely assumed that it would arise spontaneously. However, they did recognise that there would be a period of time, following the initial leap from central planning when prices would not be entirely determined by the market. In 1990, Lipton and Sachs wrote that,

> ...a transitory period of monopolistic prices might well occur in some areas, but attempts to avoid this transitory period could lead to the failure to develop private sector competition in the longer term. In a small subset of industries, such as public utilities, telephones, and intercity rail transport, prices will inevitably continue to be set by the state, as in almost any Western European economy. (Lipton and Sachs, 1990: 101)

While Lipton and Sachs (1990) acknowledged the possibility of an intermediate period where prices reflect the concentration of production, they were optimistic that this would be temporary and limited to only a handful of industries. In 1990, Kornai also admitted that it would take time for equilibrium to be established, "It will take a while before demand and supply reach equilibrium and a market-clearing equilibrium price can emerge." (Kornai, 1990: 151)

What has become apparent during the transition process is that the institutions and infrastructure necessary for the functioning of market mechanisms of coordination take time to develop. Transition itself can be seen as a process of institutional development. Mathias Dewatripont and Gérard Roland wrote an article in 1996 *entitled Transition as a process of large-scale institutional change,* where they emphasised the importance of institutional change to the development and creation of markets.

...very important aspects relate to the necessary large-scale institutional changes: the creation and development of markets, including financial markets, the institutions and enforcement of property rights and other legal and political changes along with enterprise privatization and restructuring." (Dewatripont and Roland, 1996: 2)

Other authors have also stressed the importance of institutional changes. Writing on the role of the evolutionary paradigm during transition,[24] Peter Murrell (1992) discussed the institutional legacy of the previous system and the implications for transition,

> ...the centrally planned systems will have an allocation of human capital and of management systems that matches the dictates of a non-market environment.
> Because the stock of existing routines, behavioural patterns, and expectations - organizational structure for short - is suited to the existing environment, it is unlikely to be suitable for a new market economy. (Murrell, 1992: 41)

For markets to function, not only effectively but at all, they require the institutions and infrastructure that channels or coordinates market information and ensure its functioning. This includes not only the behavioural aspect of agents emphasised by the evolutionary school, such as manager's and consumers' response to price signals, but the whole arsenal of structures that support markets. Factors will include, property rights and their enforcement; the financial market with its complex credit and banking procedures; transport structures that can move and store products for sale; entry and exit procedures; and so on. It is precisely all of these structures and channels for exchange that have to be developed during transition.

Transition entails a period when certain structures and relations developed by central planning still prevails, albeit in a weakened form, whilst the market structures are at best rudimentary. The system of coordination is then likely to be mid-way between the two systems as Kornai (1994) stressed in his analysis of transformation crises. Murrell has also discussed the likelihood that old patterns of behaviour, suited to central planning, persisted in transition, "...with a swift change to market-based stabilization policies and with the

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[24] Key proponents of this school include Poznanski (1995) and Murrell (1992).

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destruction of old institutions, deep problems arise when the old expectations are still held and when the old patterns of behaviour continue." (Murrell, 1992: 47)

I believe that this has profound implications for prices. If the channels, behaviour and institutions that ensure functioning markets are not present, then market processes cannot solely determine prices. As market mechanisms of coordination were not present, market-clearing prices were not formed. The neo-classical paradigm at the heart of the transition model for the creation of rational prices breaks down. But what does determine prices if market mechanisms are not present?

What was likely to be established were prices that reflected the transitional nature of these economies - transitional prices. What are transitional prices?

First, although there were drastic cuts in the state's subsidisation of production, there is evidence of some continuation of this practice. Although many prices were deregulated at the start of transition, there have been successive attempts to increase certain key prices, such as energy and utilities, so that they approach their world market equivalents. The implication is that the prices of these products continued to be regulated to some extent for a considerable period during transition. As Jan Svejnar noted in 1991, "...prices of basic commodities such as bread, apartment rentals, and utilities have remained partially under control as have prices of some industrial commodities."(Svenjar, 1991: 127) In a study of the industrial competitiveness of Eastern Europe and the Soviet Union in 1991, Hare and Hughes[25] stated that,

> "...although many subsidies have been or are being removed in all three countries
> [i.e. Hungary, Poland and Czechoslovakia], there still remains some significant
> distortions due to those taxes and subsidies not yet eliminated, and sometimes even
> due to new ones. There are plans to eliminate most distortions over the next few

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[25] The study by Hare and Hughes (1991) demonstrated that the value of production at domestic prices would deviate from that valued at world market prices. They conclude that, "[o]ur calculations of domestic resource costs for each country show quite conclusively that the resulting ranking of industries is very different from that based on domestic value added alone. Selection of industries or firms using criteria based on domestic prices are likely to be highly misleading." (Hughes and Hare, 1991: 11) Again, this suggests that the system of valuation is problematical.

years, but for the time being, existing market prices do not correspond to long run competitive prices (though they undoubtedly represent an enormous improvement over the old price systems)." (Hughes and Hare, 1991: 18)

Despite the dramatic elimination of subsidies at the start of the transition, and market-determination of prices, subsidisation of certain key inputs and the state's role in administering prices remained. This varied from country-to country, some making faster progress than others on this front, but in all it was uneven. The elimination of certain subsidies has been very gradual.

For Hungary, the UNECE report for 1996-7 in explaining the prospects for inflation, noted that,

> Furthermore, there are more consumption taxes and utility price increases to come, some of which were postponed in 1996, as well as higher energy prices which are seen as an essential test of the government's commitment to the modernization of the energy sector. (UNECE, 1996-7: 122)

There has been continuing incremental increases in certain important price levels, such as in the energy prices, since the onset of transition. The OECD report on Hungary in 1991 stated that,

> "One reason why consumer prices have increased at a faster rate than producer prices is the progressive elimination of consumer subsidies. Subsidies on infrastructural services were cut at the beginning of 1991, and higher energy prices were also passed through to consumers. The complete removal of fuel and household heating subsidies was decided during the summer of 1991, which led to an 81 per cent rise in household energy prices, spread over the end of 1991 and the first quarter of 1992. A wave of further subsidy reductions at the beginning of 1992 concerned meat products, pharmaceuticals, water tariffs and increases in some controlled prices (postal services) which sustained the more rapid growth of consumer prices." (OECD Economic Survey, Hungary, 1991: 23)

Whilst these reports concentrate on the early years of transition, when some subsidisation was expected, other reports point to the prolonged use of subsidies, and, importantly, in some of the most influential products - energy. The delay in raising the price of energy,

traditionally the input that was heavily subsidised under central planning, entailed a 39% increase as late as January 1995, which still did not overcome the differential between the price of Hungarian energy and the world market price as the quote from the UNECE implies - in 1996-7, further energy price increases were expected. Further evidence of the persistent use of subsidies comes from the latest EBRD *Transition Report* (1999). According to this study, state intervention in enterprise decision-making is still significant. The percentage of firms reporting state intervention in prices for Hungary was 44%, (following Belarus, Moldova, Uzbekistan and Ukraine). Romania and Poland reported lower levels of state intervention in prices, 27.5% and 10.8% respectively. (EBRD, 1999: 123) The level of subsidies is also relatively high in Hungary, as the figure in Appendix 2.2 shows[26]. Over 20% of firms surveyed in Hungary reported receiving state subsidies, a level second only to Belarus. Again, firms in Romania and Poland report lower levels. (EBRD, 1999: 127) As the EBRD study notes, "In particular, where the state supports enterprises, there is a greater reliance on direct subsidies in more advanced transition countries, and, at the other extreme, in countries that have maintained large elements of the previous command system." (EBRD, 1999: 127) This implies the continued use of subsidies, even in the countries deemed to be 'more advanced' reformers.

Thus, despite the initial freeing of prices, there has been only a gradual elimination of some subsidies, and although the price of energy has been increased incrementally over the transition period, it is still below the world market price. But is this just typical of Hungary, an economy that has been characterised by more gradual reforms, or is this more general to transition economies?

There is evidence that incremental changes in the prices, again of prices of key inputs such as energy, has been typical of Poland too, the economy heralded as the most radical reformer. A study of relative price movements in the OECD economic survey of Poland in 1992 stated that,

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[26] The study reported in the EBRD, *Transition Report*, 1999 is based on the 1999 Business Environment and Enterprise Performance Study (BEEPS) developed jointly by the EBRD and the World Bank. The total survey covered more than 3,000 firms.

Although the change in relative prices has been great, there is still every reason to expect that the processes have some way still to go. First, the continued high growth of imports of particular goods, and financial losses by some industrial branches, indicate that a sustainable relativity of domestic to world prices had not been reached. This is particularly so for the firms heavily tied to trade with the NIS. Second, many service prices are still artificially low, especially those provided by local government such as rental accommodation and local heating. (OECD *Economic Survey of Poland*, 1992: 85)

Concerning one of the key inputs, energy, a report on energy use in Poland during transition noted that although there had been a considerable increase in energy prices, this took place only gradually (Meyersm Salayf and Schipper, 1994: 699). The OECD report supports this claim,

Since January 1990, Polish enterprises have faced enormous increases in the real price of energy, a shock much greater than that experienced in either 1973 or 1979 by OECD countries, which had the advantage of developed markets. Even so, Polish energy prices still remain below the levels prevailing in Western Europe. ..Not only are fuel prices generally below equilibrium levels relative to other prices, there also remains significant distortions in relative prices for different fuels. (OECD Economic Survey Poland, 1992: 87 and 88)

Another study on the effect of transition on agriculture in Poland, stated that, "Market decontrol in 1990 did not create a unified market system."(Morgan, 1992: 149) and in conclusion it noted that; "Some industries in Poland have continued to pass on their costs in higher prices and have also enjoyed some measure of subsidy." (Morgan, 1992: 154)

Disinflating the economy was still being hampered in 1996-7 by rises in administered prices were still creating problems for. The UNECE report (1997) details the slower-than-expected reduction of inflation in Poland, and identifies one of the prime factors as "...the continued adjustment of administered prices..."(UNECE, 1997: 121)

These two economies are seen to be the more advanced in terms of progress towards transition, yet their price systems are still 'distorted' by subsidies and regulations, albeit in a more reduced form than in the previous systems. What of the economies deemed 'lagging' in

reforms? The Romanian economy is seen by many to have significant obstacles to the development of functioning markets, how has an economy like Romania fared in transforming its price system?

In Romania, there have been successive attempts at macroeconomic stabilisation and liberalisation[27]. With the fall of the Ceausescu regime a radical programme was implemented that included consumer price increases in 1990 and 1991. However, the obstacles to the creation of a functioning market economy were serious. As Ben-Ner and Michael Montias stated in 1991, "Markets still perform hardly any coordinating function. Prices vary widely between different localities..."(Ben-Ner and Montias, 1991: 168) Price controls remained pervasive in the period from the onset of transition to 1996. As the OECD reported in 1998, "Various forms of direct price controls and administered prices existed until end-1996. Retail prices of over one-half the average household's food consumption, including diary products, pork, poultry and bread, were subject to formal price ceilings or price 'negotiations'" (OECD, 1998: 160) A further attempt at shock therapy was required in 1997 in the face of rising budget deficits and growing inflation. During 1997 and well into 1998 there was a continual resurgence of higher-than-expected inflation. The month-on-month rate overshot its target repeatedly and proved stubbornly resistant to reduction. In part this can be explained by a certain laxity of fiscal policy, but one of the key reasons is the effect of continual price hikes as subsidies are withdrawn and certain prices, including energy, public services and agricultural products, are freed from administered control. The difficulty the government has had in stabilising inflation can be explained in part by the successive price hikes required to deregulate prices. The problems faced by the Romanian government in 1997-8 are evidence of the prevalence of subsidised and regulated prices within this economy, despite embarking on transition in 1990.

Even in the leading reformers, such as Poland and Hungary, removing subsidies and regulations on prices has proved difficult, and progress in eliminating price controls on some

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[27] There have also been successive attempts at stabilisation in the more advanced economies of the region. Hungary had to impose a further stabilisation programme in 1995, the Czech Republic's programme was criticised following the currency crisis of 1997. It is a fallacy that the stabilisation programmes involves a one-off implementation; they often require repeated attempts.

key products has been gradual, despite the massive steps taken to free prices at the start of transition.

Are continuing distortions important, for surely Western developed economies have distorted prices as well? Are the more advanced transition economies not just showing a level of distortion comparable with that in western economies? A sound case can be made that all economies have some level of distortion, the neoclassical model rests on the paradigm of perfectly competitive markets, but nowhere are these evident as functioning economies. However, the analysis of transition economies as having comparable levels of distortion with advanced market economies omits the *process* of transition. A simple comparison of the distortions evident in Eastern Europe to those of the West fails to give due weight to the development of the eastern economies out of the aftermath of central planning. These were economies developed on the basis of pulling in more and more inputs. Their input-output ratios were highly biased towards the widespread use of raw materials, labour and energy. The point behind transition was to create the market signals that could allow the restructuring of these extensive input-using industries. Subsidies in key sectors, such as energy, only maintain these biases. To keep lower prices in these key inputs over the transition period, and the evidence discussed above suggests that a degree of subsidisation has been prevalent for these products, means that the biases of the central planning era were not overcome. Prices have risen in comparison to those in operation in the CPEs, but they still did not reach their equivalent world price level. The study into energy use in Poland during transition noted that, "So far, few enterprises have had the resources to make the type of investments that would bring the significant improvement in energy efficiency that all observers agree is possible." (Meyers *et al*, 1994: 711) Although this study was undertaken in 1994, it still sheds light on the problems faced by these economies. If energy is still priced below the world market price, and improvements in energy intensity are slow, the proclivities of the former regime are still in evidence. This is not a problem limited to the initial years of transition either. As the OECD and UNECE reports cited above indicated the problem of increasing prices in energy and administered prices was still leading to continuing

inertial inflation in 1997, despite considerable reduction of inflation.

Yet, the elimination of the biases inherited from central planning through the adjustments in the price system was the central project of the transition models. The continuation of certain subsidies over the transition period, as well as some administered prices, is a feature of transitional prices. This raises questions about the inter-relationship between the economy as it has developed and its price system. This is the next feature of transitional prices.

The prices in the former CPEs will reflect the productive system developed during central planning. As Christine Rider puts it in her discussion of the price changes of transition,

> Theoretically, it can be argued that a market economy does not generate growth if the economy is lacking the basic infrastructure associated with a modern industrial economy, because *price signals reflect only what is in place, not what should be in place.*" (Rider, 1992: 24 - my emphasis)

As has been noted above, the CPEs developed a highly concentrated industrial base with emphasis on heavy industry and relative underdevelopment of the consumer sector. Can the pricing mechanism within an economy developed on this basis reflect anything other than these biases? As Rider states, prices reflect what is in the economy, not what proponents of transition models hope to put in place.

Also, if the basic market infrastructure of demand and supply is lacking, this will also be reflected in the prices too. If a no-man's land of neither market nor planned coordination is in existence, the prices developed by this transitional system must be treated with caution. There will be a period when there is a continuation of administered prices, along with free price setting. An IMF staff paper written in 1991, analysed this intermediate period and developed a model based on expected price changes. (Calvo and Frenkel, 1991) However, following their discussion of the formation of expectations they noted that,

> The foregoing analysis of price reform presumed that the rise in prices consequent on the removal of subsidies is determined by the free operation of market forces. In practice, as illustrated by the experience in Poland and Romania, especially in the area of energy pricing, governments have attempted to avoid an excessively large price shock by adopting a strategy of administered pricing. This strategy permits the spreading of what otherwise would have been a once-and-for-all price rise over a

lengthy period of time. (Calvo and Frenkel, 1991: 283)

Transition entails a period when many of the old centrally planned methods of coordination have collapsed, the market system is rudimentary if existing at all, and the state still intervenes to some extent. Institutions essential to a functioning market economy may be missing. As Nuti (1996a) notes, "The vacuum created by these missing elements [i.e. a basic market infrastructure, state administration and concertation mechanisms in the labour market] necessary for a mature capitalist system, has, as a consequence, been filled by a number of new elements which do not belong to the new system and should not be there." (Nuti, 1996a: 11) Thus, 'mutations' or hybrids may be formed as a reflection of the incompleteness of transition. This has significance for the project of rational, market-determined, price formation. The prices that are determined by this transitional system reflect this indeterminate state. The market may determine some final products, but so long as energy or other key inputs are still subsidised, the prices of the final products continue to be distorted.

However, even if subsidisation and administered pricing was not a problem, the lack of market structures and channels of coordination create difficulties for price determination. If transition entails the creation of the institutions necessary for the working of the market, then the market cannot be relied upon to function effectively during this period. The Walrasian paradigm rests on the existence of the channels and behaviour required allowing adjustment to equilibrium. As these channels and market-oriented behaviour did not exist at the onset of transition and are likely to take a considerable period to develop, the Walrasian model of general equilibrium did not operate.

Lastly, even if prices could be determined by the free operation of the market in these economies, what would these prices indicate? In economies built on monopolistic production using cheap inputs, prices must themselves reflect these biases. International competition can only have a limited scope for redressing these imbalances within the domestic economies.

All these factors combine to raise serious problems in ascertaining the value of a product

through the price mechanism. In the initial period of transition, prices were not determined by supply and demand, nor were equilibrium prices formed. If prices were not the competitive prices foreseen in the transition models, but some sort of hybrid, and if coordination of production was not derived via market forces, how can industries or policy-makers and other active participants in these economies, value production? As Kornai (1990) noted in the quote above, there is a danger that some industries will be deemed to be loss making when they may be potentially viable; the point is any prices determined under the circumstances of transition can only give misleading information. In the next chapter I shall examine how the change in price system creates difficulties for the formation of indices. What is suggested in this chapter is that there is a wider problem of valuation within these systems during transition[28] and this may not be limited to the initial years of transition.

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[28] I shall not attempt to answer this essential question at this stage; this is an area for further inquiry. A thorough study of the changes in relative prices during transition and its relationship to changes in output levels, quality changes and efficiency of production is needed, but is beyond the scope of the present thesis. A recent IMF paper attempted to investigate the magnitude of relative price changes in Russia. (De Masi and Koen, 1996). In this paper the authors noted that, "However, to the best of our knowledge, no systematic empirical analysis of the realignment of relative prices has yet been undertaken showing to what extent and how fast prices in Russia have converged to some market economy benchmark." (De Masi and Koen, 1996: 97 and 98) This seems to apply to central Eastern Europe also - I have not found any study into these realignments. Yet we can really only ascertain an indication of what transition has achieved as regards the price system by the analysis of these relative price changes.

Appendix 2.1

Consumer Price Changes

Annual average percentage changes

	1971-1975	1976-1980	1981-1985	1986-1989	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Hungary	2.8	6.3	6.8	11.5	5.3	8.6	15.7	17.0	28.9	35.0	23.0	22.5	18.8	28.2	23.6	18.3
Romania	0.5	1.4	4.8	1.1	-0.1	0.4	2.8	1.1	5.6	161.1	210.4	256.0	136.8	32.3	38.8	154.8
Poland	2.4	6.8	32.5	69.7	17.3	25.5	59.0	244.0	584.7	71.1	42.4	34.6	32.2	27.8	19.9	14.9

sources: UNECE (various years), EIU country reports (various years), EBRD, *Transition Report*, 1999

Appendix 2.2

Subsidies and arrears

Percentage of firms

■ Subsidies[1]   ■ Arrears[2]

[1] The subsidies column denotes the percentage of firms that report receiving state subsidies.
[2] The arrears column denotes the percentage of firms that say they had substantial arrears with either the national government, local government or state-owned utilities companies.
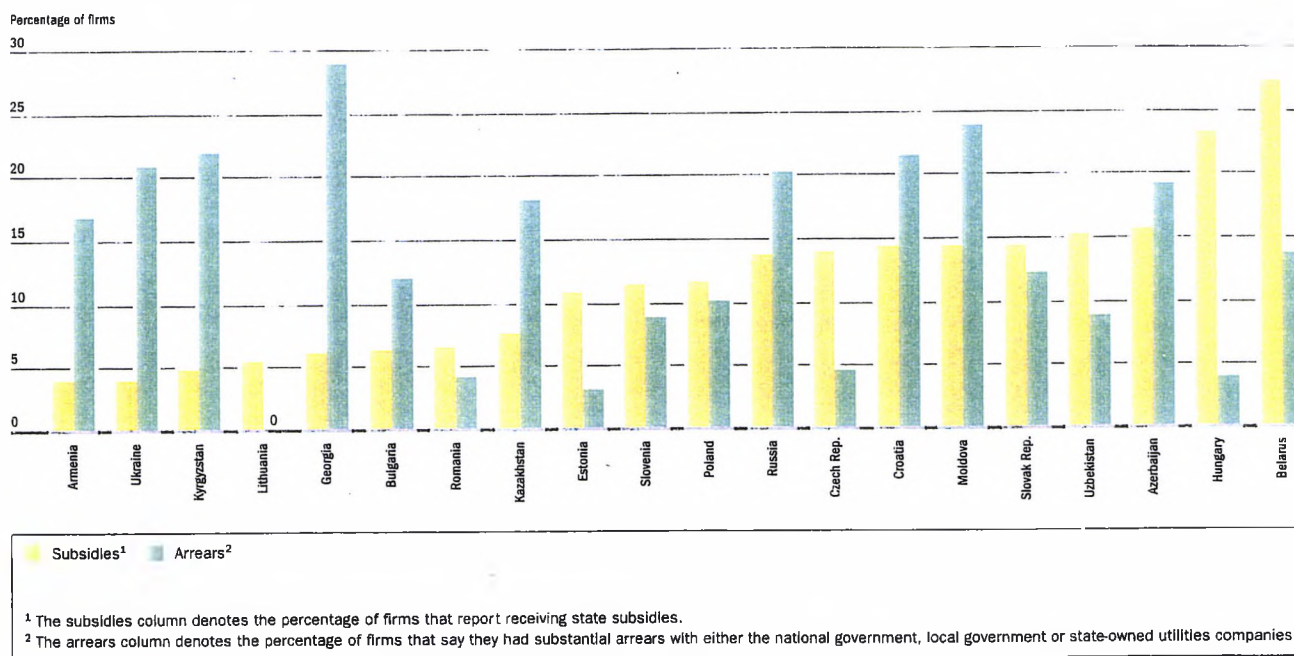
State intervention in enterprise decisions
(Percentage of firms reporting state intervention)

Country	Investment	Employment	Sales	Mergers/ acquisitions	Dividends	Wages	Prices	State Intervention Index[1]
Armenia	7.7	5.3	11.7	8.4	6.4	7.4	13.2	8.6
Azerbaijan	23.1	19.7	24.0	13.7	15.3	11.2	17.2	17.7
Belarus	32.6	17.4	69.8	24.6	12.3	53.3	87.8	42.5
Bulgaria	17.0	12.3	17.1	14.0	11.4	15.0	25.8	16.1
Croatia	18.4	9.5	15.3	20.2	6.8	20.6	15.2	15.2
Czech Republic	23.7	20.3	21.7	14.3	8.8	24.0	27.1	20.0
Estonia	10.2	6.9	10.9	17.0	10.2	15.4	15.4	12.3
Georgia	17.9	10.3	16.0	10.5	13.1	15.0	17.6	14.3
Hungary	37.9	38.2	40.0	27.6	45.4	59.6	44.0	41.8
Kazakhstan	24.7	14.0	27.4	21.5	13.3	17.6	41.7	22.9
Kyrgyzstan	25.9	15.0	30.9	25.3	12.6	14.9	44.2	24.1
Lithuania	15.7	13.0	19.8	22.4	22.4	31.6	23.8	21.2
Moldova	17.0	11.0	31.4	25.3	22.0	22.2	53.7	26.1
Poland	17.3	13.0	13.8	14.3	8.8	26.9	10.8	15.0
Romania	30.9	16.0	19.5	17.6	20.0	31.7	27.5	23.3
Russia	15.9	10.1	30.2	13.4	5.4	10.3	42.1	18.2
Slovak Republic	52.2	42.7	54.6	19.2	13.3	57.9	63.6	43.4
Slovenia	23.1	31.7	24.0	20.6	16.1	47.2	23.1	26.5
Ukraine	25.6	19.6	36.3	21.6	15.9	40.2	44.4	29.1
Uzbekistan	28.7	9.9	47.0	20.0	15.5	34.7	51.2	29.6

[1] The state intervention index is calculated as the average across all the above dimensions of intervention of the percentage of firms reporting intervention sometimes or more frequently.

A.2.3 Official exchange rates per US dollar in period averages for 1985-1997

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Hungary[a]	50.09	45.83	46.99	50.41	59.07	63.21	74.73	78.99	91.93	105.16	125.69	152.57	186.75
Poland[b]	147.1	175.3	265.1	430.6	1,439	9.50	1.06	1.40	1.80	2.27	2.42	2.69	3.29
Romania[c]	17.14	16.15	14.56	14.28	14.92	22.43	76.39	307.9	760.0	1,655	2,033	2,033	3,084

Source: EIU, *Country Profiles*, various years
[a] For Hungary, until 1989 the official commercial rate for the Forint:US$
[b] For Poland, from 1990 onwards the new Zloty to the US$ is reported
[c] For Romania, until 1990 the commercial rate for the Lei:US$ is reported.

A.2.4 Deviation between the Tourist and Commercial Exchange Rates

	Tourist (Non-Commercial)	Commercial
Hungary		
1975	20.65	8.60
1980	22.14	32.43
1985	51.57	51.57
Poland		
1975	33.20	50.00
1980	30.49	45.00
1985	-	-
Romania		
1975	12.00	20.00
1980	12.00	18.00
1985	12.81	18.00

Sources: Marer *et al*, 1985: 52-70 and *Comecon Foreign Trade Data* (1986)

A. 2.5 Labour Markets

Source: EBRD, *Transition Report*, various years

Chart A.2.1 Labour Force: year-end
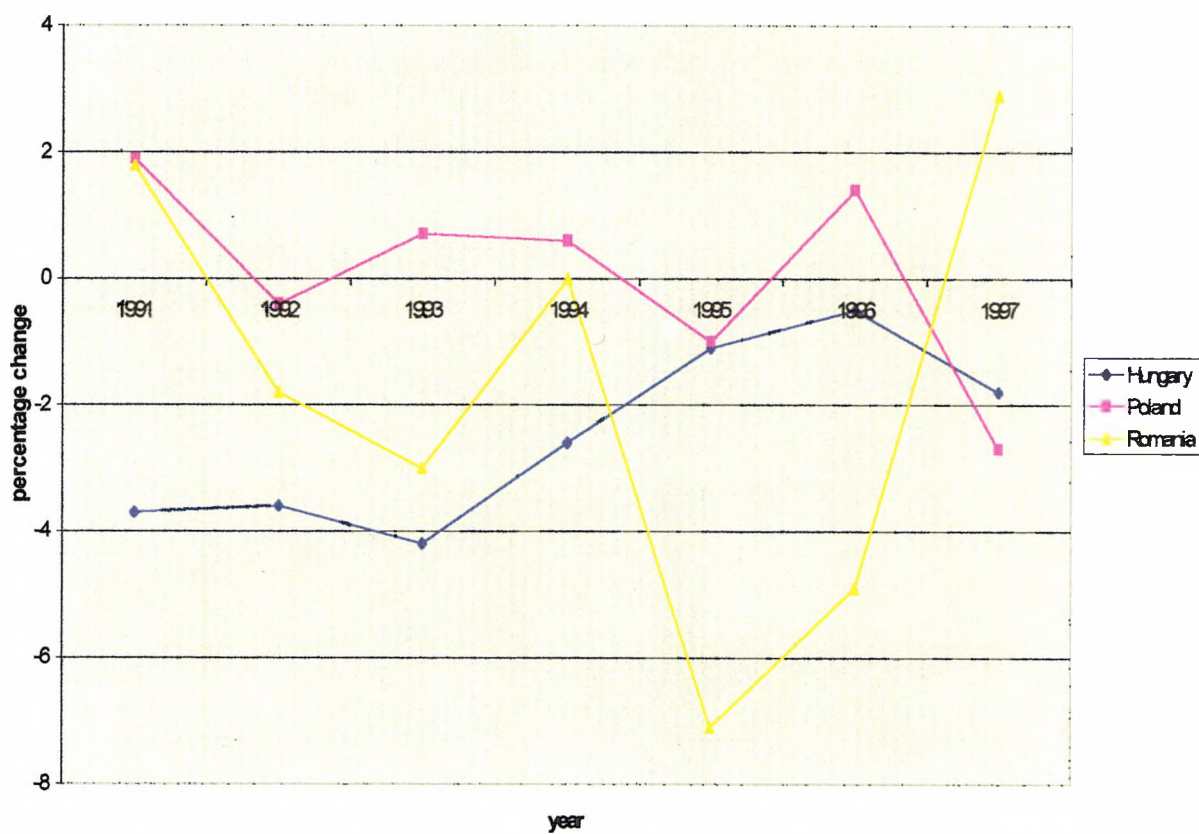
Chart A.2.2 Unemployment: in per cent of labour force
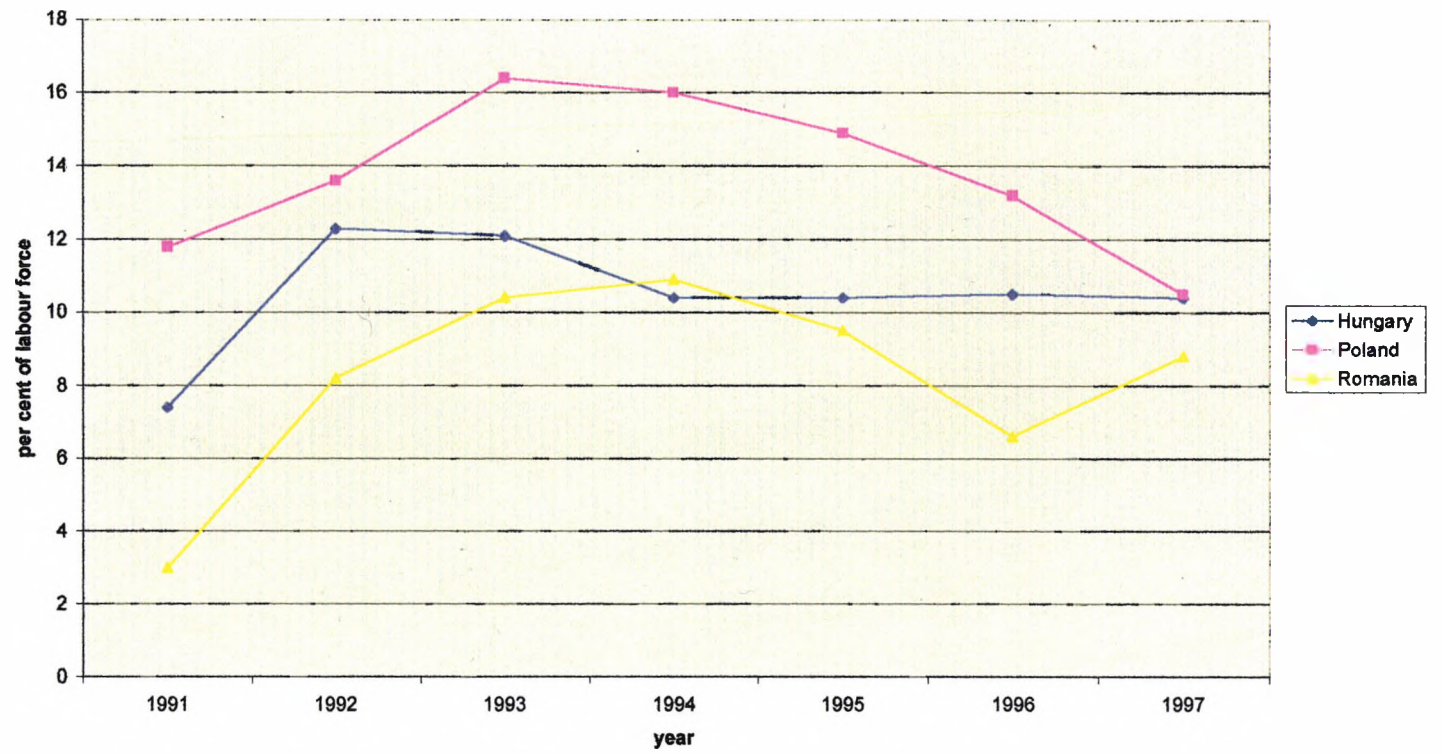
Chart A.2.3 Average Monthly Earnings : percentage change in annual averages
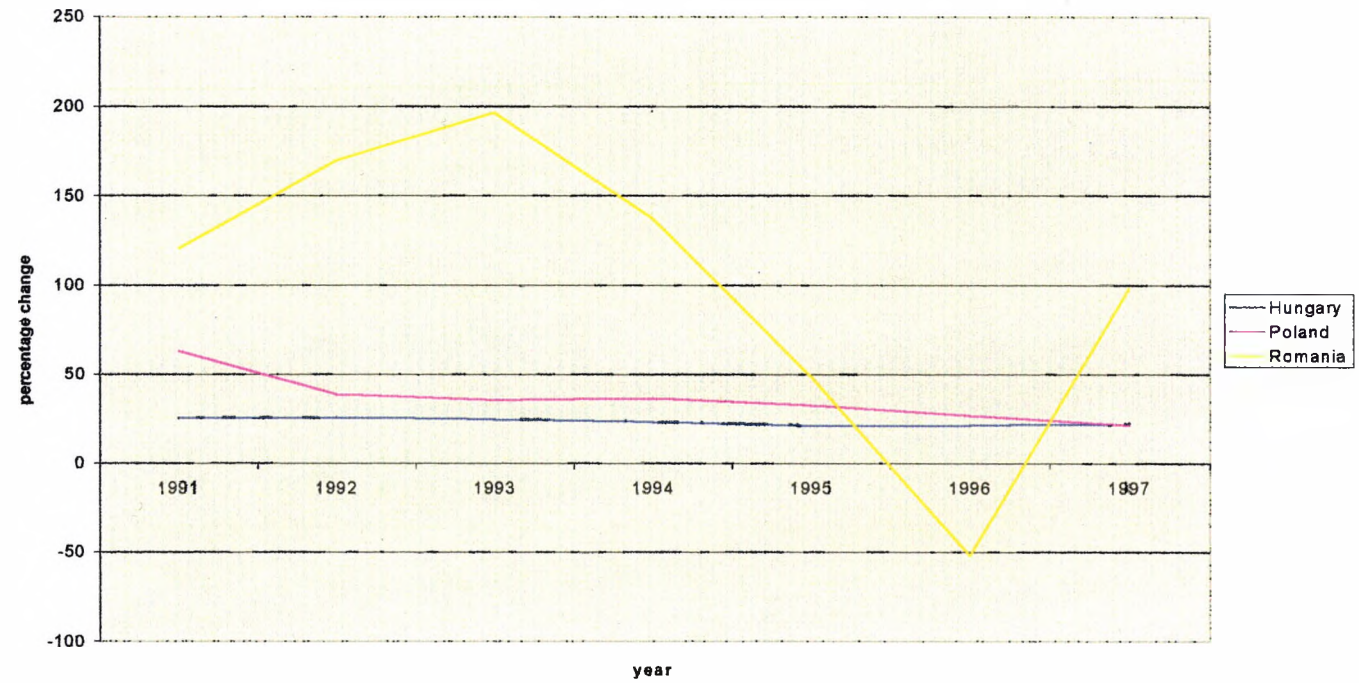
CHAPTER 3

INDEX NUMBERS DURING TRANSITION

> In measuring growth for an individual country that is following a reasonably stable path of expansion, a production index has a clear meaning...Troubles come when there is a long-range alteration in productive structure, brought about, say, in response to major innovations, or when there is a temporary radical shift, as in conversion from a peacetime to a wartime economy, or vice versa. In both cases there are substantial changes in the direction of growth being measured, and these may show up as spurious indications of sudden acceleration or retardation. (Nutter, 1957, 61)

The demise of central planning poses a serious problem for the use of index numbers as a measure of these economies' growth rates. This chapter will focus on the likely distortions to these growth rates generated by the production indices themselves. I will be concentrating on the use of production indexes as they still form the basis for national income accounting in the countries studied in this thesis.[1] In theory they are also meant to provide an estimate of the changing productive potential of an economy. It is precisely this use that is questioned in the following analysis of the conditions pertaining to the transition economies.

There exists a rich literature on the likelihood and cause of index number biases during the era of Soviet growth.[2] However, the literature on index number bias during transition is far sparser[3]. The main focus of current research has been on the boundaries of national income analysis. That is, the likely distortion to growth rates arising from the omission of economic activities such as those of the private sector or shadow economy.[4] The next chapter will address the problems associated with national income calculations during transition, the

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[1] See Chapter 4 and Appendix A for more detail on the methodology used in official GDP estimates.

[2] Studies cited here include; Gerschenkron (1947); Bergson (1961); Moorsteen, (1966 and 1961) which, although representing only a small selection of the literature, are seminal in this field.

[3] The work by Kent Osband (1992) has addressed this problem and is discussed in this analysis. Although I disagree with the findings of his work, it has nevertheless been crucial in developing the framework of analysis used here.

subject of the present chapter being confined to the economic-theoretic problems inherent in the use of aggregate indexes under the conditions connected with transition economies. This chapter will draw from the analysis of index number bias during Soviet growth and then proceed to show its applicability to the period following the collapse of central planning. The relevance of the studies of index number distortions during the Soviet era to the conditions pertaining to transition arises from the extreme dislocations and major alterations in productive structures that characterise both periods. Needless to say that whilst the analysis of the early Soviet era concerned the problems of estimating growth rates, the problem faced by current researchers is of attaining accurate estimates of the decline of these economies.

3.1 The economic-theoretic analysis of production indexes.

The aim of using index numbers to describe the production-side of the economy is to attain as closer an approximation of the changing productive potential of an economy in different periods[5] as is feasible from the different vectors of prices and quantities pertaining to each period. To undertake the comparison of the production potentials across the periods we require a definite relationship between prices and quantities[6], which will enable us to derive an approximate measure for the changing production capabilities. The basic relationship that underlies the use of aggregative index numbers for production is the efficiency standard, that is the point of tangency between the production possibility schedules for an economy and the schedules of price ratios. This is an optimal position, and rests crucially on the assumptions of a competitive economy. The next section raises some of the problems using this framework of analysis when the economy in question is not competitive, such as the Soviet-type economies. However, the efficiency standard still provides the basis on which we approximate the actual changes in vectors of output and prices to the 'true' changes represented by alteration in the production possibilities frontiers for the economy. As

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[4] See Berg and Sachs (1992) and Winiecki (1991) for a discussion of the likely underestimation of growth arising from these omissions.

[5] The comparison can also be between countries. In the analysis developed in this chapter I will concentrate on the inter-temporal comparisons for the same economy. However, in later chapters, cross-country comparisons will be discussed and it should be noted that the implications discussed here apply when comparing production capabilities between countries as well.

[6] In appendix 3.1 I derive a more general formulation for the index numbers and their inequalities.

Bergson put it; "The appraisal of production potential presupposes ideally the achievement of a partial economic optimum: The community is realizing its production possibilities. On this basis, the outputs are taken as observations on the corresponding schedules." (Bergson, 1961: 31)

Using the observed prices and quantities, we can arrive at an estimate of the change in the productive potential across two periods. The estimation can be achieved by comparing the change in output bundles in each period using the prices derived in either one of the periods as the basis for comparison. In so doing, we are assuming that the observed outputs, using either current or base period prices as weights, will generate a meaningful estimate of the optimal output bundle derived from the production possibility schedules. In other words, although we cannot directly observe the optimal bundles, the points of tangency on the production possibility schedules, we can derive the bounds to these 'ideal' index numbers.

To illustrate this procedure, I shall depict the problem using the framework outlined in Bergson (1961) and Moorsteen (1966 and 1961) and Allen (1975). It is assumed that the economy is characterised by the production of two goods, machinery and bread, following Bergson (1961). I shall start by presenting a standard analysis to illustrate the derivation of base- and current-period index numbers as bounds around the 'true' indexes in two different periods. This analysis starts by assuming that the growth in production potentials follows a homogenous path. Once the basis for these bounds has been established, I will proceed to illustrate the problems arising when the economy is characterised by periods of uneven growth, i.e. when there is a bias in favour of a disproportionate growth in one of the commodities.

The basis for the derivation of the production possibility schedule for the economy can be defined according to Warren Nutter (1957) as; "The traditional and most fruitful approach is to define productive capacity in terms of the given technology, resources and institutional structure." (Nutter, 1957: 52) This definition is important, as we shall see later, for in the consideration of transition economies it is precisely these factors, that are the technology, resources and, essentially, the institutional framework of the economy, that are undergoing

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fundamental alterations[7]. However, for now I shall continue elaborating the standard analysis, which assumes homogeneity in the changes in productive structure.

Figure 3.1: Index number estimates under homogenous growth
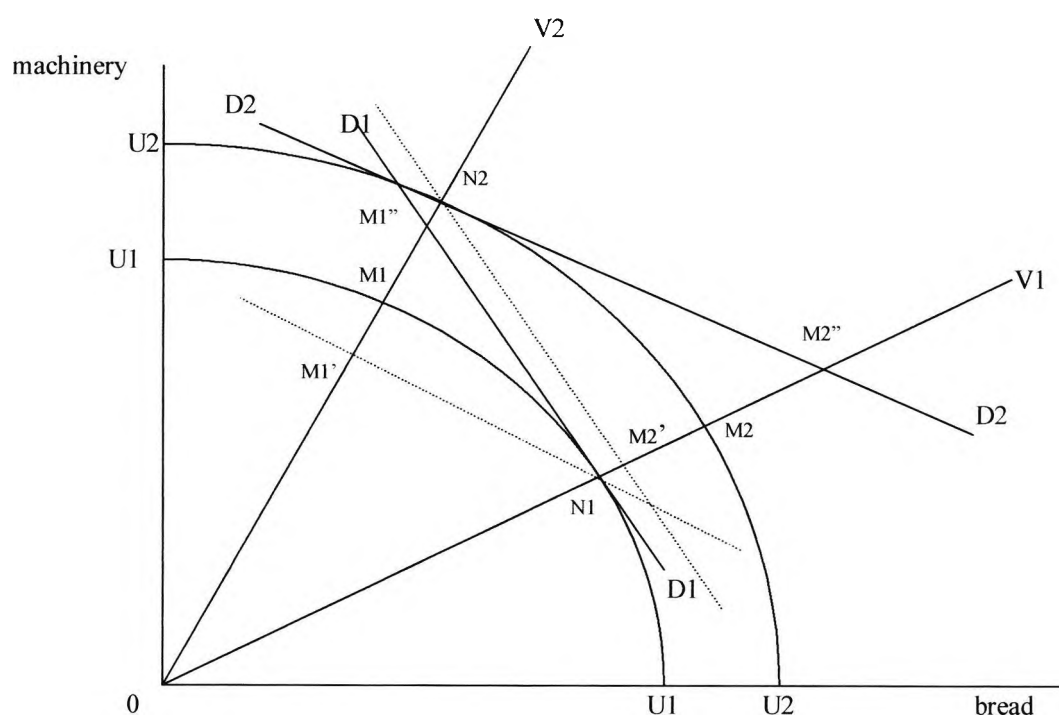
In figure 3.1 this growth is represented by a shift in the production possibility schedules from u1u1 to u2u2. The slope of these curves, as drawn in figure 3.1, are concave to the origin under the assumption of diminishing marginal product, and the curves are assumed to be non-intersecting. P1 and p2 represent the prices of the outputs and the price ratios are illustrated in figure 3.1 by the line D1D1 for period 1 and D2D2 for period 2. The dashed lines are parallel to the price lines D1D1 and D2D2 and represent equivalent and compensating variations respectively.

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[7] The definition of productivity capacity of an economy given here underlines the role of labour markets during transition. Chart A.2.1 in appendix 2.5 on labour markets shows the changes in the labour forces during transition. Whilst there have been declines in the labour force in all three countries (although there has been some growth in Poland), in Romania the decline has been comparatively greater. This can also be seen in the international migration rate from Romania during transition which reached 22-28 annual average per 10 000 population for 1991-3. For a more detailed discussion of international migration in these

Thus, the optimal outputs for our two goods in a particular period are determined by the tangency between the slope of the production possibility frontier and the price line. In period 1 the observed outputs are given at point ON1 in figure 3.1 and in period 2 by the point ON2. Our aim is to derive an estimation of the change in productive capacity associated with each quantity vector. In other words, what has been the growth in output of the two goods at the given price ratio for each period? At ON1, can we derive a comparison of the growth in output as the production potential shifts as we move along vector V1? The comparison is arrived at by allowing for a compensating variation in the composite bundles of goods under the two sets of prevailing prices. Thus, the 'true' measure of the change in production capacity starting at ON1 (i.e. period 1) will be given by the ratio:

OM2/ON1

This ratio compares the actual composite bundle position in period 1 with the point of optimality on the production schedule for period 2. In period 2, the comparison would give us:

ON2/OM1

However, the points OM2 and OM1 are hypothetical points on the corresponding production possibility schedules and are not observable.[8] To attain an approximation to these 'true' indexes we can use the price ratios of each period to derive the bounds. Thus, the price ratio of the first period (D1D1) can be drawn through point ON2 as a parallel line to give us the point on vector V1 at OM2' for period 1. This gives us the base-weighted or Laspeyres index:

OM2'/ON1

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countries in early transition years see the UNECE, *Economic Survey of Europe 1994-5*, chapter 5. For discussions of changes in the labour markets during transition see also the EBRD, *Transition Report* 2000.
[8] If the ppf were drawn as linear then the computed and true indexes would be identical.

Alternatively, we can use the current-period price ratio D2D2 to estimate the change in output at OM2'';

OM2''/ON1

Readily it can be seen that the Laspeyres index lies below the 'true' index, whilst the Paasche, current-weighted, index lies above. The same can be derived for period 2: ON2/OM1 is the true index, whilst ON2/OM1'' is the base-weighted index and ON2/OM1' is the current-weighted index. Again the Laspeyres acts as the lower bound and the Paasche the upper bound for the true index. As Allen put is, "To have a reasonable expectation that both deflators lie between the Laspeyres and Paasche index numbers, we need the Paasche index to be greater than the Laspeyres." (Allen, 1975: 75) These inequalities in the index numbers form the basis for the derivation of bounds around the 'true' estimates of the change in production capacity. They are formed from the shape and tangencies along the production possibility schedules. Only because the schedules have been drawn as concave to the origin, and because we have assumed the tangency between the production and market schedules, can these particular bounds be derived. As Moorsteen (1961) puts it, "The assumed tangency between the market and production possibilities surfaces and the uniform downward concavity of the latter are, in the absence of other assumptions, both necessary and sufficient conditions for the cardinal interpretation." (Moorsteen, 1961: 456)

Hence, the tangency condition assumes that the price ratios can reflect the opportunity costs associated with the output of bread and machinery, the market prices provide us with an indication of the marginal costs of production. This, in turn, enables us to approximate the slopes of the price ratios to that of the ppf, that is, to the marginal rate of transformation. When prices conform to marginal costs, we still have a divergence of the market schedule from the production possibility schedule (ppf), depending on the shape of the ppf and the relationship to the market schedule. According to Moorsteen,

> If the use of Economy 1's [period 1 in the analysis outlined here] prices as weights has any special significance, therefore, it lies in their reflecting the rates at which Economy 1's producers may make substitutions, i.e., in the similarity between the slopes of MM [the market price ratio] and PP. [the ppf]. (Moorsteen, 1961: 454)

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Thus, the Laspeyres and Paasche indexes act as the bounds to the true indexes and permit the unobservable true indexes to be approximated. These bounds have been established in the discussion above in an economy characterised by homogeneity and competitive equilibria. For the Laspeyres and Paasche to act as bounds in practice,

> What we need in practice, broadly speaking, is first to know that Laspeyres and Paasche index numbers are not far apart in a two-period comparison, and then to have a reasonable expectation that the true index based on one period and on the other are not very different. The first is a matter of observation. The second is *a fairly safe guess if the periods compared are neither unusual nor far apart.* (Allen, 1975: 70 - my emphasis)

As will be discussed later, this 'safe guess' is not at all safe when considering transition.

The expectation that the Laspeyres will be the lower, and Paasche the upper, bounds are greatest when prices and quantities move in the same direction. The extent of the divergence between the Laspeyres and Paasche indexes can be measured by estimating the correlation, r, between prices and quantities. The analysis is derived from von Bortkiewicz and is described in Allen (1975: 62-64). With a positive correlation between prices and quantities, i.e. when r>0 and prices and quantities move in the same direction, the Paasche index will be greater than the Laspeyres index. When prices and quantities move in the opposite directions, so that r<0, then the Laspeyres will be greater than the Paasche index. Allen (1975) points out that prices and quantities are more likely to move in the same direction in supply-dominated markets, whilst they tend to move in opposite directions in demand-dominated conditions[9] (Allen 1975: 64). Thus, the implication for the bounds described above is that, "To have a reasonable expectation that both deflators lie between the Laspeyres and Paasche index numbers, we need the Paasche to be greater than the Laspeyres. The analysis...shows that this is to be expected in a supply-dominated market." (Allen, 1975: 75)

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[9] Allen (1975: 64) suggests that suppliers markets characterise the conditions whereby prices and quantities move in the same direction, as suppliers tend to react to a rise in prices by increasing supply. The reverse takes place in the demand-dominated case when consumers react to rising prices by purchasing less.

3.2 Index number biases during the period of Soviet growth

That growth rates in Soviet-type economies (STEs) were unlikely to be characterised by homogeneity, given the propensity to bias production towards specific sectors of economic production, namely heavy industrial products, is widely accepted. The focus of research, as a consequence, was into the possible extent and direction of distortions to the indexes. In this section I shall outline the theoretical analysis of index number bias under STEs and the problems raised for estimating growth rates.

If the growth of one of the products in our simple economy is favoured over that of the other, let's say that machinery grows disproportionately to bread, what does this imply for the index number analysis? Figure 3.2 below sets out the problem, using the same framework as that developed in the previous section[10].

Fig. 3.2: Index number estimates under 'uneven' growth in STEs

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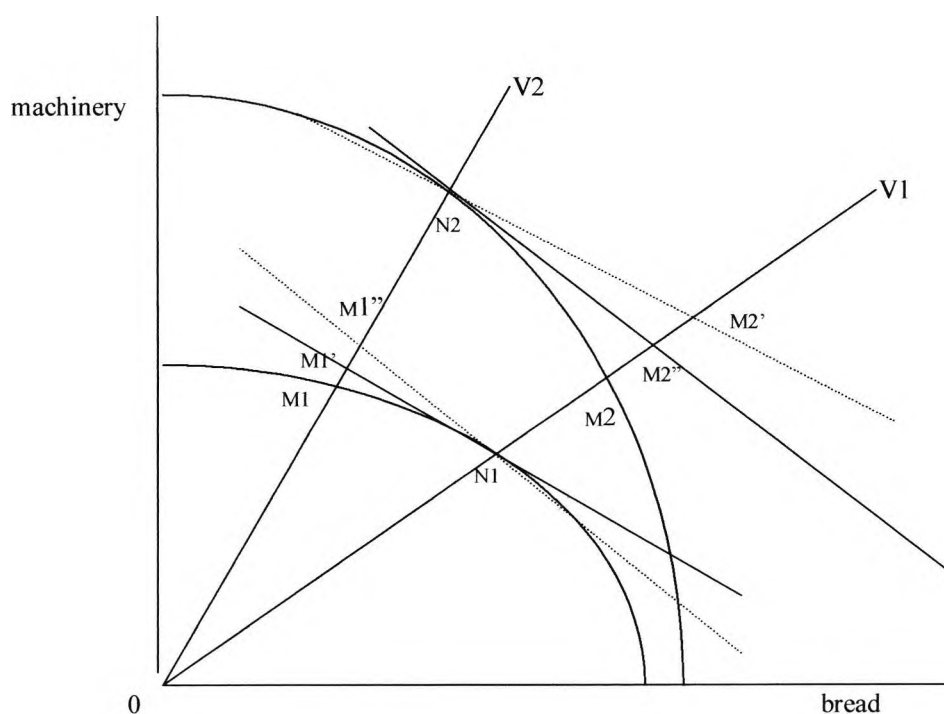
[10] This analysis is taken from Bergson (1961: 31-34)

As can be readily seen, the actual change in production of the composite bundle of goods can be measured by the ratio OM2/ON1 as before using the vector of goods V1. Using base-period prices as an estimate for this ratio, we find that the ratio of output values has risen to OM2'/ON1, whilst current-period estimates is at OM2". Thus the inequalities underlying the use of the Paasche and Laspeyres indexes as bounds to the true index have changed with the disproportionate growth of machinery. Now, the Laspeyres index is greater than the Paasche index. Both are greater than the 'true' index for the first period comparison. However, the Paasche is a closer approximation to the true index than the Laspeyres for period 1 comparison.

For the second period comparison, the actual index of production is again given as ON2/OM1. The Laspeyres index is represented by ON2/OM1' and the Paasche index by ON2/OM1". This time the Laspeyres index is a closer approximation to the 'true' index than the Paasche index ratio.

According to Bergson,

> If the marginal rate of transformation shifts against products that increase disproportionately, Formula 1[i.e. Laspeyres] necessarily yields a higher index than Formula 2[Paasche], and conversely. By the same token, we also see that the marginal rate of transformation must in fact shift against products which increase disproportionately whenever Professor Gerschenkron's well known hypothesis holds. According to this hypothesis, under industrialisation the Formula 1 index will ordinarily be greater. (Bergson, 1961: 33)

In the above illustration, taken in most part from Bergson (1961), the shift in favour of the production of the industrial product over that of bread leads to the diminishing marginal rate of transformation of machinery to bread and hence the steeper slope of the second ppf. The implication noted by Bergson is that the Laspeyres and Paasche indexes do not form bounds around the true index, in the sense that they lay either side of the true index, and the Laspeyres index will overstate the growth rate. However, although they no longer form the

upper and lower bounds to the true index, it is possible to state which index will closer approximate the true index.

The changing productive structure that accompanies periods of unequal growth implies that we attain differing measures of growth rates depending on where we place the vectors V1 and V2. According to Warren Nutter (1957) these differences are 'real' in the sense that they arise out of the change in the productive structure itself and so are beyond the more usual problem of index number bias associated with problems of weighting index numbers. (Nutter, 1957: 59) Thus if V1 was moved further to the left, then the growth rate would be greater at this point, and vice-versa. The inference drawn by Warren Nutter as a consequence of the distortions caused by the problem of changing productive structure was that, "No measure can eliminate the inherent ambiguity surrounding the movement of the production frontier since the movement cannot be summarised in a single unique measure." (Nutter, 1957: 59)

However, this is not the end of the problems faced in using index numbers as a measure of changing production potential during periods characterised by changes in the productive structure of the economy. Another set of problems arises from the introduction of new products between the periods being compared. How are these new products to be included in the index estimation of changing productive potential over the two periods? Moorsteen (1961: 465) suggests the use of a synthesised price if the product is produced in one period, but not in the other. However, this can only apply to an economy that is technologically able to produce the good in both periods, but for some reason chooses not to do so. The synthesised price would be based on the price of similar goods, (Moorsteen illustrates this with trucks being used as an estimator for tractors), along with the price in the other period, which can be used as a weight for the product. However, the case when a good is introduced for which the technology is not able to produce the product in the previous period means that the value is zero for that period. (I shall return to this point when discussing the transition period where many goods produced under STEs where found to have zero or negative values under transition conditions).

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Yet a further problem arises with new products if the price of the product is relatively high when first introduced, but then progressively falls as production increases. Again, the Gerschenkron analysis applies here, for the Laspeyres index will show a greater proportionate increase using the higher base-period prices as weights. This bias arising from index number relativity is crucial to the analysis of the problems with aggregating output during transition and is discussed in more depth below.

Lastly, we have a more fundamental problem associated with the use of prices as weights under central planning, and in particular as regards what prices actually represent in these economies. Earlier I showed that the tangency condition was important in order to derive the Paasche and Laspeyres indexes as bounds to their true indexes. We saw that the efficiency standard was the basis for the approximation of these indexes to the true change in productive capacity in the economy. Thus, prices must have some correspondence to marginal costs. Can we expect this correspondence to hold in the conditions typical of centrally planned economies? It is most unlikely that prices will represent marginal costs of production in STEs.[11] The previous chapter described the reflection of the price system under central planning in the bias towards industrial products. Rather than the slope of the price ratio being tangental to that of the ppf that is the achievement of the efficiency standard noted above, we might depict these economies as operating at a position whereby the price ratio intersects the ppf. The implication is that the price ratio, and, hence, its slope, can no longer be used as an approximator for the slope of the ppf, i.e. the price ratio will not equate with the marginal rate of transformation. What does this imply for the use of index numbers?

In addressing the question of the use of social income as a measure of economic welfare for the consumer-side of the economy, J.R. Hicks (1940) stated that,

> It will already be apparent that the reason why we use prices as weights, when measuring the social income as an index of economic welfare, is because prices give us some indication of marginal utilities, because the slope of the price-line at a point

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[11] Appendix 3.1 discusses in more depth the reasons why prices will not meet marginal costs and the implications for index numbers.

of equilibrium is the same as that of the indifference curve through that point. (Hicks, 1940: 113)

We have already seen that the competitive criteria was applied to the supply-side so that the measure of changing productive capacity requires the price line to indicate the marginal costs so that we may derive the efficiency standard at the point of tangency with the ppf. Hicks (1940) also defined an increase in real social income from period 1 to period 2 as taking place when it is impossible to redistribute the quantities of goods acquired (or in our case produced) in period 1 that would make everyone as well off as in period 2. In terms of index numbers, real social income increases across two periods when $\Sigma p2q2 > \Sigma p2q1$, (that is equivalent to point ON2 in figure 3.1 being greater than OM1').[12] As the Soviet-type economies were increasingly portrayed as operating at a point below the ppf, where the price line intersects the ppf, and as such were seen as inefficient, the possibilities of redistribution leading to improvements in economic welfare are great. The question then arises as to how we can determine 'real' increases in social income, or increasing productive capacity, from gains derived from redistributing resources.

Hicks (1940) hinted at the difficulties faced in using index numbers to measure real social income changes in the consideration of the consumer-side. Hicks (1940) noted that prices might only correspond to marginal utilities if the consumer is free to choose, so that in a rationed economy (which was arguably typical of the conditions facing the consumer in the STEs) prices will not be market determined. Thus,

At the point where he is compelled to stop, [i.e. the point of shortage] the price-line is still intersecting the indifference curves; consequently the slope of the price-line gives us no clue about the slope of the indifference curve through the point reached, and the index number tests break down. (Hicks, 1940: 113)

Now, this raises a much more fundamental problem with the use of index numbers. Certainly, on the consumers-side of the economy, we can follow Kornai's model (1979) and depict these economies as characterised by shortages and rationing. However, the question focused on here concerns the production indexes. One argument that could be presented is

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[12] As Samuelson (1950) noted, this definition does not account for the cases when ppf's intersect or when utility functions intersect so that although q2 may be greater than q1 in one region of the ppfs, in other regions it is reversed. This point is discussed later in the section on transition.

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that the widespread use of the soft budget constraint in STEs (again, from Kornai's model (1979)) again implies that price lines do not correspond to marginal utilities. What does this imply for index number use? Moorsteen (1961) suggested that there was a problem using prices as representatives of the marginal costs of production, and so as approximations for the marginal rates of transformation, under conditions where 'monopoly and socialist interventions' characterised the economies. He urged that the specific condition for the particular index number calculation be addressed.

The overall implication of this analysis of index number measures of Soviet growth is that trying to ascertain a single production index as a meaningful measure of the changing productive capacities of STEs is likely to produce the misleading changes referred to in the opening quote from Warren Nutter's paper. Nutter (1957) suggested that indexes for individual sectors be used as the basis for inference over the direction and extent of growth in productive structures. Bergson and Gerschenkron invested much research into deriving indexes using alternative weights to Soviet prices as a consequence of their analysis of index number bias in Soviet estimates of output.

3.3 Using index numbers during transition

So far, I have discussed familiar analysis shows that the significant likelihood of distortions to the index calculations during periods of Soviet growth.[13] What I wish to demonstrate in this section is that the analysis of production indexes and their biases during the Soviet era are not just of historical interest. They raise important questions concerning the reliability of

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[13] It is also highly likely that growth rates in periods of slowdown in STEs will also be misrepresented by index calculations. Research continued into the eighties in trying to derive more accurate measures of the growth rates, see Marer *et al* (1985). I do not endeavor to prove this here, other than to say that is if growth is overstated by the Laspeyres index, then this will have implications for the reference point used in comparisons of growth rates during the slowdown. Also, the Kornai model of the shortage economy (1979) that highlighted the role of soft budget constraints in generating excess demand and resource-constrained economies has important consequences for the role of prices as indicators of the marginal costs of production as noted in the above text. Lastly, I would draw attention to the problem of deriving accurate estimates of national income from production indexes during the 1970s and 1980s (the periods most associated with slowing growth in the STEs) that is discussed in the next chapter.

index number usage as a measure of productive potential during the conditions pertaining to the transition period.

The implications of the analysis of index number bias in the Soviet era is relevant for the transition economies for the following reasons:

- *The problem of using prices as representing marginal costs of production and as approximating the marginal rates of transformation.* It was noted above that STEs were unlikely to yield a correspondence between prices and marginal costs and so was unlikely to produce at optimum positions where the price ratio was tangental to the ppf. If we illustrate this point by a price ratio for STEs intersecting the ppf, then transition may be represented by an outward shifting price line[14]. As was discussed earlier, this raises problems in determining real shifts in productive capacities from gains made from resource redistribution. Also, tangency between the ppf and price ratio is unlikely to be attained rapidly because, as the analysis of the previous chapter stated, prices will continue to reflect inherited productive structures to some extent despite liberalisation. It is unlikely that there will be an overnight jump to competitive prices despite rapid liberalisation and international competition. However, even if transition did entail a shift in the price ratio so that it can now reflect more accurately the marginal costs of production, we still have a problem of using the previous period's vector of prices and quantities for comparison. Not only has the price system undergone a fundamental alteration, but so also has the composite bundle of goods. Using Soviet prices and goods, as comparators will generate serious problems for index number calculations during transition, especially if the Laspeyres index uses pre-liberalised goods and quantities for the base period.

- *The difficulties associated with using index calculations as representing the bounds around the true indexes when growth is not homogenous.* Transition entails a major shift in the productive structure of the economies which is likely to be very uneven The process associated with the decline in output during transition, namely 'creative destruction', implies the decline in productive potential in certain industries, whilst that

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[14] This is how Osband (1992) depicts the effects of price liberalisation.

in other industries increases. In the discussion below I endeavor to show what these uneven shifts imply for index number use.

- *The introduction of new products between periods.* This is especially pertinent if we consider period 1 to represent Soviet era production bundles, whilst period 2 is for the post-central planning era. As noted above, both prices and quantity vectors will undergo radical changes during transition. We can expect new products to be introduced, generating biases in the index numbers as previously explained. If the relative prices of certain products were relatively high at the start of transition, such as cars and computers, the examples discussed in chapter 2, and if they grew relatively quickly, this would bias the Laspeyres index upwards during transition. Also, other more Soviet-specific goods will be eradicated from composite bundles and the problem of goods for which there is zero, or even negative, value following liberalisation, presents further challenges for the use of index numbers as measures of productive capacities.

- *Changing tastes and quality.* In the period of transition, we can expect widespread changes in tastes and quality as these economies open up to world competition. The changing export market and demise of the CMEA will have a profound impact on the types of products produced and demanded. Quality changes and the inability of indices to represent these changes adequately have been discussed in the literature on index number problems in general. (E.g. Fisher and Shell (1971); Griliches (1971).) In discussing the problem of changing tastes in cost-of-living indexes, Fisher and Shell (1971) argue that, "If tastes change, however, and if we agree that it is the current cost-of-living in which we are interested, a Laspeyres index loses much of its meaning." (Fisher and Shell, 1971: 22) Given the scale of changes associated with transition, this would tend to imply that Laspeyres indices are invalidated. Further, Griliches (1971) argued that quality change should be included in indexes by undertaking 'hedonic' index calculations that accounted for individual characteristics of products. The value aggregates are unlikely to reflect the change in quality, especially given the changes in input prices likely during transition.

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- *A change in the direction of the bounds of index numbers accompanying a change from suppliers to a buyers market.* We have seen that when the correlation between prices and quantities is such that $r>0$, i.e. they both move in the same direction, then the Paasche will greater than the Laspeyres. The conditions most likely to generate this relationship between prices and quantities were suggested by Allen (1975) to be suppliers dominated market.[15] As transition has been described as a process of shifting from resource-constrained to demand constrained economies (see Kornai, 1979) then this implies a shift in the bounds of index numbers. Transition was associated by a period of rising prices and falling quantities, when measured on a macroeconomic basis, thus, we can expect $r<0$ and for the Laspeyres to be greater than the Paasche index.

- *Dislocations during price liberalisation rule out comparison between periods pre-transition and during transition.* Earlier, Allen was quoted in saying that for Paasche and Laspeyres to act as bounds, there must not be anything 'unusual' between the periods. I think that it would not be an exaggeration to say that from December 1989 to January 1990 was very unusual (the dates of liberalisation for several Eastern European economies). This period included the collapse of central planning and the change in the pricing system that accompanied it, along with the dramatic opening up of relatively autarkic economies to world competition. This major disruption between the periods (and the consequent upheavals that followed) must imply that the bounds will be 'unsafe' as indicators of the 'true' indexes.

These points suggest that there is a degree of overlap between the analysis of the distortions to the index numbers for Soviet era growth rates and that pertaining to transition. However, it also presents some unique challenges for the use of production indexes. These challenges include the influence on index numbers arising from the rapid transformation of the price system itself, the problem of incorporating goods which have become zero-, or even

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[15] This is not meant to imply that the analysis of STEs under period 1, where the Laspeyres index exceeded the Paasche, is incorrect, even though these economies have been described by Kornai (1979) as being characterised by resource constraints and hence supplier dominated. Allen (1975) was not dealing with an accompanying problem of uneven growth, which we may assume can outweigh the problem intrinsic with resource-constrained economies.

negative-, value-added, and dealing with conditions that imply a radical alteration in the nature of markets.

Osband (1992) attempted to show how the liberalisation of prices following an era of central planning would bias the index number measures of output.[16] His assumptions include that the pre-liberalised economy would be producing at a point where the price line intersected the ppf, and that once prices were liberalised, the good that was in deficit in the previous period would increase its output. This resulted in the Laspeyres quantity index understating growth. However, his analysis also assumed that the productive structure of the economy did not change, so that the ppf schedule was static for both periods. The productive capacity remained that from the previous period, i.e. STE, across both periods. This is highly unlikely given the upheavals concomitant with transition (even if we assume that the analysis covers two periods that are very close together, the overnight collapse of central planning and administered pricing still alters the production possibilities schedule). Also, the assumption that the deficit good experiences an increase in output may not necessarily hold. Many examples can be given of goods that may have been in short supply during the Soviet era, but the output of these goods actually fell following liberalisation; the list would include many consumer items, such as, televisions, washing machines, cookers etc. Thus, Osband's (1992) analysis ignored the problem of negative value-added or zero-value for Soviet goods following liberalisation and its effect on index number bias.

Earlier the productive capacity of an economy was defined as including the resources, technology and institutional structures. As transition involves major changes in the institutional framework of the economy following the collapse of central planning, and as we can have a high expectation that the technology developed under the Soviet era is likely to undergo successive alterations, so we can expect shifts in the ppf. Shifts are likely even over relatively short periods of time (the collapse of central planning implies that such a shift will take place literally 'overnight') The analysis developed previously to describe Soviet era growth, and much of that contained in textbooks, assumes growth. In other words, the usual position is to portray outward shifting production possibility frontiers that accompany the

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[16] Osband's analysis (1992) also included a discussion of the bias to the price indexes. However, I shall concentrate solely on the production-side, as this is the main focus of the present discussion, whilst noting that price indices are also likely to be biased for similar reasons.

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development of productive capabilities. If we accept for now the description of the crises inflicting these economies following the collapse of central planning as being one of the destruction of certain capabilities, accompanied by expansion of others, what does this imply for index numbers? How can one attain an aggregate representation of the sum of these effects?[17]

Under the conditions described as 'creative destruction', it is plausible that ppf schedules may actually intersect, as shown in figure 3.3 below.

Fig. 3.3: Index number estimations under 'creative destruction'
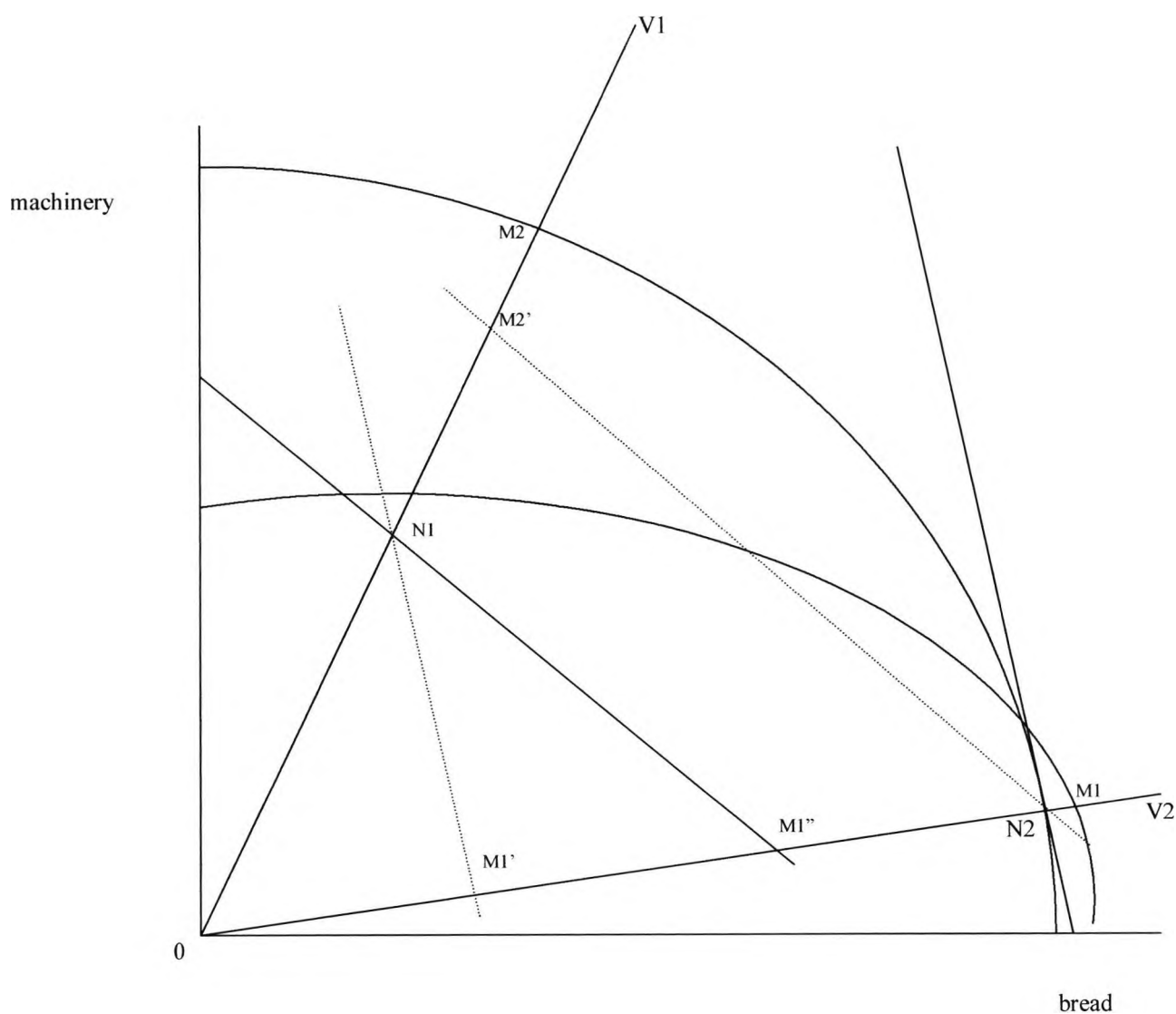
Let us assume that whilst the production of machinery was favoured in period 1 (the Soviet era), there was a shift in favour of bread production in period 2 (the transition period) and away from machinery. This is reflected in the vectors V1 showing more of the machinery in the bundle and operating below the ppf to reflect the inefficiencies and so representing a 'Soviet' bundle than V2, which is drawn to represent the 'post-Soviet' bundle with more emphasis on the consumer bundle i.e. bread. We could continue the analysis outlined in the previous section and suggest that in the first period the Laspeyres is a closer approximation to the true index than the Paasche, whilst in the second period, the Paasche is more reliable than the Laspeyres. (This fits with the point noted above that when prices and quantities move in opposite directions, the Laspeyres would be greater of the two). This would imply that the Laspeyres index would overstate growth during the transition period.

However, we have a problem making inferences from such a process, for what is to say that point ON1 on the first ppf represents a high or lower level of productive capacity than point ON2? Samuelson (1950), in addressing the problem of evaluating real national income, suggested that when using aggregate data we might not be able to infer an increase in national income. This would be the case when the output of one good rises whilst that of another falls (Samuelson (1950) criticised Hick's definition of an increase in real social income on these grounds). Using ppf schedules that cross (as I have done in figure 3 above), Samuelson (1950) states that a comparison of two points, such as points N1 and N2 shown on figure 3, will make "..no unambiguous inference about an increase in potential real income possible." (Samuelson, 1950: 13) Thus, the measures of changing production potential cannot indicate whether there has been an improvement in the productive capacity of the economy when the ppf schedules cross. We cannot assume that more of goods produced at point N1 entail a superiority of point N1 over N2. As N1 is a point on the Soviet era ppf, then it is surely incorrect to infer that even though it represents more of every good in that particular region, it also represents a higher real national income level than at point N2?

The main point that Samuelson (1950) was making in his article was that the simple index number inequality $\Sigma p2q2 > \Sigma p2q1$ does not necessarily equate with an increase in real social income over the two periods. Given the possibility of ppfs intersecting, the inference from index numbers is ambiguous. This is a problem for economic theory in general, and illustrates the complexities of defining growth and economic welfare. What is crucial for the

present discussion is that the conditions associated with transition, namely creative destruction, are likely to generate an outcome, which will lead to high probabilities of these types of ambiguities arising. The danger then is that normative judgments are made, or "ethical judgments" as Samuelson (1950) puts it, over which bundle indicates a higher productive capability over another when such a statement is not justified on the basis of measurements of aggregate increases in production possibilities. As Samuelson (1950) cautions; "One last warning is in order: to define what is feasible involves many arbitrary assumptions, some of them of an ethical nature." (Samuelson, 1950: 21)

It is widely accepted that production indexes have to be treated with a high degree of caution in transition economies. Yet, these indexes still form the basis for estimates of GDP, and so for economic policy decisions both by national governments and by multilateral institutions. The most common-held view, as was pointed out in the introduction, is that growth has been understated. Osband's analysis (1992) of index number bias lends weight to this opinion. The analysis presented in this chapter has a number of implications for index number usage. One inference is that, although we can say unequivocally that there will be bias present in index numbers during transition, it is not possible to say *a priori* the direction of the bias. We have to take into account a number of different considerations ranging from the affects of the changing productive structure to the problem of products with zero or negative value-added post-liberalisation. A less cautious inference is that the Laspeyres index is likely to overstate the growth rate, being greater then the Paasche or the true index. What is required on both these counts is an in-depth investigation of the direction and extent of the bias to the production indexes. An analysis of disaggregated data and the bias in the indexes for industrial output is the subject of chapter 5 of this thesis. Lastly, the discussion of Samuelson's view on the problems of interpreting growth in productive capacities from the simple index number inequality $\Sigma p2q2 > \Sigma p2q1$ as well as the difficulties arising from applying competition criteria based on the efficiency standard to non-competitive economies, implies deeper conceptual problems with index numbers during transition. There are profound difficulties in using the measuring rod of money to ascertain the value of a commodity when both the measuring rod and the nature of the good itself are undergoing major transformations. I will not attempt to investigate these problems any further at present, other than to say that there are fundamental conceptual problems associated with

the use of aggregative index numbers during transition and that these concerns will be the subject of further research. However, again, the problems arising from the theoretical framework of aggregative analysis imply the use of more disaggregated data.

Appendix 3.1: The economic-theoretic rationale of index numbers: A general account.

A3.1.1 The competitive criteria used in aggregation

What is the economic rationale for the use of aggregative index numbers? Frisch (1936) refers to aggregative index numbers[18] as the 'functional approach' and states that; "In the functional approach certain *characteristic relations* are assumed to exist between prices and quantities." (Frisch, 1936: 3) The use of aggregation makes certain, defined assumptions about the behaviour of prices and quantities so that, "These data include something more than just a set of prices and a set of quantities associated with each situation..." (Frisch, 1936: 10). There is a functional relationship between prices and quantities underpinning the aggregative indices so that prices and quantities are not perceived of as separate, independent variables.

The general aggregative form is:

$\Sigma p_t q_t$

To attain an index of quantity we can choose between prices in the current period (t=1) in a two-period situation, or prices in the previous period (t=0), which is the reference period. The base-weighted form for the quantity index is thus:

$$Q_{01(p_0)} = \frac{\Sigma p_0 q_1}{\Sigma p_0 q_0}$$

Current weighted form:

$$Q_{01(p_1)} = \frac{\Sigma p_1 q_1}{\Sigma p_1 q_0}$$

Likewise with price index numbers, we have current or constant weighted:

$$P_{01(p_0)} = \frac{\Sigma q_0 p_1}{\Sigma q_0 p_0}$$

$$P_{01(p_1)} = \frac{\Sigma q_1 p_1}{\Sigma q_1 p_0}$$

The first form is referred to as the Laspeyres index, the current-weighted as the Paasche. So far this is standard analysis, but what is crucial is that these index numbers assume a specific relationship between prices and quantities. As Allen puts it;

> The price index numbers...have a clear economic interpretation; the changing cost of a fixed and specific budget purchased by a specified group of consumers. The two index numbers [Paasche and Laspeyres] differ only according to which of the two budgets, for year 0 or for year 1, is taken for costing. Equally, the quantity index ...has a clear economic meaning. The value aggregates related are consumers' expenditures at constant prices, instead of at current prices. The base-weighted index, for example, compares consumers' expenditure at constant (base-year) prices. This is consumers' expenditure in real terms, as understood by the economist." (Allen, 1975: 24)

Using a value matrix we can depict the various index numbers as:

$$\begin{bmatrix} \Sigma p_0 q_0 & \Sigma p_0 q_1 \\ \Sigma p_1 q_0 & \Sigma p_1 q_1 \end{bmatrix}$$

P_{01}, the base-weighted price index is the ratio of the values in the first column, and the current-weighted prices index the ratio of terms in the second column. Likewise the quantity index numbers are found from the ratios of the rows. The leading diagonal shows actual values V_{01}.

The relationships between the value aggregates are important for they define different approaches to attaining the index numbers. For every Laspeyres quantity index number, there is an implied Paasche index number, found by dividing the actual value aggregate by the base-weighted aggregate: $P_{01}(q_1) = V_{01} / Q_{01}(p_0)$. This result becomes important when considering the bounds of the both the Laspeyres and Paasche index numbers for either price or quantity around the 'true' index for the price or quantity level respectively. For the constant utility price index may be defined as:

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[18] Aggregative index numbers have become the favoured method of calculation of economic data. However they are not the only method as Edgeworth (1925) argued. He evinced the case for a 'plurality' of index numbers, favouring a stochastic or atomistic index number in certain circumstances.

$$I_{01} = \frac{\Sigma p_1 q_1}{\Sigma p_0 q_0}$$

Where $\overline{q_1}$ is a budget purchased at p_1 that keeps the consumer on the same indifference curve, so the index number measures the changing cost of remaining on one and the same indifference curve. The production potential measure can be derived in a similar manner.

As the constant-utility index measures cannot be used as the basis for index number calculations, "What it [I_{01}] does is provide a basis for judging how close we are to the 'true' index; it gives the target at which we aim. We can hope to approximate to this true index, or at least get bounds between which the true index lies, by use of actual price and quantity data." (Allen, 1975: 49)

The study of the bounds has been a main focus of research[19], mainly for the price level, in the theory of the constant-utility price index

A study of index number theory by Diewert (1981) outlines the conditions necessary for the both the cost and the utility (production) functions to satisfy the requirements of aggregative index numbers. The basic relationship is defined by consumer and producer behaviours so that;

> The consumer's (or producer's) aggregator maximization problem can be decomposed into two stages: in the first stage, the consumer (or producer) attempts to minimize the cost of achieving a given utility (or output) level, and, in the second stage, he chooses the maximal utility (or output) level that is just consistent with his budget constraint. (Diewert, 1981: 164)

This is the fundamental assumption upon which the aggregation problem rests. The functional relationship between prices and quantities referred to earlier by Frisch is the relation between the budget constraint and the utility or production function. Diewert (1981) states that the cost function will be defined by,

$C(u,p) \equiv \min_x \{ p^T x : F(x) \geq u, x \geq n \}$ 1.

The cost function in the domain of u and p will be minimised subject to an expenditure constraint where $p^T x \equiv \Sigma^N_{i=1} p_i x_i \leq y$, where x and p are both positive vectors of commodity rentals and prices respectively and y>0 is the expenditure on N commodities. Given this relationship, the underlying aggregator function (utility or the production function) must be specified and then the optimisation problem solved. Thus, "The cost function C turns out to play a pivotal role in the economic approach to index number theory." (Diewert, 1981: 164) Diewert (1981) shows that if the aggregator function is a real valued function that has the properties of being continuous, increasing and quasi-concave over the non-negative orthant, then the cost function defined by equation 1 will satisfy a second set of conditions. (Diewert, 1981: 164) These second conditions include: the cost function defined in equation 1. will be continuous in (u,p); costs will be increasing as utility (or output) increases; the upper limit of ∞ is not feasible; the cost function is linearly homogenous in p; concavity is defined by positive price vectors; costs are increasing in price except at u=0; and all utilities cost at least as much as current cost so that the choice maximisation problem is continuous. Whilst the applicability of this second set of assumptions need not concern us in the present discussion, the first set of conditions for the operation of the cost and utility (or production) functions are essential or sufficient (If, as is argued here, the first conditions do not apply during transition, then the second set of conditions will also be inapplicable.)

Thus, the economic theory underlying the use of index numbers assumes that the cost function can be defined by a minimisation solution given a utility or production function that holds the basic property of being continuous from above. In other words, the theoretical basis for using aggregative index numbers is specified by consumer (or producer) behaviour that satisfies the optimization behaviour defined by a cost constraint. Later, Diewert (1981) relaxes the conditions for the aggregator function to just that of being continuous from above.

What is crucial for the analysis here is that, according to Diewert (1981), the economic rationale for using aggregative index numbers rests on the defined relationship between cost and utility (or production) function. What I aim to show in the next section is that this relationship cannot possibly hold for either the Soviet-type economies, nor during their transition to a market based system. The definition of cost functions, prices and the

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[19] See Diewert (1981) for a discussion of the various studies by Konus, Pollak et al on index number theory

minimisation problem given by Diewert (1981) assumes market relations and so does not fit non-market economies.

However, before proceeding to show that these basic conditions are not likely to hold, the question must first be addressed as to whether the violation of the primary assumptions underpinning the cost constraint and the optimisation problem will result in the invalidation of index numbers themselves. In other words, are the first conditions outlined by Diewert (1981) necessary for the derivation of aggregative indices, so that if and only if those conditions hold will index numbers is viable?

What has been a theme of this section on index numbers is that their use entails an underlying theory of consumer or producer behaviour. Although the literature concentrates on the consumer side, and in particular derivation of an index of the purchasing power of money or cost-of-living, the underlying rationale is true for the production side as well. This is implicit in the conditions for index numbers described by Diewert above (his aggregator function can be a production function as well as a utility function), and in Allen (1975). In Allen the supply side is defined to construct a constant-resources price deflator index. He goes on to show how the measure of real output can be implied by deflating the value change (Allen, 1975: 74) However, it must be stressed that the economic rationale is a long way from GDP constructs, as Allen puts it;

> And so we proceed at our own risk to an analysis of consumer's expenditure, as one aggregative constituent of the gross domestic product (GDP), by means of a consumers' price index and a corresponding index of real consumption. We are at even greater peril in proceeding to analyse GDP, as a comprehensive aggregate of expenditures, in the same way into real GDP by deflation by a price index described, in the official national income *Blue Book*, as 'home costs per unit of output'. If we reach this point, we are far from the theory of value. (Allen, 1975: 48)

Certainly the economic theory focuses on the derivation of price indices, but this in itself implies a relation to the output index numbers. For, as explained above, for each price index, either Paasche or Laspeyres, implies a corresponding quantity index number found via the value relation. Thus, the relationship between the price and quantity index numbers is implicit in the value relationship; they form the bounds to the quantity index. This in turn is defined by the function of costs and aggregator functions defined in equation1. Cost

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and the constant-utility price and output index numbers.

minimisation is crucial to the derivation of the bounds for the quantity index (be it a Konus or Allen quantity index[20])

Aggregative index numbers involve a relationship between prices and quantities that must hold for them to be viable. Their purpose is to measure an unobservable magnitude, either the aggregate price or output level. The use of prices as weights (either constant or current prices) to describe changes in output assumes that there is a value relationship between prices and quantity such that prices reflect the scarcity value of the commodity in the economy. This is the relationship defined by the minimisation of costs by the aggregator function. If this relationship does not hold then we can no longer assume that Laspeyres and Paasche index numbers will be measures of the bounds around a 'true' index for either prices or quantity. We are in danger of violating the economic rationale for using aggregative index numbers, and as a consequence, the measures will be misleading.

A3.2.2 Soft budget constraints, planners' preferences and the violation of the market criteria for aggregation

Using Janos Kornai's model of soft budget constraints (Kornai, 1986) I wish to demonstrate the violation of the cost minimisation assumption in the STEs. Diagram 3.4 below illustrates the softening of the budget constraint.

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[20] Diewert (1981) notes that the Malmquist quantity index does not assume cost minimisation (Diewert, 1981: 164) But in this index number a deflation function is assumed that satisfies the conditions of being continuous and homogenous, as well as transitive (or circular) properties in the index numbers must hold

Diagram 3.4 Kornai's soft budget constraint
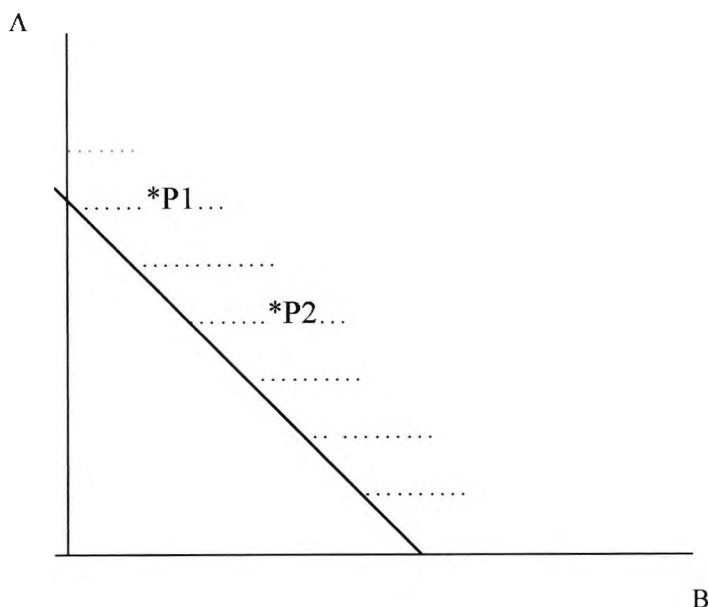
The basis for this soft budget constraint[21] (sbc) is that the operator has a high expectation that its cost overrun will be met be finance from the state. Thus, Kornai (1979) shows an 'expendable' budget constraint. In the STEs there is a high probability that excess expenditure by the state will cover the financial requirements of the firm. If in period 1, the actual expenditure of the firm jumps to P1, as a consequence of the firm undertaking to fulfill its planned output target for that period (the target for output being set by the central planning authorities), some form of softening of the budget constraint will allow finances to also jump to P1. In the following period the ratchet effect of the targets for output growth (see Dyker, 1992) requires that output jumps to P2, which again will require a financial jump so that the output is covered regardless of costs.

The operation of the central plan with its growth targets for each period and resultant jumps in financing have several important consequences. First, the cost function is discontinuous. In period 1, it jumps to P1, in period 2 to P2. Second, the cost minimisation equation outlined above does not define the choice undertaken here. The central planners are

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[21] I am using Kornai's model (1986) here as an illustration of the problem. Its use does not imply an unqualified adherence to the model I believe there are problems with the depiction of sbcs to describe the centrally planned economies as well, for still he is couching the problem in terms of prices. The problem is presented as one of a vector of prices, albeit soft ones, in the quantity domain. As the central planners only used prices and money as an accounting device, not for allocating resources, then the budget constrain, be it hard or soft, does not explain the choices facing the planners - prices do not mediate their decisions, no matter how soft.

determining output according to their preferences, which, as I discuss below, may not fulfill the criteria for preference ordering assumed in the literature on producer and consumer behaviour. Third, one way that the state can allow budget constraints to operate is by the use of administered prices. (Kornai, 1986: 6) As the previous chapter outlined, the operation of the pricing system under all the centrally planned economies reflected the priorities of the planners - forced industrialisation.

The implication is that the axioms of the cost minimisation problem do not hold. As Kornai puts it, "*Soft budget constraints are not effective*. The financial situation of the firm does not constrain action. Money has only a passive role. "Let it cost what it may."" (Kornai, 1979: 807)   Further, Kornai adds that,

> If the budget constraint is soft, Say's principle is not valid, and together with it, Walras law is not valid either. In the final result, the fundamental axioms of standard microeconomics are not valid. Therein lies the key to understanding the microfoundations of the shortage economy. (Kornai, 1979: 809)

The implication presented here is that if the fundamental axioms of microeconomic theory are invalid, so is the use of index numbers, because as shown above, these axioms underpin the use of aggregative indices. The widespread use of sbcs or the high probability of firms gaining the funding necessary generated the shortage economy. Although there may arise cases in western economies when individual firms are 'bailed-out', this does not imply the same problems pertaining in the west. (Although there may be implications for index numbers even when western market economies are considered). As Kornai points out, "It would be a grave mistake to over-rate the similarities between socialist and non-socialist economies in this respect." (Kornai, 1986: 22) for the bailout of firms in the STEs this is fundamentally different to the bailout of individual firms in the West, as these are exceptions to the rule. In Hungary, "There the bankruptcy is the exception and the bail-out the normal routine." (Kornai, 1986: 22)

As has been previously, the object of the central planners was to undertake industrialisation as rapidly as possible. They would produce 100 tonnes of steel, no matter what the cost, if that were the amount decided in the plan. The 'no matter what the cost' part of the decision refers to the direction of resources, as well as to financial considerations. Resources in the economy were withdrawn from areas deemed to be of lower priority, such as the consumer

sectors and light industrial goods, into the heavy industrial sectors. As David Dyker notes; "...if plan fulfillments in priority sectors was threatened, resources would be shifted across to them from the 'soft' sectors - usually agriculture and light industry. "(Dyker, 1992: 12)

This led to the bottlenecks for the production of low priority goods described in Kornai's shortage economy model. It also laid the basis for the informal networks of trade between enterprises that has typified the period of barter following the collapse of central planning. As Nove puts in when discussing the classical period of Stalinist planning;

> Under Stalin the top priority of heavy industry was ruthlessly enforced. Errors or omissions were borne by the less important sectors. Hence persistent neglect of agriculture, and the fact that even modest housing plans were never fulfilled, despite the notorious degree of overcrowding. (Nove, 1969: 358)

The 'priority principle' was applied in all the centrally planned economies, although during the era of reforms it was relaxed somewhat. (Elsewhere I discuss the imposition of planning on the central European nations and the consequences for the statistical methods.) A further point is that it was this priority principle for heavy industrial production, led to the wasteful practices that came to typify these economies.

The priority ordering described here is an example of lexicographic preferences. Lexicographic preferences are commonly depicted as bundles where the order is determined according to the principle of words in a dictionary or a lexicon; food comes first in the lexicon, clothing second, and so on. (Deaton and Muellbauer, 1980: 27) The choices under these preferences can be defined as,

> ...an agent with lexicographic preferences evaluates all bundles by first comparing the amounts of some specific good the bundles contain. If one bundle has more of the good than another, that bundle is chosen, no matter how much of the other goods the bundles contain. Only if two bundles contain the same amount of the good does the agent compare the amounts of some second good and choose a bundle that has the most of the second good, and so on." (Schotter, 1997: 27)

Instead of portraying this ordering as to a lexicon, we can depict this as the preference ordering according to the principles of forced industrialisation. In the plan, heavy industrial

products will always come before food or clothing etc, no matter how much of the latter items are contained in alternative bundles. The priority principle outlined by Dyker above and in Janos Kornai's shortage economy model where a particular output will be produced 'no matter what the cost', I would argue are examples of this type of lexicographic preference ordering. It is the functioning of this bias to heavy industry that Kornai depicted as a 'siphoning' off of resources from the consumer sector into the firms, so generating the shortages of consumer goods. Many commentators on the Soviet regimes have referred to the planners' output decisions as 'irrational', including, famously, Hayek, a view seemingly vindicated by the growing waste and shortages that typified these regimes. What is argued here is that, indeed, these preferences did not fit the 'rational' ordering that corresponds to the choice axioms of neoclassical microeconomics.

Preferences will be discontinuous under lexicographic ordering.[22] When preferences are lexicographic then no indifference curves can be drawn and "no utility functions exist." (Deaton and Muellbauer, 1980: 27). Again the operation of lexicographic preferences violates the axioms of the producer and consumer behaviour that underpin the use of index numbers.

The analysis contained in this appendix suggests that the microeconomic framework operating in STEs as described by the shortage economy model was not suitable for aggregation. Diewert (1981) established the market criteria for aggregation. The STEs violate the competitive criteria. The implication is that index numbers under STEs are unreliable. In which case, we cannot use index numbers of output to measure the absolute level of output in these economies prior to transition. We are left without a measuring rod to judge the performance of transition.

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[22] See Schotter (1997: pages 27 and 28) for a proof of discontinuity under these conditions.

CHAPTER 4

MEASURING THE GDP OF TRANSITION ECONOMIES

> Traditionally the statistics complied in Central and Eastern European countries (CEECs) and the New Independent States (NICs) of the former Soviet Union have differed in content, classification and methodology from similar data available in OECD Member countries. (OECD, 1994: 9)

The problem of attaining a meaningful estimate of economic activity in centrally planned economies (CPEs) has been well documented. A number of renowned western institutions, including the World Bank and United Nations, attempted to calculate a more reliable GDP measure for the CPEs in recognition of the problems inherent in figures published by the official statistical agencies in the Eastern-bloc countries. Although references to the difficulties and direction of possible biases during transition are manifold, similar systematic studies are lacking. Unlike the research resources put into establishing more reliable measures of centrally planned economies, most economists, whilst acknowledging the likelihood of a certain level of bias in measures of GDP during transition, are willing to accept official GDP statistics.

The difficulties identified for measuring GDP in transition economies can be classed in the following categories following Simon Kuznet's (1948) classification of the main issues of economic measurement[1]: value, scope and netness. The first, value, refers to the problems inherent in a measure of economic activity based on money flows applied to an economy changing from an administered price system to more market derived measures. Regarding the second, scope, there are implicit problems in the production boundaries for the measure under central planning, with many services omitted being included within the output of the state-owned enterprise. The changing nature of these production boundaries inherent in the process of privatisation and developing *de novo*

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[1] Kuznets (1948) constructed the following categories when tackling the problem of national income determination. Thus, "The great pioneer of national income accounting and Nobel laureate Simon Kuznets posed the problem of measuring output and its growth through time in terms of 'scope, valuation, and netness'." Boss (1986: 243) Although Kuznets' classification focussed on the western market economies, Boss (1986) has used these categories to discuss the problems specific to the centrally planned economies. In this discussion I will also use Kuznet's general schema to tackle the issues concerning national income accounting in transition economies.

private sector will be discussed. The boundary between state and market production is also subject to much confusion during transition. Lastly, netness, meaning the attempt to ascertain a measure of the final value of a product without double-counting the intermediate levels of production, is also be highly problematic given the concentrated nature of production in these economies, as well as the difficulties establishing clear boundaries between production for government and the market.

This chapter examines the likely sources of bias in both GDP per capita for Hungary, Poland and Romania before the transition, as well as during transition itself. First, can a meaningful measure of GDP be derived for these centrally planned economies given the nature of the difficulties? This inquiry is not just of historical interest. If we are to judge the performance of the present day transition economies then we need some basis for comparison. The current practice is to use 1989 as the base year (see EBRD *Transition Report*, 1999 chart 3.1 p58, and Martin Wolf (1999) in the *Financial Times*) and to measure each country's performance relative to this base year. The implication of these procedures is that Poland is the clear front-runner, achieving 121% of its 1989 level of output by 1999. We need to verify the reliability of the original estimates of GDP if we are to undertake such a comparison.

Second, the statistical systems evolved under centrally planning were specific to the requirements of those economies. "Historically, statistical offices in CEECs and the NIS were closely integrated into the central planning system." (OECD, 1994: 9) The collapse of central planning entailed a revolution in the statistical systems. These countries' attempt to be included in the world economic institutions also required the adoption of procedures aimed at establishing a standard methodology for measurement of GDP of market economies, namely the OECD-UN System of National Accounts (SNA hereafter). In this chapter I present an argument that this adoption has meant a fundamental shift in statistical practices. The crucial problem raised in this discussion is how a statistical system of measurement based on the workings of the market can be applied meaningfully to economies that are only in the throes of creating markets practices.

Third, I will examine different attempts at measuring GDP per capita during transition. One feature of most measures of GDP per capita is the wide divergence between estimates converted on the basis of market exchange rates and PPP measures. This gap

will be discussed with particular reference to data derived from the European Comparison Project (1995).

4.1 Background

The centrally planned economies used 'Net Material Product' (NMP) as their chief system of measuring aggregate economic performance. Using the physical output of individual enterprises, the statistical offices' key aim was to publish and collect data that would aid the drawing up of five-year plans. Monitoring enterprises' output was also crucial to the derivation of both targets and material balances underlying the plans. This process generated volumes of information concerning the quantitative output of enterprises, but little data was expressed in monetary terms.[2] As Derek Blades points out, "They [i.e. the statistical offices in centrally planned economies] do publish detailed quantitative data on production of a vast range of products, but not the price information required to convert these into common units – rubles, zlotys, forints, and so on – to provide overall measures of economic performance." (Blades, 1991: 13)   This has led some commentators to describe the statistical offices' practices under central planning rather as "bookkeepers than statisticians." (Blades and Harrison quoted in the *Monthly Labor Review*, Feb 1994: 38)

Despite the lack of monetary data for the CPEs, the need to attain a measure of aggregate performance in these economies in order to make a comparison with that of the market economies led to the use of constructed national income measures as an alternative to official estimates. What became the subject of much research in both eastern and western institutions was the derivation of a measure of economic performance of the CPEs that was comparable with estimates in the west.

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[2] Helen Boss (1986) suggests that the emphasis on physical output can be traced back to the period following the civil war for soviet statistics. "After the devastation of the Civil War, concern was with the quantity indicators covering a limited number of physical items (grain, fuel), with a corresponding lack of interest in value aggregates. The early focus on quantities made sense in that huge price changes since 1913 rendered statistics in current rubles of dubious value. But practices born of war and hyperinflation legitimized "ton-mentality" and aggravated tendencies to leave services out of account." (Boss, 1986: 254) Elsewhere, I document the imposition of soviet statistical practices onto the eastern European countries in the post second world war period. Later in this chapter I also question the use of measures based on currencies in periods of hyperinflation following the collapse of central planning.

The reference to the material product system as an aggregate system comparable to the UN's SNA was a western convention chosen by the United Nations Economic Commission for Europe to differentiate the two systems. The actual Soviet term was the 'system of material and financial balances'. Another western convention was the rendering of *natsional'nyi dokhod* (national income) as the 'net material product'. (Boss, 1990: 162) The view that NMP was an equivalent measure of national income led to a range of comparisons between the two measures of output.

One method for deriving GDP measures for the former Soviet-bloc economies was to 'scale up' the NMP. This process involved identification of the areas where NMP differed significantly from SNA. In the United Nations' *National Accounts Statistics: Main Aggregates and Detailed tables* (1993) there is a detailed discussion of the main differences between the SNA and MPS systems. According to the UN, "The presentation [of the material balances] is therefore comparable to that of production, income and outlay and capital finance accounts by institutional sectors in the System of National Accounts (SNA)." (UN, 1993: xxiii)

Thus, despite the difficulties arising from the derivation of material balances for the purpose of the planning agencies, along with the omission of monetary data from the publications[3], the MPS was still seen as an aggregate measure comparable to the SNA. In listing the tables of MPS the United Nations state that; " Table 1 on net material product by use is similar to the SNA table on gross domestic product by kind of economic activity." (UN 1993, xxiii) Although the United Nations tables asserted that the two measures are comparable, it also acknowledged where the two systems differ. One of the main differences from the SNA identified in the MPS is that of the scope of coverage, in particular the omission of nonmaterial services from the MPS.

The differentiation of productive and non-productive activities in the economy under Soviet practices resulted in many services being omitted from the NMP, whilst some

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[3] Added to this, the value data that was published would have to be interpreted carefully. Making direct comparisons between prices derived by the administered system to market derived prices would be highly misleading.

were included that would not have been in the SNA system. Thus the 'scope' of NMP differs significantly from the conventions of the SNA standard. As the study by Marer *et al* (1985) points out, certain services were included in NMP such as freight transport and material communications. Hungary, Poland and Romania did include passenger transport in NMP, whilst the USSR convention was not to include it. Social services that were provided free of charge to employees in the material sectors were left in NMP estimates. However, these would be removed in the SNA system. All of which makes comparisons very fraught. (Marer *et al*, 1985: 17) Once this problem has been identified a possible solution is to estimate the services omitted from NMP and adjust the aggregate measure accordingly. Such a procedure would make use of official data on employment, average wages and wage taxes to which was then added an estimate for the operating surplus i.e. profits, in order to arrive at an estimate of the nonmaterial services contribution. However, as the study by Marer *et al* notes; "Lack of data and sometimes also lack of knowledge of production boundaries or valuation in the NMP practices of some countries have made it difficult to know whether or how to adjust NMP in some cases." (Marer *et al*, 1985: 17)

The problem of valuation has also been widely addressed in the literature and I refer here to a few chosen, but arguably seminal, studies. That the NMP was evaluated on the basis of administered prices, with the inherent biases in prices for industrial goods as described in chapter 2, generates severe problems when making a comparison to market-based measures. Can NMP the be used as a measure of production potential or welfare given that prices are often divorced from cost structures and scarcity values? One solution pioneered by Abram Bergson (1961) involved the use of adjusted factor cost estimates as an alternative to the use of prevailing administered prices. This method involved removing from the prevailing prices the turnover taxes and subsidies, and profits whilst adding notional amounts for returns to working and fixed capital and land. The aim is to ensure that prices are equal to average costs and that factor prices are proportional to factor productivities and equal between markets.[4] Underlying this methodology is the notion that Soviet prices can be transformed in such a way that the efficiency standard and the corresponding index indicative of the production potential of the economy can be upheld. (See chapter 3 for a discussion of the theoretical basis of

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[4] For a detailed account see Bergson (1961) whilst Marer *et al* (1985) provides a useful summary of the application of adjusted factor cost approach in his evaluation of the estimates of dollar GDP in the CPEs.

index number use in this context.) Marer *et al* (1985) raises the important criticism of the AFC approach in that it omits differences in quality and the introduction of new products. But there is a more fundamental critique of this method - can the estimates of turnover taxes and subsidies be accurately measured and are the imputed interest charges on capital realistic when the market mechanisms required to derive them do not exist? Further, to calculate costs, some knowledge of factor prices will be required, yet we know that CPEs also had distorted prices in the factor markets. To break out of the prevailing price system in the CPEs requires a leap that is likely to render any resulting estimates of prices more fanciful than 'rational'.

An alternative study that attempted to establish comparable measures between the CPEs and market type economies (MTEs) was that of the *International Comparison Project* (ICP). The ICP recognised that along with the distorted domestic price system, the currency was also inconvertible. The existence of differing exchange rates made calculation of economic performance in internationally convertible currencies implausible. The aim of this project was to establish comparable measures that permitted the countries to be ranked according to the size of their GDP per capita. It initially covered 10 countries in 1975 and was later expanded to 34 countries by its third phase in 1983, including Poland, Hungary and latterly Romania. The innovation of the ICP's methodology was the use of 'international prices' as the weights for aggregation. According to the ICP, "The world price structure comprises a set of average international prices based on the price and quantity structures of the ten countries included. [10 being the extent of the study in 1975]" (Kravis, Heston and Summers, 1982: 5) The USA was used as the numeraire country, and the price relations in the different countries were expressed in 'international dollars'. For the CPEs, Austria was also used as the reference country during the 1980s study for group II European countries, a group that included Hungary, Poland, Austria, Finland, and Yugoslavia (Romania also participated at the beginning but withdrew in the later stages). The surveys of goods and services in each country undertaken by the ICP also had the benefit of being adjustable to take differing quality of product or service into account. Thus, a type of Purchasing Power Parity (PPP) measure of GDP per capita could be calculated in dollar terms. This methodology, it was hoped, could be a way of solving the problem of comparability between products and services in the CPEs with those produced in the market type economies (MTEs) as the studies rested on detailed surveys

of individual commodities and services. (More detail of the ICP methodology is provided in appendix C)

In Phase IV of the ICP programme, based on a European Comparison, Austria was used as the numeraire country. The volume relatives (to Austria) of GDP per capita for Hungary and Poland were estimated to be 53.7% and 50.1%. The dollar value GDP per capita's on the basis of one Austrian purchasing power schilling in 1980 were:

Hungary $4,373
Poland $4,081

(Marer *et al*, 1985: 89)

However, these studies continued to rely on official price lists and retail prices in state shops and therefore were likely to be subject to significant bias. Concern was also raised over the adjustment for quality differences, the feeling being that the poor quality of goods and services was underestimated by the ICP. Overall, the World Bank study of CPE GDP levels concluded that,

> The experts from Hungary and Poland participating in the second workshop [of the World Bank study] as well as others with whom we have talked in Hungary, Romania and Poland, believe that the ICP Phase III results...are strongly biased... (Marer *et al*, 1985: 36).

However, although these criticisms have validity and illustrate the problems deriving accurate aggregate measures, the ICP did attempt to adjust for factors such as quality, and the low prices of services in CPEs. These factors tend to be omitted in other estimates of GDP for these economies. The ECP data also provides a consistent series for Hungary and Poland for both periods of central planning and transition.[5]

The study for the World Bank by Paul Marer *et al* (1985) also attempted to establish a measure of GDP per capita in dollar terms. Their methodology was based on the adjustment of purchasing power parities by using the exchange rate deviation index (calculated from the relationship between the PPPs and exchange rates of market

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[5] In Chapter 6, I use the ICP and ECP data to estimate the relative share of services in these economies because they provide a consistent database for Hungary and Poland from 1985 to 1993 and because they do attempt to adjust for services. The drawbacks of using data from these sources are also discussed in Chapter 6.

economies at given levels of GDP). This, they believed, would produce measures of GDP per capita for the CPEs that were comparable with those of the MTEs and allow ranking in the World Bank Atlas. (Marer *et al*, 1985: 9)

In a study that provided a critical appraisal of these attempts to estimate levels of GDP in the CPEs comparable with western economies, Lancieri (1993) questions the reliability of each of these methods,

> Estimation procedures have all been developed on the basis of a quantitative stance. By running regressions between income and quantities in Western countries, and then applying the coefficients obtained to CPEs, these procedures have implicitly assumed the same degree of efficiency across countries in handling quantities, both for consumption and for investment. Problems of waste, delays, unreliable distribution, loss of quality during excessive stockage…higher energy requirements by appliances and machinery…etc, have been overlooked. (Lancieri, 1993: 173)

I believe this criticism cuts to the heart of the problem of estimating gross domestic products in the centrally planned economies. The estimations of comparable GDP levels for the CPEs rests on the notion that these economies can be treated in the same fashion as market economies, albeit with adjustments to take into account possible distortions. Alternatively, certain measures rely on 'norms' for market type economies, such as those used in the physical indicators method[6], and then apply them to the CPEs. Although the Physical Indicators method can side step the valuation problem by using data in physical terms, it cannot avoid the problem of comparing market-type economies and centrally planned ones. The usage of these items will differ between the two economic systems. Again, it is a problem of not being able to compare like with like.

What all these estimates overlook is the uniqueness of the centrally planned economies. They also have to rely on data from the national statistical offices at some point, either for output or for prices. Yet the rationale for data collection in these economies primarily concerned the requirements of the five-year plans and, as we have seen

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[6] By Physical Indicators method I refer to the estimates generated by comparing income levels to a variety of physical 'indicators' (typically around 30) as inputs into single regressions. These physical indicators can include: steel, cement, energy consumption, cereals per day, animal protein per day, education health indicators etc.

provided distorted information on monetary aggregates, or omitted it altogether. Which entails using data that was not collected for the purposes of analysing monetary flows in the economies. Results of the calculations based on monetary flows to gauge economic activity in an economy where prices function in the main as accounting devices and where data is collected for the purposes of the plan, are almost certainly subject to considerable inaccuracies.

From Lancieri (1993), if we take a sample of estimates of GDP for the CPEs, we find that the deviation between the differing measures is very high. However, a word of caution is appropriate when interpreting the data. The World Bank estimates are based on the *Atlas* method described in detail in appendix B. The estimates provided by the World Bank *Atlas* are in current dollars and so rely on official exchange rates. For the estimate for Hungary the World Bank notes that,

> Several factors may influence both the level and the comparability of this estimate with those of other countries, and the Bank is aware of other estimates that have been made in Hungary's case. These have used methodologies that attempt to take account, severally, of price and wage distortions, subsidies and taxation, and possible distortions introduced through the exchange rate, and have provided a range of alternative results. (World Bank, *Atlas* 1981: 10)

The other estimates do try to take some of these factors into account, therefore their comparison to the World Bank estimates will, given their expression in international dollars, inevitably generate conflicting results. The estimate for Romania presented in the *Atlas* also makes use of official exchange rates for conversion and so the same proviso stands for these results too. The non-availability of the estimate for Poland raises doubts over the accuracy of GNP per capita estimates from centrally planned economies,

> A number of methodological issues concerning the estimation of per capita GNP for centrally planned economies remains unresolved. Until a broadly acceptable methodology is developed, GNP per capita estimates for non-member countries with centrally planned economies will not be shown. (World Bank, 1981: 10)

Table 4.1[7]

GDP pc 1970 and 1980

	GDP per capita in 1970		GDP p.c. for 1980		
	ECE[a]	World Bank (WB)[b]	Vi Inst.[a]	WB[b]	Marer[b]
Hungary	1,419	1,600	5,881	1,930	4,390
Poland	1,392	1,400	5,241	n.a.	3,730
Romania	1,095	930	4,623	2,290	2,680

[a] in international dollars

[b] in current dollars

where ECE refers to United Nations European Commission for Europe

WB refers to World Bank

Vi Inst. refers to the Vienna Institute (WIIW)

source: Lancieri, 1993 and World Bank *Atlas* for WB (various issues)

Table 4.1 shows the degree of variation between the estimates. If we express the same figures as percentages of the US economy, the differences become even more striking. In 1970, Hungary was 42.4% according to the ECE study, whilst the World Bank estimated it at 33.6%. Likewise with Poland, the ECE put it at 41.6% and the World Bank at 29.4% for 1970, and Romania, 32.7% and 19.5% respectively. For the 1980 estimates these differences widen so that Hungary was 58.7% according to the Vienna Institute, but just 36.8% in the World Bank calculations. Poland stands at 41.6% of the USA GNP per capita in 1980 by the Vienna Institute calculations. Romania is 32.7% by the Vienna Institute and 19.5% by the World Bank in 1980. From these figures, it is hard to disagree with Lancieri when he states that, " On the whole, estimates for 1980 are notable for their diversity." (Lancieri, 1993: 168) In part this divergence is explained by the gap between PPP estimates and those that rely on official exchange rates.

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[7] See also Charts 4.1 and 4.2, page 131 and 132 below.

Yet there are further explanations for the divergence in the estimates of GNP per capita for the centrally planned economies. First, the calculations tend to use different methodologies. The Vienna Institute uses a physical indicators approach, the ICP programme a multilateral comparison on the basis of PPP estimates. Second, all these methodologies rely on imputed data on prices or other monetary aggregates, often based on comparisons with western economies. As Lancieri (1993) pointed out, this comparison is likely to generate misleading results. Comparisons with market economies on the assumption of similar productivity or structures will be misleading given the nature of the centrally planned economies. Third, where significant state intervention in the domestic price system exists and/or state allocation of resources takes place purchasing power parities will be distorted. This is especially so when there exists significant trade distortion,

> In particular, when trade restrictions take the form of sufficiently high and comprehensive tariff walls, quotas, or exchange control, a freely floating (or any maintained) exchange rate may bear virtually no relationship to the PPP, because the price responsiveness of imports and exports is greatly reduced. PPP becomes all the more inapplicable if controls are extended to the domestic sector in the form, for example, of price and wage controls, rationing of consumer goods and industry allocation of raw materials and primary factors of production. (Officer, 1982 123)

As these were precisely the key characteristics of the centrally planned economies, the conclusion is that PPP is inapplicable. Attempts to generate a comparable measure of GDP per capita on the basis of PPP will, as a consequence, be misleading.

Lancieri (1993) argued that by 1990 estimates of GDP per capita tended to converge as shown in table 4.2. However, the divergence in estimates is still significant. Certainly the gap between the PPP estimates and that of the World Bank based on its *Atlas* method is still significant. However the estimates from WEFA for Hungary and Poland are greater than the others estimates. Thus, whilst WEFA estimates that Poland reaches 23.4% of the USA level of GNP per capita, PlanEcon puts it at 18.7%. This is still a considerable gap. Again for Hungary, WEFA estimates it at 31.5% of US GNP per capita, but PlanEcon at 27.5%. For Romania, PlanEcon has the higher of the range of estimates, standing at 19.3% whilst WEFA estimates its GNP per capita at only 16.9%. Although Lancieri believes there have been 'convergence' in the estimates of GNP per

capita for these countries in 1990 and a developing 'consensus', it would still seem that the estimates are divergent even if the range has lessened from the previous two decades.

What is also striking is the drop in economic activities in these economies relative to the USA. In 1970, Hungary was estimated to be 42.4% of the US economy by the ECE. In 1980, the Vienna Institute (using a similar methodology to the ECE study - physical indicators) calculated it at 58.7%. However by 1990 it had dropped to 31.5% according to the highest estimate, a mere 27.5% according to PlanEcon. These sharp falls in the level of economic activity relative to the USA are repeated in Poland where it falls from 41.6% in 1980 in the Vienna calculation to 18.7% according to PlanEcon in 1990, but the decline is less in Romania.

Table 4.2

<u>**Estimates of GDP per capita in 1990**</u>[8]

	PlanEcon		Alton/CIA		WEFA		WB
	$	%	$	%	$	%	$
Hungary	6,017	27.5	6,119	28.0	6,888	31.5	2,780
Poland	4,089	18.7	4,352	19.9	5,122	23.4	1,690
Romania	4,214	19.3	3,987	18.2	3,697	16.9	1,620

Source: (Lancieri, 1993: 171) and (World Bank *Atlas*, 1991)

It would seem then that estimates of GDP varied widely in the 1970s and 1980s, but should the reduction in the divergence in estimates in the 1990s be seen as evidence of more accurate calculations? To answer this we need to address how GDP calculations have evolved during transition. However, there must be some doubt over the reliability of these estimates still as the 1990 calculations had undergone significant revisions, PlanEcon and Alton's estimates were reduced by roughly one-quarter. (Lancieri, 1993: 170) One implication that can be drawn from this is that the practice of comparing GDPs during transition to an earlier reference level, such as 1989, may be misleading

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[8] See also chart 4.3, page 132.

given the doubts over the accuracy of the 1989 figures[9]. If Lancieri is correct in suggesting that, "Therefore, until the introduction of market economic mechanisms in Central and Eastern Europe, the construction of a methodology for GDP comparisons with Western countries remains impossible" (Lancieri, 1993: 174), what are the implications for GDP calculations during transition?

4.2 The problem of measuring GDP during transition

4.2.1 Value

The transition economies have undergone unparalleled changes in their price systems. Chapter 2 described these changes and also drew attention to the likelihood of on-going distortions in the establishment of market-clearing prices whilst markets are in the process of being formed. Whilst it is likely that the extent of this effect on prices will differ between economies, and even between sectors within an economy - those more advanced in establishing functioning markets are more likely to achieve prices that reflect costs etc. What can be said with certainty is that *all* economies will have undergone massive disruptions in their pricing systems and that discontinuities in the process of valuation will have a profound effect on economic calculation. To echo a recent IMF study of national accounts,

> In the liberalization process that has been in place in most transition countries for a number of years, the grip of the government has been relaxed over time. Nevertheless, vestiges of the former system still exist in many areas, not least in the practice regarding the valuation of production. (Bloem et al, 1996: 14)

Economic statisticians have never had to deal with such a profound shift in the process of valuation as that which took place when central planning collapsed in 1989. Whilst similarities pertain to economies transforming from war production to that of peacetime, or vice-versa, as well as to episodes of rapid development and industrialisation, those

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[9] This point relates specifically to the difficulties in measuring GDP under central planning. It is also likely that other aggregate measures of economic performance would also be subject to significant bias given the distortions in the Soviet markets. Chapter 5 on industrial production addresses the problem of bias in the industrial output data during transition, whilst chapter 6 looks at the distortions in measures of service sector development in the periods of both central planning and transition. For data on labour markets and exchange rates, see appendices 2.3, 2.4 and 2.5.

attempting to measure the change in economic activity face unique conditions. It is commonplace to assess the difficulties of economic calculation as being 'index number problems', common to most economies. Whilst certainly pertaining to these problems, it has also been argued in this thesis that the difficulties associated with transition surmount those normally classed as index number problems. For transition will affect the weights used in index number calculation in the following ways.

Following from the discussion of the accuracy of measures under Soviet systems of statistical calculation, we are faced with the related problem of which base year to choose. Earlier it was also noted that it is standard to look at the development of output from 1989 onwards. However, the choice of base year is crucial, "During a period with massive shifts in the output and absorption structures, as well as in relative prices, the choice of base year for constant-price series can exert a major influence on estimates of growth in real GDP." (Bartholdy, 1997: 133)

If a base year is chosen from any year up until 1989, then we will be incorporating prices that were derived from central planning practices. The consequent measure of 'real' GDP will then be biased by the use of administered prices as weights to measure output during a period of price liberalisation. If we use a base year from a later period, say one during transition, then several further problems emerge. One is that we now have limited basis for comparison with the earlier period. We do need to be able to judge the evolution of output from central planning towards the market - a transition period base year will limit this comparability. Second, the prices established during transition will also be distorted, as was discussed in chapter 2. The EBRD, *Transition Report*, (1995) noted that,

> Many countries in the region have gone through a period of very high inflation, which has made it particularly difficult to deflate correctly nominal data for production, use of inputs, consumption, fixed investment, stock-building and wages. When price increases as well as volumes of production are subject to large swings from month to month, it is difficult to compute a measure of growth in real GDP. Computation of constant-price estimate for GDP through simple deflation of the annual nominal GDP-figure by a measure of annual average inflation may lead to serious errors. (EBRD, 1995: 21)

Hungary uses the method of double-deflation for calculations of value-added at constant prices. In western market economies the practice of double-deflation is likely to generate significant errors[10], for an economy undergoing transition these errors are likely to be excessive.

The problems of high inflation will also bias the Paasche indexes for similar reasons. Measures of current GDP will suffer from the inability to make comparisons over the period of transition, as well as with earlier developments.

In practice, statistical agencies have now adopted base years from a transition year, although estimates of early transition real GDP tended to use base years from the era of central planning. Hungary uses 1991 as its base year for national accounts, Romania 1992 and Poland 1990. (World Bank, 1995: 761)[11] These were years of relatively high inflation in these economies. Inflation in Poland reached 586% in 1990; Romania annual average inflation rate was 210.4% in 1992 and Hungary 35% in 1991. That the base years pertained to periods of high inflation makes the foregoing remarks concerning causes of bias in estimates during periods of high inflation pertinent.

Added to these problems are those that accompanied the shift in trading partners following the demise of the CMEA and the liberalisation of external trade to the West. With the EU taking the place of the former USSR as the countries main trading partner, changes in the actual production of goods were required so that they now met the requirements of the EU markets. With many of the goods destined for Soviet markets now becoming redundant and with the need to improve competitiveness for the EU markets, new goods had to be produced. The extents to which these shifts in competitiveness have taken place are the subject of further research[12] and are beyond the scope of the present discussion. Suffice it to say for now that any changes in the product-mix and quality of the product may not be fully captured in the estimate of GDP. Which way this will bias the estimate is not clear-cut. Although there are likely improvements in the quality of some products, which may not be reflected in the use of early period transition prices as weights, the industrial demise suffered by the

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[10] According to Allen, "Real value added by double deflation may be subject to unacceptably large errors." (Allen, 1980: 91). The difficulty arising from the requirement of this method of calculation is that estimates of both gross outputs at constant output prices are achieved as well as inputs at constant input prices. Both estimates are subject to large likely errors, which will be multiplied when brought together.
[11] See Appendix A for more on the methodology used in the official estimates of GDP.

economies and the possibility of shifting to production with lower value-added may counteract the quality bias. Marie Lavigne (1999) makes an interesting point regarding the bias to output statistics from negative value-added production, "Logically, if it is argued that the removal of negative value-added production means an addition to the GNP, then one should admit that its continuation means that recorded GNP is above its actual level." (Lavigne, 1999: 154) Given the level of subsidisation still prevalent in certain industries (see chapter 2), there is reason to believe that the level of negative value-added may still be high, adding to the case made here that GNP is in reality inflated. A study of the effects of changing competitiveness and quality during transition on the national income estimates is required to verify the changes in value-added production and again furthers the requirement for analysis of more disaggregated data than is provided in the national accounts.

4.2.2 Scope

Internal reorganisations at a variety of levels have had a profound effect on statistical measures. The changing status of enterprises has created biases in the estimates for national income. The statistical offices under central planning operated by monitoring state-owned enterprises (SOEs) and cooperatives only. As the SOEs were privatised, questions were raised over the reliability of the statistical offices in continuing to monitor their activities now they were in the private sector. "...the privatisation of state enterprises will involve a drastic overhaul of their [national statistical offices] data collection procedures. Enterprises will no longer regard provision of detailed statistics as a necessary part of their functions and will have to be persuaded to co-operate." (Blades, 1991:16) Secondly, the problem with monitoring small private enterprises has also significant implications for the procedure of monitoring performance. "The explosion in the number of enterprises now means that establishing and updating the business register is a major task and one that is unfamiliar to the national statistical offices." (OECD, 1994: 9) However, whether national statistical offices have indeed changed their practices to

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[12] Alan Smith (2000) studies the relation between trade and improvements in the competitiveness of goods destined for the EU markets. Current research under the ESRC 'One Europe or many' project is attempting to measure the change in quality of exports to the EU using unit value calculations.

take into account the different circumstances within which they operate remains in question. According to an IMF survey,

> In many transition countries the collection of data from enterprises is conducted using forms that were designed during the era of central planning. The forms require enterprises with employment above a given threshold (often 5 employees) to report monthly on a cumulative year to date basis, as a means of monitoring conformity with the plan. (Bloem *et al*, 1996: 33)

Thus, "Recording private sector activity is proving one of the biggest stumbling blocks that statistical offices in CEECs and the NIS are facing." (OECD, 1994: 9) Not only are the surveys of activity often not suited to the change in circumstances, but the nature of the enterprises are themselves in transit. Trying to ascertain the likely direction of the bias arising from the changing private sector activity is highly problematic. Firstly, non-response from private enterprises or inadequate coverage on the part of the statistical surveys will underestimate the 'true' extent of activity. On the other hand, enterprise registration where little or no activity takes place will also require their deletion from official registers. "...often an enterprise is registered but no activity takes place or the activity that does result is very small and does not represent the main source of income to the entrepreneur concerned." (OECD 1994:9) Trying to locate the core operations of an enterprise during transition will be highly problematic, as the production boundaries of the enterprise are themselves changing.

The link between an enterprise's statistical status and its legal status is liable to cause difficulties. The SNA is clear that for an enterprise to be deemed, as an independent institutional unit in statistical status there should exist "a complete set of accounts" or be capable of producing one. (quoted from Bloem *et al*, 1996: 7) As the IMF study of national accounts (Bloem *et al*, 1996) points out,

> In transition countries, applying this criterion may imply that producing units without an independent legal status would not be discerned as separate institutional units and remain within the government sector, because they may not have a complete set of accounts, and in particular may lack balance sheets. (Bloem *et al*, 1996: 7)

The implications of enterprises being included under the government sector are discussed in the next section on netness. A further related point concerns activities that may have previously been deemed to be secondary activities for enterprises under central planning, and thus went unrecorded, may now be included as separate activities. This may be especially pertinent during privatisation, when core operations are established for an enterprise and secondary activities spun-off into apparently 'new' operations. The implication is that activity will now be included in the new census of operations that would have previously been unrecorded if the decision was taken to include only the core activities of the enterprise.

The conventional view is that the national income statistics are biased downwards by the omission of private sector activity. Revision to the Hungarian and Polish GDP statistics has been advised on the basis of the weak coverage of private sector activity. "Studies published within the last two years with the backing of statistical agencies in Hungary and Poland point to a need for substantial positive revisions to these countries' official data for GDP-growth in the first half of the 1990s." (Bartholdy, 1995: 273)

Although the present discussion acknowledges the likelihood of bias arising from the under-reporting of new private activities, it also raises the possibility of bias in the opposite direction arising from the transferral of activities from state- to private- sectors. The conventional view tends to present a clear-cut picture of the problem, and advises an upward revision of national income data on this basis. What is argued here is that the problem of how to include private sector activity is complex and reflects the fluid nature of production boundaries during transition. It may generate bias in both directions; one influence is from spin-offs from large enterprises being included as independent production for the first time, the other being from new start-ups. It is not clear which bias will outweigh the other.

However, another problem arises from the difficulties involved in enterprises providing complete accounts. The information base of the statistical offices is weak because the enterprises they are monitoring do not have a tradition of maintaining data necessary for the national income accounts. The enterprises under central planning would provide information required by the ministries and planning bodies. The extent to which these were falsified has been the subject of debate and we are unlikely to be able to assess with certainty the direction and extent of the practice of falsification. The quality and coverage

of the statistical offices' information sets from these enterprises for the purpose of national income accounting will be determined in part by the reliability of data kept at enterprise level. If accounting practices are non-existent or weak, then the national accounts will also be defective.

The IMF study reports discrepancies between the results generated by separate monthly surveys and cumulative data. Whilst the cause of the differences between these are not clear and "Investigations are being conducted into the cause of these discrepancies." (Bloem *et al*, 1996: 34), this discrepancy raises further questions over the reliability of current official data.

A further complication in the information flows between the national accounting offices and the enterprises arises from activity concealment. A feature of transition has been tax evasion and avoidance, again implying that economic activity may be unrecorded in official statistics. In the periods of crisis following the dissolution of central planning, practices such as barter, arrears and illegal or grey activities are believed to have increased. But national income accounting entails that, "All monies arising from current economic activity by nationals are accounted for; nothing is left floating loose." (Allen, 1980: 8) The amount of activity outside the boundaries set by national income accounts is then arguably likely to have grown. Market based measures are unlikely to yield meaningful estimates of economic activity when barter exchanges are high.

However, a note of caution on the evolution of the practices outside the national income accounting boundaries is pertinent. The general view is that activities such as barter; arrears and the shadow economy have grown during transition. Thus it follows that GDP would underestimate the true level of economic activity in these countries. However, this does not automatically follow. We do not have any real idea how great the level of informal activity was in the CPEs. It seems feasible that the current practices of barter and arrears are continuations of practices carried out under Soviet management. In circumstances prevailing in the last years of central planning when shortages and bottlenecks were commonplace, the likelihood of these practices taking place then is high. Hence, we do not really know whether the shadow economy has grown since the collapse of central planning or not, or whether arrears, tax evasion and barter have increased significantly. Falsification of information under central planning and the use of

informal networks for production is a legacy of the old regimes that would have biased the national income estimates then, as it is likely to do now.

The existence of barter creates further challenges for GDP estimation. Recent studies indicate that barter is not insignificant in Eastern Europe. Only Hungary would seem to have avoided it. "More surprisingly, barter and non-monetary transactions appear in the Central and eastern European countries (where they have often assumed to be absent). While there are relatively small proportions of firms reporting barter at the level of 25% of sales or more, barter is not non-negligible except perhaps in Hungary."(Carlin *et al*, 1999: 4) In Poland, 12.6% of firms questioned reported 10 per cent and more barter in 1999, in Romania the per cent of barter trade in the survey was higher at 16.8, but for Hungary it was only 1.6 per cent. (Carlin *et al*, 1999: 5) What is certain is that this barter trade will not be accounted for in GDP. Again, this problem relates to the appropriateness of GDP as a measure of activities for these economies.

4.2.3 Netness

The CPEs operated large units under the auspices of the ministries, and incorporated many activities other than their core one. Further sources of bias to national accounts arise from the transfer of secondary activities into the private sector and the reclassification of activities.

The core activity may be easily reclassified as a market provider and established as an independent legal unit producing for the market, in which case its value-added can be calculated. If, however, the boundaries between non-market and market provision are not clear then this will bias the GDP calculation. This confused boundary between the government and private, independent status arises because,

> The producing units, even if they are legally independent, are strongly intertwined with the respective ministries; the fixed capital used by the producing units is typically financed through the ministerial budgets; the ministries often decide prices, and the ministries usually take care of the operating results by compensating losses or appropriating surplus. (Bloem *et al*, 1996: 6)

Where these boundaries are unclear, national income measures will be biased by whether the activity is included as a market provider, in which case value-added will be calculated from producer prices, or a non-market provider with the cost side forming the basis of calculation[13]. The SNA 1993 distinguishes the market from non- market on the basis of prices (Bloem *et al*, 1996: 8). With the price system undergoing radical changes as prices are liberalised, the use of prices to establish the production boundaries between market and non-market production is likely to be misleading. A study by Harrison (1996) indicates that the shift from non-market to market production implies that, "...because of the difference in the valuation of output between market producers and non-market producers, this [that is, the shift from non-market to market provision] would lead to artificial and implausible growth rates." (Harrison, 1996 quoted in Bloem *et al*, 1996: 9)

From the IMF study of national accounts, "In view of the magnitude of these payments in transition countries [i.e. the market/non-market distinctions] the effects of these decisions in this respect can be enormous." (Bloem *et al*, 1996: 8) As the effect of classifying a provider as non-market government institution generates a lower value-added than if classed as a separate market provider, the shift of operations from the government to the market sector could well result in overstated growth rates for the transition countries.

A related point concerns the reclassification of activities from intermediate consumption of enterprises to separate institutions. The SNA 1993 made clear that the conversion of NMP to SNA concept to GDP entailed the deduction of material expenditures by enterprises on cultural, sports and similar facilities for their employees. (UN 1996: xxxii) The provision of social services by enterprises was a significant characteristic of many SOEs and is still a feature of many transition enterprises. (See chapter on services) It follows that there is the possibility that service activities undertaken by the enterprise are merely transferred into the private sector. "State-owned and privatized firms are downsizing their social benefit provisions, decreasing their social asset investment

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[13] The IMF working paper (Bloem *et al*, 1996) provides an example of how these different measures can influence the GDP. If an organisation is classed as a separate institution, then its market output at producer prices is used as the basis for calculation. Subsidies and intermediate consumption at purchaser prices are deducted to generate gross value added. A non-market establishment of the government would include total output at basic prices and deduct intermediate consumption at purchaser prices. The end result is that value added is smaller if the producer is classed as a non-market government institution and larger when classed as a separate institutional market provider. (Bloem *et al*, 1996: 12-13)

programmes, and, rather more slowly, disposing of assets." (Schaffer, 1995: 249)[14] The transformation of these units into separate legal entities producing for the market creates difficulties for the national accounts. However, the reclassification of these activities raises a further likely source of bias to GDP.

Overall, transition entails a radical overhaul of established boundaries both between the government and market provision, as well as in the nature of the production process itself. Classifying activities causes problems for calculations of national accounts in all economies. The solution suggested by the ICP is that, "National-income statisticians, seeking to avoid arbitrary decisionmaking, regard that which is actually exchanged between buyer and seller as the touchstone for defining a transaction and the unit in which it should be measured." (ICP, 1982: 130) However, as with the problem of valuation, it is precisely this 'touchstone' for national accounts decisions' that is in the throes of being transformed. Exchange cannot serve as a reference point under the conditions pertaining to transition.

4.2.4 Balancing National Accounts

Those involved in calculating GDP measures have long been advised to include as much information from the three measures of GDP as possible. When it is available, data on domestic expenditure can act as a check on the data from the income and production sides. A further legacy from the era of central planning is the emphasis of estimates of GDP on the production side. This follows from the practice of statistical offices' calculation of material balances along with the requirement of monitoring output for target setting purposes. Whilst Hungary estimates GDP from all three methods, "The main approach used for the estimation of GDP [in Hungary] is the production approach." (United Nations, 1996: 585) In Romania the European System of Accounts (ESA) was adopted for the period following 1989 for the calculation of GDP in constant prices. For Poland, the SNA system was adopted in 1991; the material balances system was in place until that time. Changing the system of calculation from material balances to the SNA system adds a further discontinuity to the data. This discontinuity can also be seen in the frequent and sizeable revisions to the data during transition. "One of the results of the

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[14]. In the chapter 6 on services I discuss in detail in the measurement of the service sector.

gradual methodological change has been frequent, and sometimes massive, revisions to national income estimates." (EBRD Transition Report, 1994: 186)

> Although the statistical offices in the transition countries emphasise production estimates, where expenditure data is forthcoming it reveals a growing discrepancy with the production side. "Unfortunately, indicators of expenditure fail to support the hypothesis that currently available data on production tend to underestimate growth in all the east European countries. In fact, expenditure data for Hungary and Poland point in the opposite direction." (EBRD, 1994: 186)

The current practice of the statistical offices for tackling this discrepancy is to attribute the gap between the supply and expenditure sides to stock building. The result is implausible fluctuations in the level of stocks from year to year.

In the case of Poland for 1993,

> ...developments in consumption and investment would leave supply for the domestic market equivalent to about 5.5 per cent of GDP – i.e. more than the entire recorded growth in GDP – unaccounted for by recognisable developments in domestic demand components. ...The June- [1993] release of national accounts data implicitly attributes this gap to stock-building. (EBRD, 1994: 187)

Again, in Hungary the mismatch between expenditure and output measures of GDP have been attributed to stock building. In his detailed study of Hungarian national accounts, Kasper Bartholdy points out that,

> ...the official national accounts for Hungary point to a rundown of stocks equivalent to 3.8 per cent of GDP in 1992 (at current prices for that year), followed by a build-up of stocks of 1.1 per cent of GDP for 1993, 2.1 per cent in 1994 and 3.5 per cent in 1995. These changes in stock building would have contributed more than 7 percentage points to growth in real GDP between 1992 and 1995 – a period during which the supply-side measure of total real GDP rose in cumulative terms by less than 1 per cent. This is clearly unrealistic. (Bartholdy, 1997: 137)

How can these fluctuations in stock building be interpreted? One could take the production data as the more reliable of the two measures and argue that the expenditure measure is misleading. The EBRD suggests that, "...responsible governments should give budgetary priority to improvements in the quality of demand data." (EBRD, 1994: 191) However, it could also be that the production side measure is misleading and the

decline has been understated. The next chapter on industrial output attempts to measure the bias arising in the industrial output index using Alexander Gerschenkron's methodology. What is clear from the different measures of GDP is that these estimations contain significant, and potentially serious for policy-making, biases.

4.3 GDP estimates for the transition period

From the calculations for GDP per capita from the World Bank *Atlas* (various years), the divergence between the PPP calculations and those based on exchange rates is clearly significant. This divergence can in part be explained by the initial real devaluation of the exchange rates that characterised the early years of transition. As Nuti states, "To a greater or lesser degree, everywhere except Hungary, instant convertibility was accompanied by a grossly undervalued exchange rate – with respect to Purchasing Power Parity and other measures of competitiveness..."(Nuti, 1996: 140). These 'grossly undervalued' exchange rates imparted a downward bias in the exchange rate conversions. As Alan Smith (2000) notes, the divergence between estimates of income derived from market-determined exchange rates and PPPs, "... has been augmented, in the case of central and south east European economies, by the adoption of relatively depreciated exchange rates in the initial stage of the transition..." (Smith, 2000: 6)

Table 4.3[15]

GNP per capita measured by PPP[e] and by national exchange rate conversions[d] (Atlas Method)

	1989	1990	1991	1992	1993	1994	1995	1996	1997
Hungary - Exchange rate - PPP	2,830	2,920	3,030	3,210[a]	3,330 6,260	3,840 6310	4,120 6,410	4,340 6,730	4,510 6,970
Poland -exchange rate - PPP	1,990	1,730	1,840	1,970[b]	2,270 5,010	2,470 5,380	2,790 5,400	3,320 6,000	3,590 6,510
Romania - Exchange rate - PPP	1,850	1,760	1,460	1,170[c]	1,120 2,910	1,230 2,920	1,480 4,360	1,600 4,580	 4,270

Source: World Bank *Atlas*

a. 1989 to 1992 from World Bank Tables uses *Atlas* method of conversion – note it is not PPP. Series for Hungary starts in 1977. (World Bank, 1995: 344-345) All sources 1960-1993 Central Statistical Office (WB, 1995: 754)

b. As above, the series starts in 1982 (WB, 1995: 548,549)

c. As above series starts in 1989 (WB, 1995: 556-557) all sources 1980-1993 Statistical Yearbook (WB, 1995: 755)

d. Exchange rate uses Atlas Method for conversion see Appendix B that is a three-year weighted average official exchange rate. PPP is defined, as the number of units of a country's currency required to buy the same amounts of goods and services in the domestic market at US$1 would buy in the United States.

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[15] See also chart 4.4, page 133 below. For exchange rates during transition see appendix 2.3.

e. The 1993 PPP estimates are calculated from earlier PPP and extrapolated to 1993 or based on regression estimates. Thus, 1993 was the first year that PPP estimates were included in the *Atlas*

(World Bank, *Atlas*, various issues)

A further explanation for the divergence between the income estimates based on exchange rate conversions and PPP relates to the Balassa model (1964) of productivity-differentials. According to this model, lower income economies tend to have a greater divergence between exchange rate converted and PPP estimates of income, which imparts a downward bias on the former measure. The cause of this bias, emphasised by Balassa (1964), Samuelson (1964) and later Kravis *et al* (1983), is generated by the lower productivity in the non-tradeables sector. Higher productivity in the high-income tradeables sector will lead to higher wages. Wage equalisation results in higher wages in the nontradeables sector even though they have a lower relative productivity. In lower income economies, wages are lower as productivity is lower in the tradeables sector. Thus the relative prices of services and other nontradeables tend to bias upwards in higher income economies and, hence, the PPP measures tend to result in higher income levels for the lower income economies. Chapter 6 on services discusses this model in more depth, applying it to the PPP estimates for the service sector. Here, we can say that the lower wage rates of non-tradeables in the transition economies are another factor underlying the divergence between PPP and exchange rate income estimates.

The following table compares PPP estimates of GDP per capita for 1993. The estimates from the PlanEcon and Vienna Institute concur with the World Bank *Atlas* calculations in so far as all three indicate significant divergence between PPP and market exchange rate based estimates. However, the PPP estimates from the different organisations show a significant degree of divergence. The Vienna Institutes estimate shows a downward bias compared to PlanEcon and to the World Bank for Hungary and Poland, but is above the other two organisations in the case of Romania.

Table 4.4[16]

GDP per capita estimates for 1993 from selected sources

	Hungary	Poland	Romania
World Bank, xr	3,330	2,270	1,120
PPP	6,260	5,010	2,910
PlanEcon			
Market xr	3,739	2,230	1,141
PPP '93$	6,200	5,000	2,850
WIIW			
USD xr	3,745	2,232	1,159
USD PPP	5,992	4,668	3,700
OECD- real values of GDP in US$, p.c.	5,954	4,671	3,638
EIU			
$ PPP	6,051	4,715	3,638

Source: PlanEcon Report, 1997

World Bank, 1995

WIIW, (Vienna Institute) 1997

I focussed on 1993 estimates of GNP per capita because this is the year when the Conference of European Statisticians reported on the latest European Comparison Programme survey for group II countries that includes Hungary, Poland and Romania. The project was based on a regional comparison, using Austria as the numeraire. The survey covered data on prices that included 840 consumer items, 314 producer durables and 7 construction projects. The expenditure questionnaire covered 295 headings. The findings are presented in the table below:

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[16] See also chart 4.5, page 134 below.

Table 4.5

ECP Estimates of GDP per capita volumes; Austria = 100

	Poland	Hungary	Romania
PPP	24.6	31.7	19.5
Final Consumption	31.1	42.3	25.3
Market xr	9.8	16.4	5.0

Source ECP, 1993

Again, the divergence between the PPP and exchange rate based estimates of GDP is highly significant. According to the ECP authors,

> The difference of the economic performance in CEE countries was considerable in 1993. The discrepancy between the PPP and the official exchange rate was extremely high especially in the CIS countries. The GDP per capita value indices for these countries show an extremely small level against Austria. These results would mean that nobody could survive at such level. They manifest the deficiency of official exchange rate to use them as an adequate conversion rate in GDP comparisons. (ECP, 1993: 14)

The ECP 1993 estimates cast doubt on earlier World Bank *Atlas* estimates of GDP per capita. As the EBRD *Transition Report* (1996) pointed out, there was a clear divergence between these ECP estimates for 1993 (published in 1997) and earlier *Atlas* calculations for 1993 that were published in 1995 and 1996. The table below reports the GDP per capitas reported by the ECP for Hungary, Poland and Romania for 1993,[17]

Table 4.6

ECP GDP p.c. 1993

	Poland	Hungary	Romania
ECP	4,666	5,976	3,698

Source: ECP, 1993

The divergence between the estimates from the World Bank *Atlas* estimates for 1993 shown in table 4.4 and those of the ECP table 4.7 is significant. Again, this underlines the unreliability of these estimates during the transition period.

Further, final consumption in comparison to Austria for the transition economies exceeds income. As the report noted, "For all group II countries the volume index for final consumption of the population lies above the GDP volume index against Austria. This seems characteristic for the situation in transition countries." (ECP, 1993: 14) This holds whether the PPP estimate is used for comparison or the market exchange rate. Although in the latter estimate, the difference between final consumption and income is dramatic; final consumption in Poland is 31.1% of Austria's, but income per capita is a mere 9.8%. There is clearly something very wrong with the data at some point.

However, the ECP report also sheds doubts over the use of PPP during transition, albeit implicitly. First, there was a problem of non-comparability of prices between Austria and the comparison countries. This arose from the different conditions pertaining in the central and southern eastern European economies compared to Austria. But also, differences in the nature of the products themselves generated difficulties of comparison.

> A relatively high number of price quotations submitted by the countries turned out to be not comparable with Austrian prices...This was mainly due to the quite different circumstances (consumption and investment patterns, supply of domestic goods on the domestic market) between Austria and most of the partner countries. Since their goods and services were often of different kind/character and substitution articles with more or less big discrepancies in terms of quality (or even quantity) had to be accepted in the first instance. This was mainly the case in machinery and equipment where only relatively small amount of price quotations were immediately comparable. (ECP, 1993: 5)

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[17] For a full account of the divergence across the transition region, see EBRD, 1996: 122

The following table shows the proportion of price quotations that were directly comparable in the producer goods sector. Although in Hungary around 60% of items could be compared, in Poland only 10% were comparable and in Romania a tiny 1.5%.

Table 4.7

<u>Number of producer goods surveyed by ECP comparable to goods in Austria</u>

No. producer items	Pol	Hun	Rom
no items originally priced	313	284	198
% comparable with basic list	10.2	60.2	1.5
no item finally used	286	200	162

(source: ECP, 1993, 6)

However, the number of items finally used is higher, 91% in Poland, 70% in Hungary and 82% in Romania. The use of such a high number of products that were not deemed to be comparable with the basic list implies grave concessions on quality, as well as a high degree of guess -work over the comparisons of the basic nature of the products.

Lastly, how feasible is the use of PPPs during transition? Will the use of PPP also impart bias on GDP estimates? We have already seen that the use of PPP was questionable for centrally planned economies. Their distorted domestic structures and barriers to trade would have made PPPs 'implausible'. These economies are continuing to undergo significant structural changes involving redirection of trade, internal re-organisations and changes in consumption patterns. Do these on-going structural changes invalidate PPP? In his seminal work on PPP, Lawrence Officer pointed out that, "Structural changes in the economies may produce a relative price parity that would diverge from the absolute parity for the current period and therefore from the long-run equilibrium exchange rate." (Officer, 1982: 129) As discussed in chapter 2, the rapid growth in service sector prices during transition will bias the PPP results; "The structural change most damaging to PPP is one that involves a differential shift in the tradeable/nontradeable price ratio between

the countries. Any systematic country differences in movements of this ratio give rise to a definite bias in relative PPP." (Officer, 1982: 129)

The European Comparison Programme estimated that GNP per capita in Hungary was over half (53.7%) of Austria's in 1980. By 1993 this had fallen to 31.7%. For Poland ECP estimates were 50.1% of Austria's GNP per capita in 1980, falling to 24.6% in 1993. In 13 years GNP per capita relative to that of Austria's has halved. Yet the programme also raises questions over the reliability of both PPP and exchange rate based estimates. It explicitly questions estimates based on market exchange rates, these as we have seen, suggest extremely low levels of economic activity. However, the methodology for deriving the PPP estimates was also questioned - the low level of comparability between the prices listed for the transition economies and Austria sheds doubt on the reliability of the estimates for PPP.

A feature of GNP determination in these countries, both under central planning and during transition, has been the range of PPP estimates and the divergence between PPP and market exchange rate conversions. This chapter has raised concerns over the problems of value, netness and scope during transition. What is certain is that these difficulties will generate biases in the estimates of national income. What is not clear is the direction and extent of this bias. In the next chapter I shall employ Gerschenkron's methodology for establishing the direction and extent of bias in industrial output data.

Chart 4.1 GDP per capita in 1970: different estimates
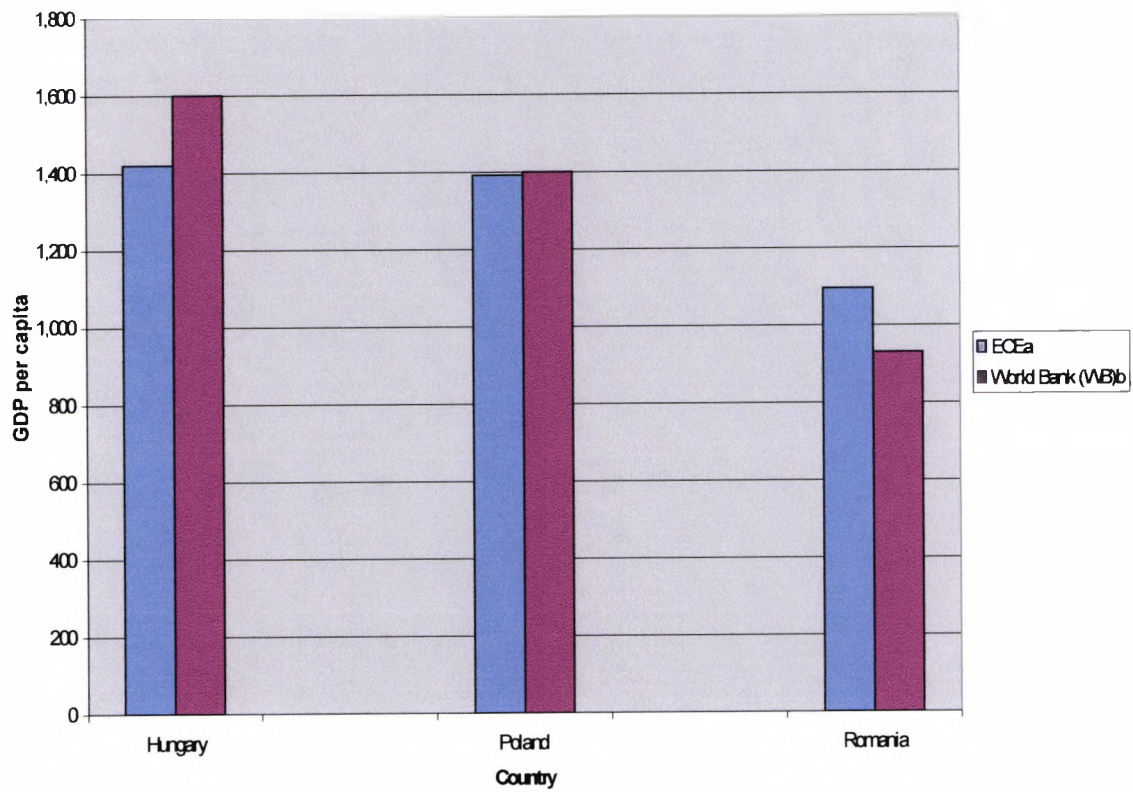
Chart 4.2 GDP per capita in 1980; different estimates
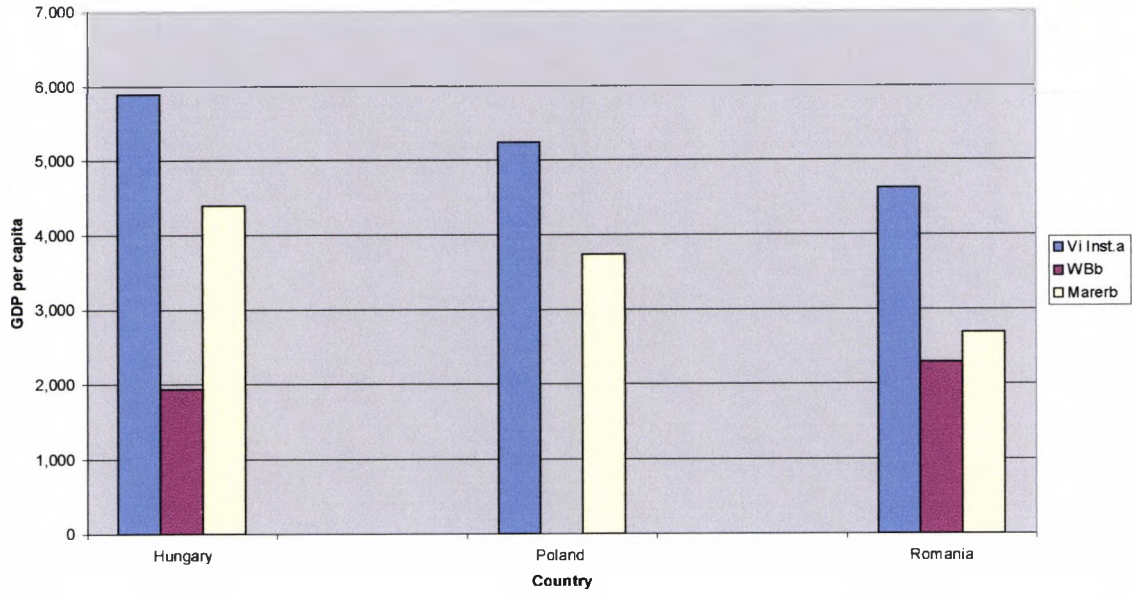
Chart 4.3 Estimates of GDP per capita in 1990
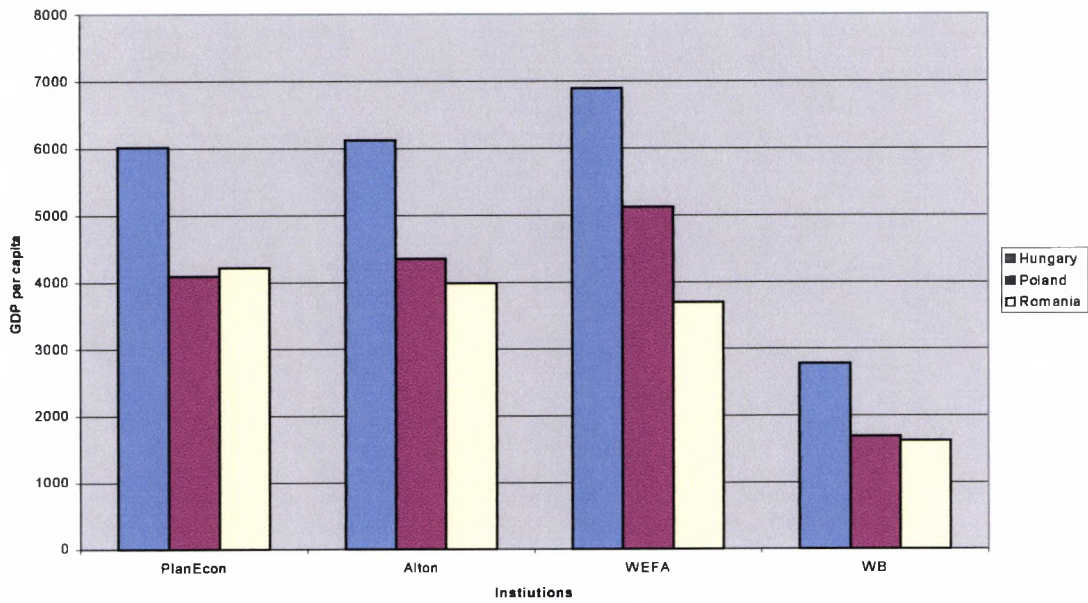
Chart 4.4 GDP per capita measured by PPP and national exchange rate conversions, 1989-1997

Legend:
- Hungary - xr
- Poland - xr
- Romania - xr
- Hungary - PPP
- Poland - PPP
- Romania - PPP

Y-axis: GNP per capita
X-axis: year
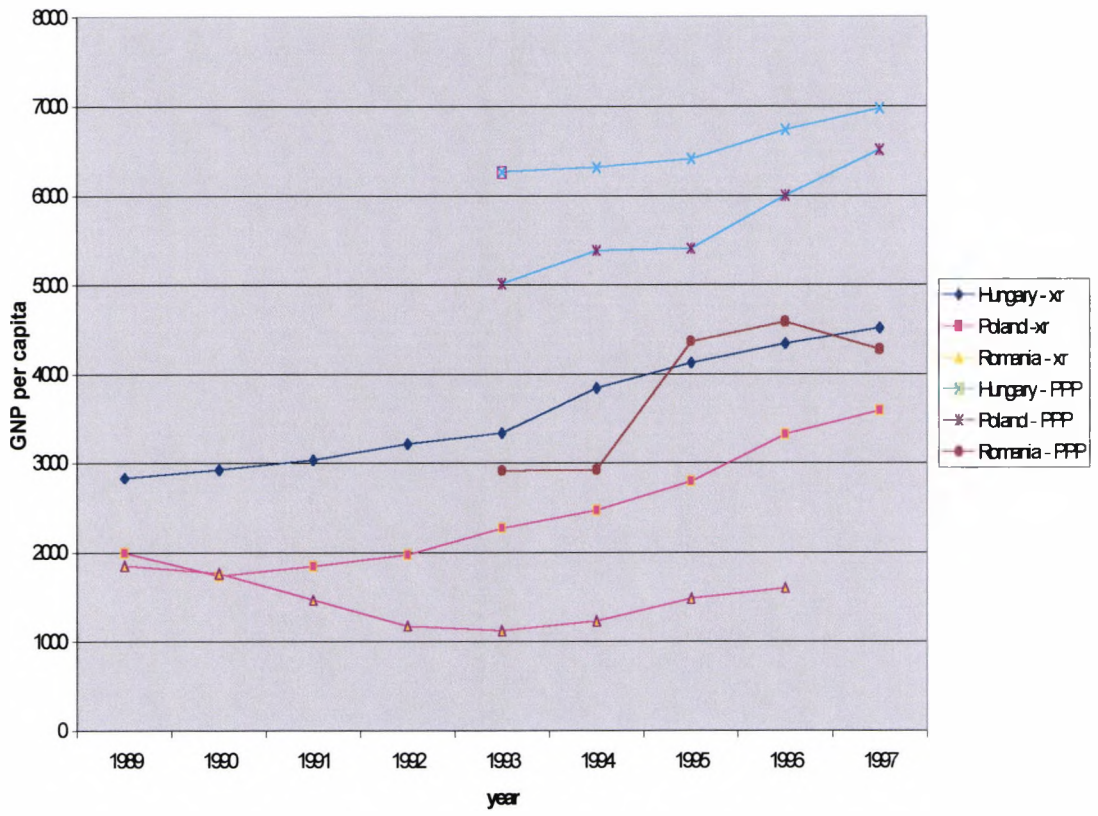
Chart 4.5 GDP per capita estimates for 1993

GNP per capita

Legend:
- WB
- PlanEcon
- WIIW
- OECD
- EU

Country: Hungary - xr, Poland - xr, Romania - xr, Hungary - PPP, Poland - PPP, Romania - PPP
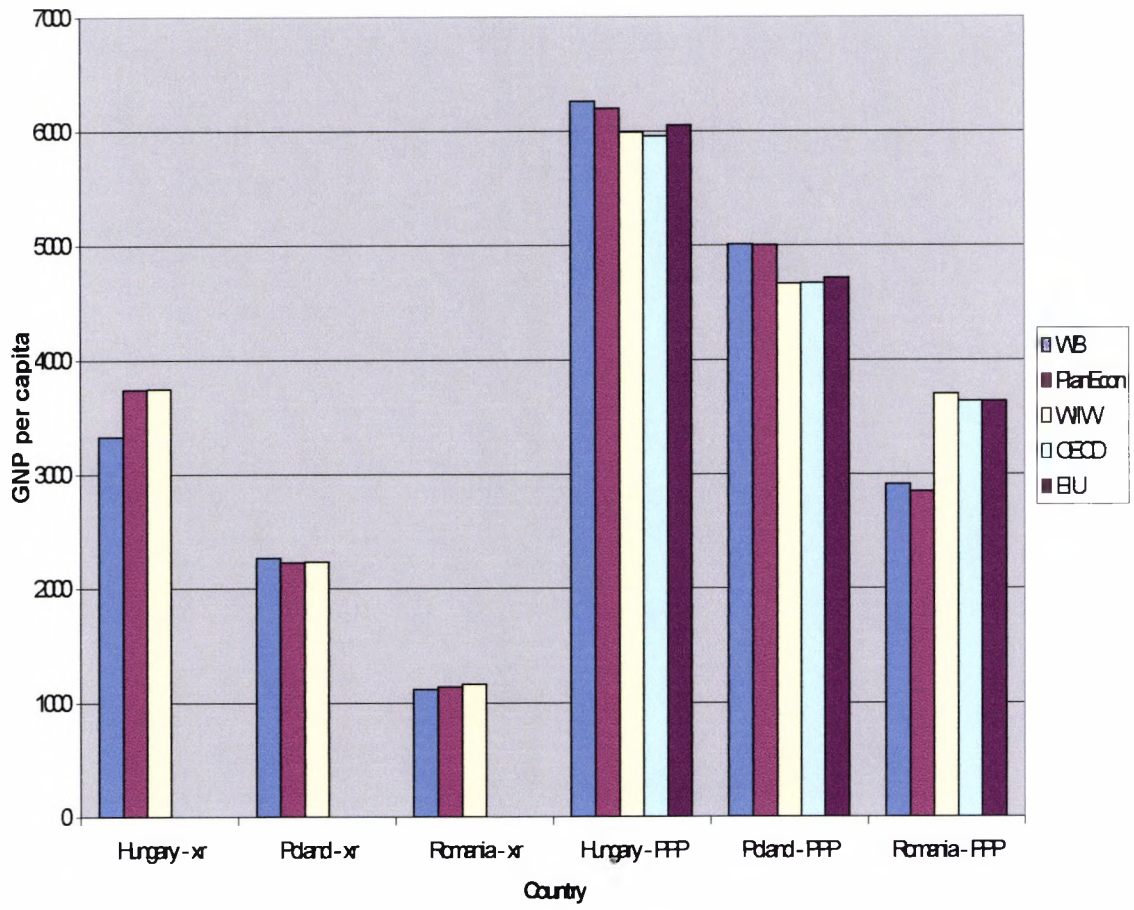
CHAPTER 5

MEASURING INDUSTRIAL OUTPUT DURING TRANSITION

The foregoing analysis indicated that there is likely to be profound, unascertainable biases in the aggregate data for transition economies. The problem that has been raised concerns the effects of price liberalisation and accompanying structural change on the index numbers for national output. The main argument being that we cannot say with confidence *a priori* what the direction and extent of this bias will be.

This chapter focuses on industrial output indices and discusses the relevance of Alexander Gerschenkron's analysis (1947) to the transition economies. His work concentrated on economies undergoing significant structural changes and the effect these upheavals may have on index numbers for industrial output. His analysis also included a methodology for estimating the extent and direction of the bias in industrial output indices.

I have applied Gerschenkron's methodology and calculated the percentage deviation between the industrial output indices and data for individual commodities expressed in physical terms for three transition economies, Hungary, Poland and Romania. The results are presented in second section of the chapter. They show categorically that there is a significant upward bias in the industrial output index numbers for all three countries. In other words, the extent of industrial decline has been grossly understated by the industrial output indices. The third section goes on to analyse the bias within individual industrial sectors taking Hungary as a case study. The aim of this section is to ascertain whether the bias has been spread across all sectors, or confined to certain industrial sectors only. Lastly, I present the means of industrial output by sectors for Hungary and Romania using 1985 as the base year. The means have been calculated using the physical output data, and again this provides an indication of the severity of the declines in industrial output across the sectors for these economies. A further indication of the extent of the decline in industrial output is provided by the change in output of individual commodities since 1985.

5.1 The relevance of Gerschenkron's analysis today

Alexander Gerschenkron's analysis of Soviet industrial output statistics[1] for the period of rapid industrialisation from 1927 onwards pioneered a vast body of research and criticism of official Soviet data. His thesis centred on the causes of distortion within the indices for industrial production for the Soviet economy undergoing significant structural changes. The growth figures for this industrialising economy were likely to be inflated if the base year chosen represented a period at the initial stages of industrialisation.

Gerschenkron (1947) demonstrated that the official indices for industrial output were unreliable as the base year used was 1926-27, "Today, despite, the radical structural changes which took place in the course of the thirties and during World War II, indices of industrial production are still weighted by a price system which was in effect twenty years ago." (Gerschenkron, 1947: 217)

Gerschenkron's thesis (1947) asserted that inflationary bias would be imparted on the official indices that used 1926-7 as the base year for a number of reasons. First, rapid industrialisation would generate a number of new products, which would be included in the index at current prices. As the period of the first five-year plan was one of high inflation, including new goods at current prices in a constant base-weighted index generated an upward bias to the indices. "To the extent that price developments were upward, this method of evaluating new commodities resulted in an artificial inflation of the index." (Gerschenkron, 1947: 220)

This problem of artificial inflation of the index relates to the source of error arising in index numbers when an economy undergoes structural transformation. A change in the efficiency and level of value-added of production biases the indices.[2] If the base year chosen for weighting was a period of lower efficiency or lower value-added then measures of output would be upwardly biased if there had been subsequent significant changes that improved the efficiency of production.

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[1] The work by Gerschenkron cited in this study includes (1947) "The Soviet indices of industrial production" *Review of economics and statistics*, 29:4, and (1966) "Soviet heavy industry: a dollar index of output", *Economic backwardness in historical perspective*.

[2] Chapter Three of this thesis examined the index number problem and presented an analysis of the likely effects on index numbers of significant structural change.

As the economy progresses on the road of industrialization, the spread [between prices of industrial products of low value-added to those of higher value-added] tends to become narrower. At the same time, the share of relatively highly fabricated goods in total output increases. If the prices of the first year of the period are used as weights, the increase in output over the whole period appears greater than it would if prices of the last period were employed. (Gerschenkron, 1947: 220)

Thus, an index number relativity effect will be imposed on the measures during a period of rapid structural change. The faster growing sectors will tend to lower relative prices as they utilise newer technology or generate economies of scale compared to the slower growing sectors. The price weights used in the index number estimation if taken from an earlier period will lead to a bias towards the more rapidly growing sectors.

Gerschenkron also included several further reasons for the imparting of bias into indexes, which are often overlooked in the accounts of his thesis, but, as will be explained later, are pertinent to this discussion. Inflationary bias was also imparted by the inclusion of small-scale industry, which had previously been omitted from the index, into the category of large-scale industry. Also, the change in ownership, from privately owned to state owned, will also generate a bias. Privately owned small-scale production may be omitted from the index, but as they were taken over by the state, their produce would augment the aggregate output levels.

The 'Gerschenkron effect' has been widely acknowledged to have biased the data produced under Soviet methods of measuring industrial output[3]. It is believed to have been present not only in the period analysed by Gerschenkron himself, but to have had a significant effect throughout the Soviet era. According to a World Bank study (Marer, *et al*, 1985) on GDP estimation in centrally planned economies,

This tendency [for index number relativity to bias indexes upwards] is generally valid for most CPEs, although their prices often remain fixed for many years and their methods of price formation have many unusual features. This tendency is also an important reason why there is no single "true" growth rate but a whole series of growth rates, one for each set of price weights. (Marer *et al*, 1985: 169)

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[3] Taking the likelihood of significant bias in official Soviet statistics into account, a vast number of researches attempted to provide alternative aggregate measures of output for the USSR. Studies on soviet output data include Gerschenkron himself (1966) Grossman (1960); Hodgman (1954); Jasny (1962); Bergson (1953); and Nutter (1962).

What is more, the upholding of index number relativity imparts a bias not only to industrial output indices, but also to the measure of national income as a whole. Abram Bergson (1961) investigated the likelihood of the 'Gerschenkron effect' biasing national income and concluded that,

> Professor Gerschenkron refers especially to industrial production. According to my calculations, his principle applies no less to national income, at least for the USSR. Thus, Soviet national income is found to grow less in terms of 1937 then in terms of 1928 ruble factor cost. Where valuation is at 1950 ruble factor cost, growth generally is less than where valuation is at 1937 ruble factor cost. (Bergson, 1961: 210)

Bergson (1961) also demonstrated that the scale of structural change influences the extent of index number relativity. The scale of structural change and the extent of index number relativity are positively correlated, so that the greater the structural change, the stronger the 'Gerschenkron effect' on index numbers.

> ...index number relativity depends in part on the extent of the changes in the structure of prices and production. While illuminating the applicability of Professor Gerschenkron's hypothesis to the USSR, therefore, my calculations would also seem to underline the violence of the structural changes that occurred under the first two five year plans. (Bergson, 1961: 214)

The influence of the 'Gerschenkron effect' on measures of industrial output and national income as a whole during the period of transition is even more controversial. The analysis of the bias generated during this period is limited. From my study of this subject I know of only two attempts to investigate the implications of the Gerschenkron effect during transition.[4] In the chapter on index number theory (chapter three) I discussed the view put forward by Kent Osband (1992). His proposition is that there will be a downward bias imparted to the index numbers in the course of transition. The Laspeyres base-weighted index will overestimate the level of decline in industrial output, as the output of goods with relatively lower prices is likely to fall further. A

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[4] This is not to understate the body of research into the bias of national income data during transition. In Chapter 4 of this thesis focusing on the measure of national income, a variety of these studies are discussed. The key point here is that most of these fail to take further the likely influence of the Gerschenkron effect other than to reiterate the view put forward by Kent Osband (1992). Namely, that if index number relativity is a problem, we can decide *a priori* that it will exert a downward bias on the data.

paper on the output of the Polish state-owned sector during the early period of transition written by Mark Schaffer (1991) confirmed this view,

> A Laspeyres (start-year weighted) quantity index would be likely to yield a lower level of output in 1990 than would a Paasche (end-year weighted) quantity index, because of Gerschenkron-type effects. One of the responses of enterprises to the price liberalisation should have been to decrease production of those products whose relative price dropped a lot and would therefore have a large start-year weight and increase (or decrease less) production of those products whose relative price increased a lot (and would therefore have a low start-year weight). That Gerschenkron effects were operating is supported by figures for the private sector's share of industrial output at 1984 and constant prices in 1989 and 1990...(Schaffer, 1991: 12)

When looking at index number theory I have already argued that there are serious omissions and deficiencies within this analysis. The assertion that we can know *a priori* the direction of the likely bias generated by index number relativity rests on the assumption that prices and output behave in a predictable way during transition. It does not take into account either the effects of profound structural change, that is the change in efficiency and value-added, or of the disruption to the entire economic systems generated by the change in price systems. However, where I do agree with these authors is that the 'Gerschenkron effect' will be of importance in transition economies. It will be significant for a number of reasons.

1. *The change in price systems.* Moving from a system of administered prices to a more market determined system would impart a bias to constant base-weighted index numbers. This will be particularly the case if the base year chosen is from a period either when central planning was still functioning or one from early on in the transition period (i.e. 1989 or 1990). Subsequent inflation will further undermine the reliability of both the base-weighted index and the current-weighted one. When a later base-year is chosen, problems of comparability with the earlier measures of output arise.

2. *The profound structural change.* All these economies underwent a period of significant upheaval with a relocation of export markets and a radical alteration in domestic demand. The loss of the CMEA trade structure combined with the reorientation of exports to the west necessitated a significant shift in the structure of production, including the loss of Soviet-specific goods. The positive correlation between output changes and prices assumed in the studies by Schaffer (1991) and

Osband (1992) may not hold. The burst of high inflation, rapid devaluations, and continuing use of subsidies[5] generate a much more complex relationship between prices and output than that implied by the 'creative destruction' thesis, which underpins the view that output rises as relative prices rise.

3. *Change in value-added in industrial production.* Certain industries will experience a significant change in the value-added of its output. Again, however, it is not clear-cut in which direction this may occur. A key aim of increasing the competitiveness of production is to generate increases in efficiency. Reducing the costs of production in some industries will generate a positive 'Gerschenkron effect' if the price of these goods subsequently falls in relative terms and output increases. Some industries may experience an increase in value-added as they attempt to align to western markets. Others may actually experience a decline, especially if they are dominated by 'outward processing' techniques. These industries may well rely on lower labour costs relative to Western Europe, but the importing of components would generally lower the level of value-added for that industry. If the share of higher value-added products in total output increases during transition, then a positive 'Gerschenkron effect' will be experienced. Establishing *a priori* which effect will outweigh the other is not plausible.

4. *Changing ownership structures.* Moving from state owned to privately owned production could again cause bias in both directions. If the privately owned output is not measured by official statistical surveys then the index numbers will be biased downwards. This is the accepted view. However, if the change in ownership is based on moving output from the state to private sector it may well be accompanied by a change in the method of estimation, such as a shift from evaluating output at input costs to market prices. In this case the estimates may be inflated.[6] The downsizing and breaking up of single entity firms into several separate ones may also inflate the output measures. Given the high level of vertical integration prevalent in the typical enterprise operating under central planning, privatisation and restructuring is likely to increase the number of independent units. The output of component makers, services etc. within these firms may have gone unrecorded under Soviet practices. If these units are then spun-off as separate enterprises, their output will now be included. This may lead to an inflation of

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[5] See Chapter 2 on changes in the price system during transition for a discussion of the role of inflation and impact of subsidies.
[6] See Chapter 4 on the likely generation of bias in estimates of national income resulting from the reclassification of output.

the officially measured output. Again, we cannot know with confidence *a priori* which effect will outweigh the other.

Given these points, we can say with a high degree of confidence that the index number relativity problem is likely to bias current measures of industrial output in transition economies. What is not clear, given the complexity of changes during transition, is in which direction and to what extent this bias will operate on indices for industrial output. Gerschenkron (1947) was concerned with the problem of measuring industrial output during a period of intense structural change. Transition is just such a period.

Not only am I arguing that the 'Gerschenkron effect' is relevant today, but that we cannot state with confidence that the bias to index numbers will be downwards as assumed in the studies cited above. The direction of the bias imparted on the index numbers as a result of the 'Gerschenkron effect' needs to be estimated.

In his seminal paper on the reliability of Soviet industrial production indices, Gerschenkron (1947) also outlined a methodology for measuring the extent and direction of the bias. Because the bias was generated through the use of a weighting system that was a poor reflection of the changes in the economy, he suggested using physical output data to estimate the extent of the bias in the aggregate figure, "A possible method for checking the suspected error in the indices of aggregate output is through comparison with figures on the output of basic industrial products and freight transportation, all expressed in physical units." (Gerschenkron, 1947: 221)

Gerschenkron (1947) established the extent of the discrepancies between the official figures for Soviet growth in the period of industrialisation by estimating the percentage rates of growth of the physical output of individual commodities. This is the methodology that I have employed below. I have calculated the percentage deviation between the aggregate figures and the rates of growth of the individual commodities in physical terms to derive an indication of the extent and direction of the bias imparted on index numbers.

However, before proceeding with the analysis a word of caution is required concerning the databases of individual commodities in physical terms. A criticism levelled against studies that make use of physical data is that they fail to address the problem of change in efficiency of production or levels of value-added. Thus, in an article on the causes of output decline in Poland, Czyzewski, Orlowski and Zienkowski (1996) state that,

The use of output volume measures based on physical indicators rather than on deflated value of production was generally more appropriate for a centrally planned economy. As the quality of products and the output mix was not changing significantly, while methods of estimating prices growth were to a big degree illusory, the physical indicators-based indices allowed for the most reliable estimate of volume changes. The situation reversed during transition when the intensity of quality and output mix variations exceeds the level normally observed in market economies. It is our belief therefore, that indicators based on the value of production and price deflators, given all the reservations one should make, supply much more reliable data for evaluating the size and causes of output decline in Poland during transition than indices based on physical indicators. (Czyzewski, Orlowski and Zienkowski, 1996: 3)

Although the present study is not an attempt to derive alternative aggregate figures based on physical indicators,[7] it does make use of the physical data, so their criticism would be relevant to my analysis. I believe their criticism overlooks several essential points. It is certainly true that there has been wide-scale structural change during transition. It is precisely because of the upheavals in these economies that I am questioning the use of aggregate data. Czyzewski, Orlowski and Zienkowski (1996) question the use of physical data on the basis of the scale of structural change during transition, but they ignore the implications for aggregate data in value terms. The aggregate data in value terms is not completely separate from the physical data, if there are distortions in the physical data there will also be biases in the value aggregates. Thus, their argument that physical indicators are invalid due to structural change must also be applied to the value aggregates. However, what makes the value aggregates even more prone to distortion is that aggregate data expressed in value terms is biased not only by the changes in efficiency and intensity, but by the changes in the system of valuation as well. The point of the present study is to acknowledge the existence of these effects and to gain an insight into the extent and direction of these biases.

So, why then use the physical output data? This data provides the main source of indicators of industrial output that are free from the problems associated with changing the system of valuation. Industrial output in physical terms can also provide a database that is reasonably consistent between the two periods, pre- and post-collapse of central planning. As far as taking structural change into consideration, it is precisely because economies can undergo periods of intense change that Gerschenkron recommended the

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[7] The reasons for not attempting to calculate alternative series of aggregate figures have been discussed elsewhere in this thesis (see chapter 4 in particular).

use of physical output data. Whilst the physical output database may not provide direct measures of changes in efficiency or value-added, more disaggregated data enables significant changes in output to be identified. Later in this chapter I present the data for certain individual commodities. Further research that attempts to investigate the correlation between changes in the efficiency of production with changes in physical output is recommended from this thesis[8]. The important point presented in this current work is that the aggregate figures are biased by both changes in the price system used as weights and by structural changes, ascertaining which is the more powerful effect is not possible using aggregate data based on price weights. The extent to which the aggregate data is presenting dubious results is the subject of this investigation.

5.2 Measuring the bias in the industrial output indices

The databases used in the estimation of biases in industrial output indices are the production of principle commodities expressed in physical terms. These are published in the statistical yearbooks of all three countries concerned. They have two key features that render them suitable for the purpose of bias estimation. First, they are highly disaggregated. This enables changes in the main groups of industrial commodities to be identified and provides a picture of the changes in the main commodities at an individual level. Second, as they are expressed in physical terms we can overcome the difficulties associated with prices. The main contention of this thesis is that aggregation will generate biases given the change in system of valuation associated with transition. Physical output data stands apart from these biases and so provides a check.

In the case of Hungary, the database contains 270 commodities covering the period 1980 to 1995. These tables are published in the annual yearbook, Statistical Yearbook of Hungary (*Magyar Statisztikai Évkönyv*) produced by the Hungarian Central Statistical office (*Központi Statisztikai Hivatal*). Whilst the classification of commodities within the database is consistent over the 1980's and 1990, problems exist in later years. As transition progresses, the tables for commodities expressed in physical

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[8] A possible avenue for further inquiry is to conduct an input-output analysis where data is available. Treml, Gallik, Kostinsky and Kruger (1972) provided an account of the structure of the Soviet Economy on the basis of an analysis of input-output data for 1966. A study of an economy during the period of transition would provide an insight into the changing efficiency of production if compared to an earlier period.

terms undergoes significant reclassification. First, a number of key commodities are omitted from the published tables. Between 1991 and 1994, 62 commodities are omitted from the table. These omissions include key commodities such as pig iron, thin steel sheets, household electric cookers, edible oils and tyres for trucks. I have taken these omissions into account in the calculations below. Second, the tables underwent significant reclassification in 1996 onwards. From 1996 onwards, the number of commodities that are comparable with earlier years is only 38 per cent.[9] For this reason the present analysis continues up until 1995. The high number of reclassifications renders further calculations with this database implausible. However, I believe covering the period until 1995 provides an adequate indication of the extent of the bias and its direction during these first years of transition and also points to the trend in the bias. Further, until 1997, the official volume indices for industrial production and sales were calculated with a base year of 1985. In 1998, the base year was revised to 1990. (*Magyar Statisztikai Évkönyv*, 1997: 430 and 1998: 400)

For Romania, I have used the tables for the production of the main industrial commodities published in the Romanian statistical yearbook, *Anuarul Statistic Al Romăniei*. The National Commission for Statistics publishes the annual yearbook. This database contains 232 commodities. I have covered the years 1980 to 1997. There are no significant omissions or reclassifications over this period, making comparison of the long-term trend possible. Beginning in 1991, the Laspeyres method was used for calculating the official indices of industrial output, the base year being 1985. (*Anuarul Statistic Al Romăniei*, 1993: 476). From 1993, the indices of industrial output by branches in Romanian were calculated using 1990 as the base year until 1996. (*Anuarul Statistic Al Romăniei,*1996: 488). Because of the revisions to the series of industrial output indices, and also to make a direct comparison between the three countries involved in this part of the inquiry, I have used the industrial output index produced by the UNECE[10]. This uses 1985 as the base year and is consistent for all three countries

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[9] I have contacted the central statistical office to seek an explanation for both the omissions and reclassification. The response on both occasions was that it was the prerogative of the central statistical office to alter the data as it saw fit. I have included one of the letters from the Hungarian Statistical office in the Appendix 5.3. It implies that the missing commodities have been omitted because they were derived from less than 3 data suppliers" (HCSO, May 1996, appendix 6.3). This suggests that the number of enterprises supplying these branches is less than three and raises the possibility of very high concentration in these branches or closure of enterprises.

[10] The UNECE industrial output indices are presented in the UNECE, *Economic Bulletin for Europe*, volume 47 (1995: 163)). United Nations New York and Geneva

across the period being studied, hence its suitability as the index for industrial output. As the UNECE uses data from official sources, it also provides an insight into the deficiencies with the official series as well.

For Poland, I have used a smaller database, 70 commodities in all, taken as principal commodities for industrial production. These are found in tables published in the monthly Statistical Bulletin, *Biuletyn Statystyczny*, published by the Central Statistical office. The years covered by this database are 1980 to 1996. The industrial output indices reported in the national statistical yearbook, *Rocnik Statystyczny*, uses 1985 and 1990 as the base year for the periods up until1995 (*Rocnik Statystyczny*, 1995: 392). For the same reasons as discussed with Romania indices, the UNECE index for industrial output has been chosen to calculate the percentage deviations with individual commodities output.

The next step in the analysis is to select the base year. I have used same base year as the aggregate statistic and then calculated the change in output for the individual commodities given that base year. The percentage deviation between the change in output of the individual commodities and the aggregate index for industrial production is then calculated. The results for each of the three countries are presented below.

For Hungary I have used the official Gross Industrial Index with 1985 as its base year. The percentage deviation of the individual physical indices, with 1985 as the base year, to the gross industrial output index is then calculated. The numbers falling below the official index is then estimated in percentage terms. To gain an insight into the extent of the deviation, the percentage falling more than fifty percentage points below and more than fifty percentage points above the industrial index is reported. The results for Hungary are shown in the table below:

Table 5.1

Percentage Deviations of the Physical Output Indices for individual commodities in Hungary from the Gross Industrial Index, 1985=100

	1989	1990	1991	1992	1993	1994	1995
% below GPI	56	52	57	57	65	66	65
% total more than 50% below	8	10	21	28	34	28	56
% total that are 50 percent more than GPI	8	7	9	20	16	12	10

source: calculations based on official data from the national statistical yearbook, various years

Table 5.1 shows that in 1989, 56% of commodities were below the gross industrial output index and that this increased to 66% in 1994. Further, the percentage of commodities that were more than 50% below the output index rose from 18% in 1989 to 28% in 1994. There was a further significant increase in 1995 when the number of commodities falling by more than fifty percentage points below the official industrial index reached 56%. In fact, in 1993, over one-third of the total commodities analysed were more than 50 per cent *below* the gross industrial index for Hungary and by 1995 this had risen to over one-half. This indicates that the deviation between the aggregate measure of output and the output of individual commodities has been worsening.

For comparison between the countries, I have also included a measure of the deviation between physical output data and the industrial output index provided by the UNECE. The UNECE index of industrial production uses 1989 as its base year. The percentage deviations have been calculated in the same way but with 1989=100.

Table 5.2

Hungary: Percentage deviations between the UNECE index of industrial output and the output of individual commodities. 1989=100

	1990	1991	1992	1993	1994	1995
% below GPI	49	53	56	65	68	71
% total more than 50% below	5	12	18	28	34	40
% total that are 50 percent more than GPI	4	8	18	15	9	8

Source: calculations based on UNECE (1997) and national statistical yearbook (various years)

This confirms that both the official and UNECE industrial output index show significant bias. The percentage of commodities fell more than fifty per cent below the aggregate index grows for the UNECE aggregate figure. In 1989 a mere 5% were more than 50% below, rising to 40% by 1995. In the case of Hungary, the deviation between physical output of commodities and their aggregate industrial output index is highly significant. The bias is also towards the aggregate figure overstating the level of output of industrial products. This upward bias is growing significantly according to these calculations.

I have employed a similar method for Poland to analyse the percentage deviation of individual commodities expressed in physical terms from the industrial output index. Again to enable comparison between the countries I have selected the UNECE index of industrial production, which uses 1989 as the base year. I have also used several years

of transition, namely 1990 to 1996, for analysis of the percentage deviation, the results of which are contained in the following table:

Table 5.3

Percentage Deviations for Physical Output Indices for Individual Commodities in Poland from the Gross Industrial Output Index, 1989=100

	1990	1991	1992	1993	1994	1995	1996
% below GPI	38	54	57	66	66	72	72
% total more than 50% below	1	12	27	26	27	34	35
% total more than 50% above	8	7	5	8	5	9	9

Source: calculations based on UNECE (1997) and the *Monthly bulletin of statistics*, (various issues)

This table also shows that the bias of the index is to overestimate output. The proportion of commodities below the industrial production index rose from 38% in 1990 to 72% in 1996. The proportion of commodities more than 50% below the output index also shows a significant and dramatic increase from only 2.7% in 1990 to 35% in 1996. Again, the extent of the deviation with the aggregate measure would appear to be worsening as transition progresses.

For the third country, Romania, I have also undertaken a measure of the percentage deviation with the UNECE industrial output index. Again, 1989 is the base year. The years covered are 1990 to 1997.

Table 5.4

Romania: percentage deviation from UNECE index, 1989=100

	1990	1991	1992	1993	1994	1995	1996	1997
% below GPI	67	64	59	63	68	69	72	76
% total more than 50% below	1	8	10	18	24	27	32	36
% total more than 50% above	6	7	11	13	9	7	8	3

Source: calculations based on UNECE (1998) and national statistical yearbook (various years)

There is a significant increase in the percentage of commodities falling below the industrial index, from 67% in 1990 to 76% in 1997. The deviation at the start of transition is higher than in the previous two cases, implying that the problems with the aggregate data were significant at the very onset of transition. The deviations stabilise during 1992-3; a plausible explanation is that this was the period when the government resorted to increased subsidisation of industrial output. For 1996 and 1997 the deviations rose significantly, further price liberalisation in late 1996 and into 1997 may explain the further rises.

The percent falling by more than 50% below the aggregate figure also shows a significant rise, from only 1% in 1990 to over a third in 1997. Interestingly, this is not as high as in the other two countries. Again, a possible explanation for the lower deviation in Romania's indices the slower pace of reforms. Price liberalisation and structural change does indeed have a pronounced effect on aggregate data. Economies that have undertaken more gradual reforms show more stable aggregate figures than economies that have undertaken more radical reform. This confirms the point made by Bergson, that there is a positive correlation between the extent of bias of aggregate data and the scale of structural change. In this instance, the greater the structural changes during transition (including price liberalisation) the greater the bias upward on aggregate industrial output indices. This analysis indicates that the industrial output indices seriously overstate the level of output in these economies during transition.

5.3 A sectoral analysis of the deviations from the Industrial Output Index: A case study of Hungary

From this analysis it would seem that the aggregate indices of industrial production show considerable bias away from individual commodities, in such a way that understates the level of decline. But can a more detailed picture of the distortions be ascertained? In other words, are there some sectors that show greater distortion from aggregate indices than others? The next stage in the analysis is to look at which sectors are most subject to distortion. The following study is of the 270 commodities produced in Hungary from 1989-1995, using 1985 as the base year.

To estimate the extent of bias in the industrial sectors, the indices of gross production for each sector, 1985=100, was compared to the physical output indices for individual commodities (grouped according to their sector). The percentage deviation between the two was then calculated and the percentage below the sector's Gross Production Index calculated. The percentage of commodities that were more than 50% below the Gross Industrial output index for each sector was then computed. The results are given below:

Table 5.5a

Mining and quarrying

	1989	1990	1991	1992	1993	1994	1995
% below GPI	60	67	73	60	67	40	40
% total more than 50% below	0	0	20	33	13	13	27
% total that are 50 percent more than GPI	0	0	0	13	7	40	40

Source: calculations based on official sectoral index and physical output data from the national statistical yearbook (various years)

* Includes natural gas

1991 was the year when there was the greatest number of mining commodities falling below the sectoral index of gross production. But in 1992, the number of those falling below the gross index that showed a fall of more than 50% increased. One-third of the total commodities showed a negative deviation from the gross sectoral index of more than 50% in 1992, although this decline slowed markedly after 1993. The main trend for this sector over the period is for the deviations to begin to subside after 1994 and 1995, whilst at the same time the percentage falling more than 50% below begins to increase again in 1995. There is also a substantial deviation above the GPI in 1994 and 1995 (40%) and particular commodities showing growth include crude oil and manganese ore. Commodities that show significant deviation below the GPI include quartzite and raw bentonite.

Table 5.5b

Manufacture of Non-Metallic Mineral Products

	1989	1990	1991	1992	1993	1994	1995
% below GPI	61	65	65	77	85	88	81
% total more than 50% below	8	11	27	31	38	38	46
% total that are 50 percent more than GPI	4	4	4	12	8	8	8

Source: calculations based on official sectoral index and physical output data from the national statistical yearbook (various years)

In 1994, 88% of total non-metallic mineral product commodities fell below the GPI, with nearly 40% felling by more than 50 percent. By 1995, the percentage falling below the industrial output index for this sector had declined slightly, but the percentage falling by more than 50% below the GPI had risen to 46%. Commodities such as chrome magnesite products, fire clay products and insulating cotton were considerably

below the GPI. Drawn sheet glass showed considerable growth above the GPI. The picture in this sector is one of overall decline, a significant portion of the commodities being more than 50% below the GPI and only a small number, 8% in 1995, showing any positive deviations.

Table 5.5c

Basic Metal Industries

	1989	1990	1991	1992	1993	1994	1995
% below GPI	50	37	50	50	75	75	75
% total more than 50% below	0	0	25	25	50	50	50
% total that are 50 percent more than GPI	0	0	12	25	12	12	12

Source: calculations based on official sectoral index and physical output data from the national statistical yearbook (various years)

From 1993 to 1995, three-quarters of total basic metal commodities were below the GPI; half the total commodities were more than 50 percent below. There is some positive deviation, particularly in 1992, but this slowed in later years. Several of the steel products, such as electric steel, rolled bar steel and steel wire, are considerably below the GPI. Thick steel sheets were above the GPI.

Table 5.5d

Manufacture of Machinery and Equipment

	1989	1990	1991	1992	1993	1994	1995
% below GPI	55	42	50	50	47	66	74
% total more than 50% below	16	21	31	31	39	50	61
% total that are 50 percent more than GPI	18	26	29	29	37	24	21

Source: calculations based on official sectoral index and physical output data from the national statistical yearbook (various years)

In 1995, nearly three-quarters of machinery and equipment commodities were below the GPI, and over 60% of total commodities were more than 50% below the GPI. Diesel motors, closed motor trains, floating cranes, aluminium kitchenware and buses are some of the commodities that were considerably below the GPI (100% below in many cases listed). However, the picture in the machinery and equipment sector is more mixed as substantial proportions of commodities were significantly above the GPI, 37% in 1993. The commodities more than 50% above include, stoves, ploughs and tillers, telephone sets and cash registers.

Table 5.5e

Chemicals

	1989	1990	1991	1992	1993	1994	1995
% below GPI	38	46	35	35	42	50	52
% total more than 50 percent below GPI	4	4	8	27	23	23	41
% total more than 50 percent above GPI	23	19	23	31	27	15	22

Source: calculations based on official sectoral index and physical output data from the national statistical yearbook (various years)

In 1995, over half the individual commodities were below the GPI, of these 41% were more than 50 percent below. In 1992, 31% were over 50% above the GPI, a considerable positive distortion for chemicals, although the positive distortion seems to have waned by 1994, only to rise again in 1995. The commodities showing output significantly above the GPI include fuel oil, polyethylene and blast furnace coke. Sulphuric acid, superseptyle, rubber tubing, and fertilizers were some of the commodities substantially below the GPI. Thus, whilst there is still some downward distortion from the sectoral GPI in this sector, this is to some extent counter-balanced by significant positive bias.

Table 5.5f

Wood and Paper Products, including furniture

	1989	1990	1991	1992	1993	1994	1995
% total below GPI	100	93	100	87	93	93	93
% total more than 50 percent below GPI	0	27	67	67	67	80	60
% total more than 50% above GPI	0	0	0	0	0	0	0

Source: calculations based on official sectoral index and physical output data from the national statistical yearbook (various years)

From 1989 to 1995, wood products were considerably below the GPI. It is the proportion of the commodities that are more than 50 percent below that has risen, from 0% in 1989 to nearly two-thirds of total commodities in 1995. Sawn wood, semi-cellulose and wood pulp are considerably below the GPI. There is no indication of any positive bias in this sector.

Table 5.5g

Textiles

	1989	1990	1991	1992	1993	1994	1995
% Total below GPI	53	63	53	55	60	76	68
% total more than 50 percent below	10	13	5	13	24	37	42
% total more than 50 percent above GPI	5	5	24	24	10	16	21

Source: calculations based on official sectoral index and physical output data from the national statistical yearbook (various years)

In 1994, over three-quarters of textiles were below the GPI, over a third of total commodities were more than 50 percent below the GPI in 1994. By 1995 the percentage of total products below the GPI had fallen, but the percentage falling more than 50% had risen to 42%. There is some positive bias from the GPI, by nearly one-quarter in 1991 and 1992. Individual commodities that show significant negative bias include children's shoes, fabrics (wool and hemp), and children's clothes. Whilst unwoven fabrics, women's underwear and men's jackets were considerably above.

Table 5.5h

Food Industry

	1989	1990	1991	1992	1993	1994	1995
% Total below GPI	42	40	47	57	62	55	56
% total more than 50 percent below	0	0	5	7	17	10	15
% total more than 50 percent above GPI	2	2	0	2	7	7	10

Source: calculations based on official sectoral index and physical output data from the national statistical yearbook (various years)

In 1993, nearly two-thirds of the commodities in the food industry were below the GPI, 17% of the total commodities were below 50% of the GPI. Hog fat and fruit brandy were considerably below, whilst mineral water and soft drinks were considerably above. Again, the picture in this section is mixed, the negative bias grew over the period, but the proportion of commodities showing positive bias has also increased from 2% in 1989 to 10% in 1995.

From this analysis of the industrial output of the various sectors and their distortions from the sectors' gross production indices we can see that some sectors show greater negative bias than others. All sectors show a significant bias below their GPI, but for some sectors, such as in the chemicals and food processing sectors, this is almost counter-balanced by significant positive bias.

For chemicals and the food industry the GPI seems to reasonably measure the sectors' output, the significant negative biases being almost equivalent to the positive biases. For textiles, machinery and equipment, and mining, the picture is more mixed. Whilst textiles, machinery and equipment and mining indicated an overall negative bias, in other words, there was a greater decline in individual commodities in that sector than shown by the GPI, there had been substantial growth for some commodities. Hence, these sectors as a whole show the output of individual commodities to be below, in many cases substantially, the GPI, but there have been some commodities that were substantially above and indicate important pockets of growth. Lastly, some sectors showed high negative deviation from the GPI. These sectors include non-metallic mineral products, basic metals production, wood and wood products and other manufacturing, including furniture.

5.4. Changing Output in the Industrial Sectors: Hungary and Romania Compared

Further evidence for the scale of changes in industrial output can be derived from the physical output data by calculating the annual mean for each group. The base year chosen for both Hungary and Romania was again 1985. This enables a comparison of output changes, from a period before transition with a period during the era of transformation.

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The tables below report the annual mean for each sector from 1986 onwards for both Hungary and Romania. In the appendix to this chapter (6.1), the means, standard deviations, standard errors and confidence levels are reported. The means presented here provide an indication of the scale of changes within each sector. However, these results have to be interpreted with a degree of caution given the high standard errors and low confidence levels reported for some sectors.

For Hungary, the scale of decline across all sectors is quite clear from the estimates of the annual means for each sector. All twelve sectors declined over the period, seven sectors declined by nearly one-half over the 1985 level. However, the decline was more significant in certain sectors. Three of the twelve sectors declined by more than one-half of the 1985 level. Other mining, which includes limestone, gravel and raw bentonite, showed a significant drop in output levels, falling to nearly 28% of the 1985 level by 1995. Wood products and paper and metallic products also showed severe declines falling to just over 40% of the 1985 level of activity. Four of the twelve sectors were only just over 50% of the 1985 level, including coal mining, mineral ores, textiles and non-metallic mineral products. Machinery and equipment and food processing products performed relatively better, although both declined to some extent in the early period of transition. However, the standard deviation of the mean for these groups (reported in the appendix 6.1) is also high. In the case of the machinery and equipment sector the standard deviation reached nearly 160 by 1995.

For Romania, the annual means for each sector also indicate the extent of declined across all industrial sectors. Seven of the nine sectors decline by more than one-half of their 1985 levels. Textiles and apparels declined to nearly 28% of the 1985 level by 1997 and chemicals also showed a severe drop by 1997 to just below 30% of the 1985 level. The decline across all sectors was more severe than in Hungary, with only mining and quarrying and crude oil and gas staying above one-half of the 1985 level. However, the confidence levels (at 95%) are low for most of these sector means, except in machinery and equipment and rubber and plastics sectors. This implies that a cautious interpretation is necessary in using these means for the Romanian sector output.

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Table 5.6: Mean output by Industrial sectors for Hungary, 1985=100

Hungary	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Coal mining										
Mean	96.36	95.94	86.46	83.09	73.02	70.36	68.33	53.14	60.18	56.81
Petroleum and gas products										
Mean	96.92	95.35	90.44	90.27	82.13	80.86	79.27	76.07	77.84	77.72
Mineral ore mining										
Mean	98.88	102.21	105.25	92.83	84.28	40.47	28.86	51.18	54.15	50.67
Other mining										
Mean	106.85	113.50	96.69	89.48	65.38	46.90	35.50	40.43	44.52	27.89
Food products										
Mean	101.90	106.20	103.29	101.95	100.87	89.81	84.40	75.98	83.76	88.00
Textiles and apparel										
Mean	95.82	92.60	85.98	80.79	68.48	60.57	55.76	48.16	51.48	50.92
Wood products and paper										
Mean	91.34	95.23	96.94	93.75	67.01	51.25	52.52	46.55	43.75	47.23
Chemicals										
Mean	99.68	116.57	121.82	126.51	117.42	100.53	102.45	96.29	93.20	77.79
Non-metallic mineral products										
Mean	98.84	103.54	92.31	89.87	78.34	57.96	87.46	53.68	52.83	54.64
Iron and steel										
Mean	104.03	103.64	103.75	97.69	85.85	57.07	51.54	46.77	48.01	46.44
Machinery and equipment										
Mean	116.93	129.04	128.95	107.09	113.02	94.11	92.49	75.07	97.16	76.85
Other machinery products										
Mean	107.41	119.37	137.22	156.74	91.52	84.93	85.02	108.38	80.57	95.77

Source: calculations based on physical output data from the national statistical yearbook (various years)

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Table 5.7: Mean output by industrial sectors for Romania, 1985=100

Romania	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Mining and quarrying												
Mean	103.76	110.64	118.30	119.58	73.17	63.86	70.53	69.50	69.11	70.63	75.68	64.04
Crude oil and coke												
Mean	106.65	110.99	111.40	107.03	87.62	67.38	65.62	63.93	68.26	68.62	57.63	54.18
Metallurgy												
Mean	107.52	104.30	105.67	99.83	70.09	52.33	41.45	40.58	43.22	49.73	49.13	49.95
Food and beverages												
Mean	102.49	109.29	98.79	93.85	88.66	70.08	52.60	48.37	45.63	47.58	48.18	43.81
Textiles, clothing and footwear												
Mean	104.14	102.19	99.29	97.75	76.48	51.95	43.73	40.30	35.99	36.13	29.27	27.87
Wood processing and wood products												
Mean	98.99	94.41	91.20	88.90	67.66	51.93	43.25	41.36	39.40	40.08	36.90	36.71
Chemicals												
Mean	110.72	105.65	107.29	101.92	69.87	50.54	38.49	35.73	34.86	40.20	34.67	29.52
Rubber and plastics												
Mean	100.06	92.36	94.30	86.75	71.14	54.50	41.81	46.92	39.25	41.85	36.81	30.69
Non-metallic mineral products												
Mean	105.67	102.81	105.52	99.69	73.03	51.31	49.06	47.64	42.19	46.21	47.88	39.21

Source: calculations based on physical output data from the national statistical yearbook (various years)

A further method for checking the scale of decline is to examine changes in the output of individual commodities. Obviously presenting the changes for over 200 individual items is not plausible, but I have taken several key items and presented the change in these for the period, again using 1985 as a base year. The commodities chosen are obviously arbitrary to some extent, but I have tried to conform to the general view of which can provide the most clear indications of general changes by using the commodities selected by the Economist Intelligence Unit in their *Country Profile* for an individual country.[11] These were selected on the basis of their importance as exports, as well as for domestic production.

In the case of Hungary, only one commodity exceeded its 1985 levels, that is colour televisions. Synthetic materials stayed relatively level with its 1985 level. For the other eight commodities, the declines were steep. The production of radio receivers fell to zero by 1995, whilst production of buses, a commodity that was one of Hungary's key exports under the CMEA system, had fallen to a mere 9.1% of its 1985 level by 1995. Production of steel almost halved over the period, whilst chemicals such as sulphuric acid and alumina fell to around a quarter of their 1985 level.

For Romania, the output of selected industrial commodities also paints a picture of significant decline. The output of ten out of the eleven selected items was lower than that in 1985. By 1997, seven of the eleven commodities declined by over one-half of their 1985 levels. The biggest drop was in radio receivers, but tractors and television sets also showed dramatic falls, reaching only 15.7% and 17% of their 1985 levels in 1997 respectively. Synthetic rubber products also dropped sharply, falling to just over 18.5% of its 1985 levels. Crude steel and cement production nearly halved over the period 1985 to 1997, whilst caustic soda reached only around 40% of its 1985 level in 1997. Passenger cars faired relatively better, reaching nearly 95% of its 1985 level after experiencing steep declines in the early years of transition; production nearly halved in 1992. Refrigerators are the single item from this selection that showed any growth over the period, reaching 107.25% by 1997.

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[11] For example, see the EIU's *Country Profile for Romania*, 1998-99, page 38 and EIU's *Country profile for Hungary*, 1996-7: 23.

Overall, the pattern presented by these outputs of individual items in both Hungary and Romania is one of steep decline. Although the selection of items is arbitrary, the EIU chose them as indicative of the country's performance. They are central to the economy's development; steep falls in steel and cement production, for example, is indicative of the overall stagnation given their importance as general industrial and construction industry inputs. This analysis confirms the view presented by the foregoing calculations that the industrial decline in these economies has been severe and protracted; continuing right up to the end of the period studied here.

It is clear from this analysis that the aggregate measures of industrial output have underestimated the true extent of the declines during transition[12]. Estimating the percentage deviation between the aggregates and individual commodities output has shown this result. Not only are there significant deviations between these measures of output for all three countries, but these deviations grew. The percentage of commodities falling by more than fifty per cent below the aggregate, whether for industrial output as a whole, or for sectors in the case study of Hungary, also rose. Again, this indicates a worsening bias as transition progresses. The means of sector output also indicate a worsening performance, although some sectors showed a greater variation than others. Lastly, the output of selected individual items also points to the severity of the decline.

Gerschenkron (1947) pointed out that this analysis did not take into account improved efficiency, export trade, nor higher value-added. I have suggested throughout this chapter that further investigation into the correlation between output changes and these factors is required. However, the purpose of the present study is to investigate the bias

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[12] Reasons given for the slowdown in economic growth include, "...insufficient progress in institutional reforms and enterprise restructuring, rising real costs of credit and an increased debt burden, as well as a vitual paralysis in the banking and corporate sectors." (Eurostat, 2000: 7) However, as discussed in chapter 2, given the disruptions in the system of valuation during transiton, determining what is genuinely loss-making activity is raught with difficulties. The danger is that potentially viable activity may be lost. Discontnuity in the systems of co-ordination and produciton will also lead to a fall in output (see Kornai, 1994 and Blanchard, 1997).

in aggregate measures of national output. From the analysis of industrial output this bias is very high and generates significant over-estimates of the growth rates of industrial output for all three countries during transition.

Chart 5.1: Hungary: Changes in output of selected commodities
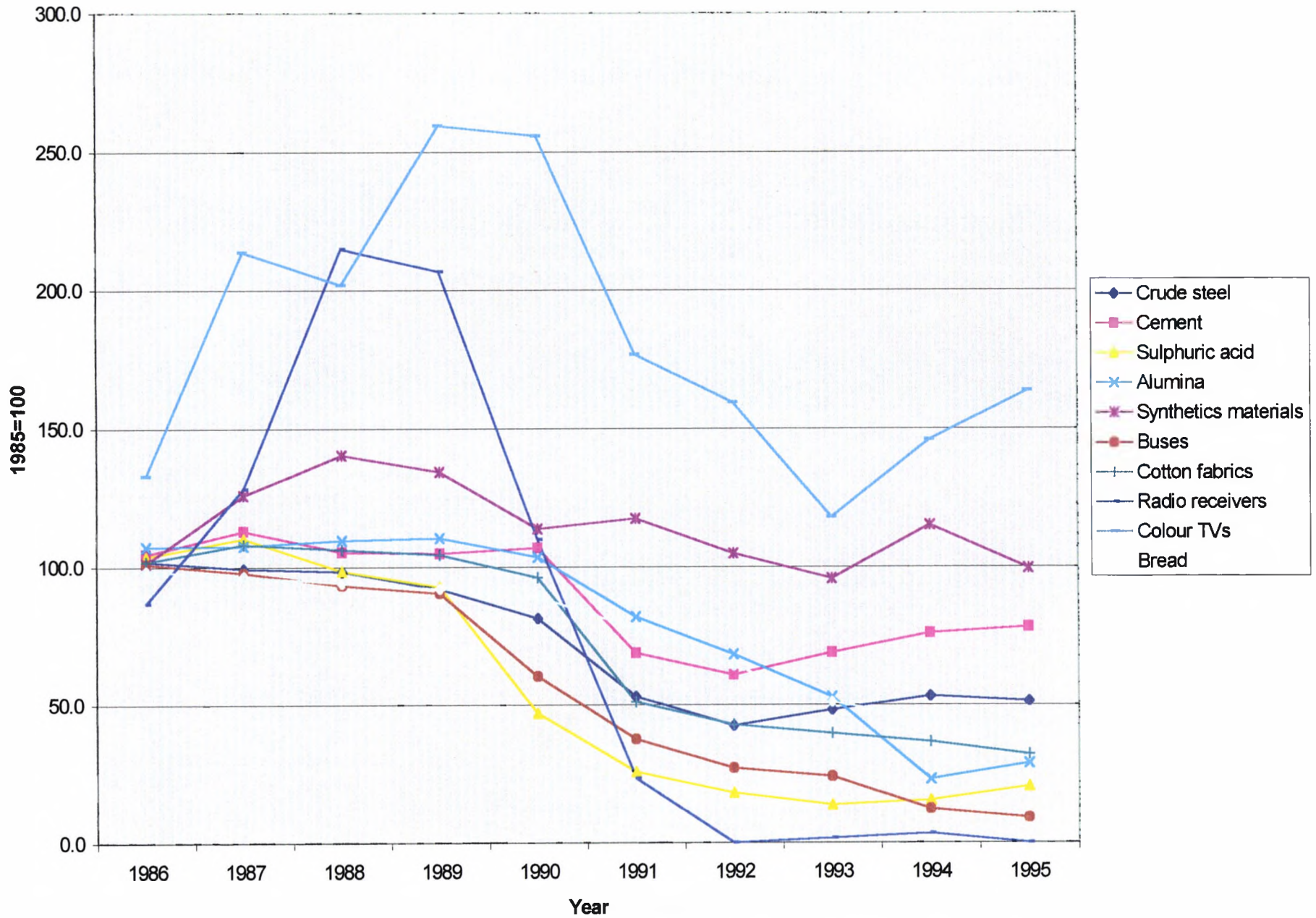
Chart 5.2: Romania: Changes in output of selected commodities; 1985=100
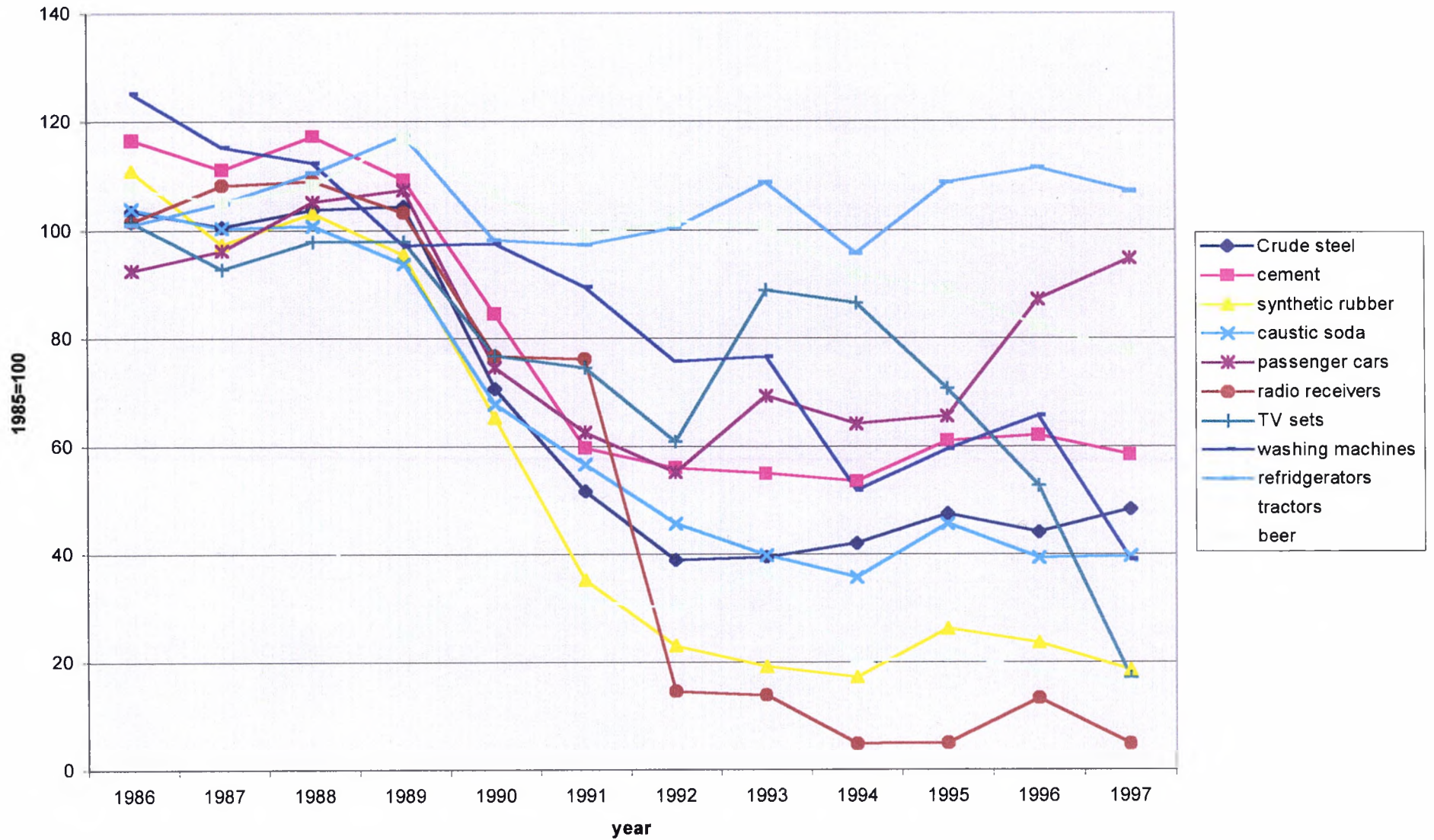
Appendix 5.1: Descriptive Statistics for Industrial Sectors

Source: calculations based on physical output data from the national statistical yearbooks (various years)

Hungary

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Coal mining										
Mean	96.36	95.94	86.46	83.09	73.02	70.36	68.33	53.14	60.18	56.81
Standard Error	0.84	0.72	3.60	1.27	0.73	0.94	9.25	5.33	10.70	14.09
Standard Deviation	1.68	1.43	7.20	2.54	1.45	1.87	18.50	10.66	21.41	28.19
Confidence Level(95.0%)	2.68	2.28	11.46	4.05	2.31	2.98	29.43	16.97	34.06	44.85
Petroleum and gas										
Mean	96.92	95.35	90.44	90.27	82.13	80.86	79.27	76.07	77.84	77.72
Standard Error	2.74	0.22	6.32	7.44	15.98	13.22	11.44	8.87	3.22	5.24
Standard Deviation	3.87	0.31	8.94	10.52	22.60	18.70	16.18	12.54	4.55	7.41
Confidence Level(95.0%)	34.77	2.83	80.36	94.54	203.07	168.03	145.37	112.66	40.91	66.54
Metal ore mining										
Mean	98.88	102.21	105.25	92.83	84.28	40.47	28.86	51.18	54.15	50.67
Standard Error	3.73	9.34	9.69	14.75	6.17	14.42	12.53	19.28	24.07	20.36
Standard Deviation	7.46	18.68	19.37	29.50	12.34	28.85	25.06	38.56	48.14	40.72
Confidence Level(95.0%)	11.87	29.73	30.82	46.93	19.63	45.90	39.88	61.36	76.60	64.79

Other mining

Mean	106.85	113.50	96.69	89.48	65.38	46.90	35.50	40.43	44.52	27.89
Standard Error	6.75	14.22	3.15	3.62	7.57	6.06	11.41	11.62	14.14	17.20
Standard Deviation	15.10	31.79	7.04	8.09	16.92	13.55	25.51	25.98	31.61	38.47
Confidence Level(95.0%)	18.75	39.47	8.74	10.04	21.00	16.82	31.67	32.26	39.25	47.77

Food products

Mean	101.90	106.20	103.29	101.95	100.87	89.81	84.40	75.98	83.76	88.00
Standard Error	1.50	3.22	3.00	2.63	3.48	3.62	5.27	6.74	8.48	10.77
Standard Deviation	9.27	19.84	18.49	16.24	21.46	22.33	32.49	41.56	52.30	66.42
Confidence Level(95.0%)	3.05	6.52	6.08	5.34	7.05	7.34	10.68	13.66	17.19	21.83

Textiles and apparel

Mean	95.82	92.60	85.98	80.79	68.48	60.57	55.76	48.16	51.48	50.92
Standard Error	1.49	2.72	7.43	5.87	6.05	5.49	7.41	7.86	10.65	11.74
Standard Deviation	9.19	16.77	45.78	36.18	37.31	33.86	45.68	48.43	65.68	72.40
Confidence Level(95.0%)	3.02	5.51	15.05	11.89	12.26	11.13	15.01	15.92	21.59	23.80

Wood products and paper

Mean	91.34	95.23	96.94	93.75	67.01	51.25	52.52	46.55	43.75	47.23
Standard Error	4.54	2.94	2.97	3.12	8.38	5.96	6.94	7.94	8.84	9.56
Standard Deviation	17.58	11.38	11.51	12.07	32.45	23.07	26.89	30.73	34.23	37.01

Confidence Level(95.0%)	9.74	6.30	6.37	6.69	17.97	12.77	14.89	17.02	18.96	20.50

Chemicals

Mean	99.68	116.57	121.82	126.51	117.42	100.53	102.45	96.29	93.20	77.79
Standard Error	4.41	9.57	12.41	14.58	17.48	16.11	20.94	20.06	19.05	18.68
Standard Deviation	22.92	49.75	64.49	75.77	90.83	83.70	108.83	104.22	98.98	97.09
Confidence Level(95.0%)	9.07	19.68	25.51	29.97	35.93	33.11	43.05	41.23	39.15	38.41

Non-metallic mineral products

Mean	98.84	103.54	92.31	89.87	78.34	57.96	87.46	53.68	52.83	54.64
Standard Error	2.81	3.56	7.20	6.51	8.34	7.32	32.62	9.91	11.03	12.72
Standard Deviation	14.31	18.18	36.70	33.19	42.51	37.30	166.34	50.54	56.26	64.85
Confidence Level(95.0%)	5.78	7.34	14.82	13.41	17.17	15.07	67.19	20.41	22.73	26.19

Iron and steel

Mean	104.03	103.64	103.75	97.69	85.85	57.07	51.54	46.77	48.01	46.44
Standard Error	3.37	3.54	3.98	4.52	5.92	8.56	12.18	11.25	11.84	12.99
Standard Deviation	9.55	10.03	11.24	12.78	16.75	24.20	34.46	31.83	33.48	36.74
Confidence Level(95.0%)	7.98	8.38	9.40	10.68	14.01	20.23	28.81	26.61	27.99	30.71

Machinery and equipment

Mean	116.93	129.04	128.95	107.09	113.02	94.11	92.49	75.07	97.16	76.85
Standard Error	8.38	14.63	17.69	11.69	15.51	24.52	27.73	16.84	33.52	26.87

Standard Deviation	48.86	85.30	103.14	68.13	90.45	142.95	161.70	98.21	195.45	156.71
Confidence Level(95.0%)	17.05	29.76	35.99	23.77	31.56	49.88	56.42	34.27	68.19	54.68

Other industrial products

Mean	107.41	119.37	137.22	156.74	91.52	84.93	85.02	108.38	80.57	95.77
Standard Error	14.19	19.28	18.89	43.26	28.63	20.35	21.52	30.09	28.26	31.71
Standard Deviation	28.38	38.56	37.77	86.52	57.27	40.69	43.04	60.19	56.53	63.43
Confidence Level(95.0%)	45.16	61.36	60.10	137.68	91.13	64.75	68.48	95.77	89.95	100.93

Romania

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Mining and quarrying												
Mean	103.76	110.64	118.30	119.58	73.17	63.86	70.53	69.50	69.11	70.63	75.68	64.04
Standard Error	1.02	1.16	3.42	5.59	5.65	5.61	6.75	8.31	8.50	8.89	6.81	3.98
Standard Deviation	3.05	3.48	10.26	16.76	16.94	16.84	20.26	24.94	25.51	26.67	20.42	11.95
Confidence Level(95.0%)	2.34	2.68	7.89	12.89	13.02	12.94	15.58	19.17	19.61	20.50	15.70	9.18
Crude Oil and Coke												
Mean	106.65	110.99	111.40	107.03	87.62	67.38	65.62	63.93	68.26	68.62	57.63	54.18
Standard Error	2.54	3.87	4.20	3.88	4.41	7.13	7.38	8.18	8.90	10.23	11.87	11.17
Standard Deviation	8.02	12.24	13.29	12.27	13.94	22.55	23.35	25.86	28.14	32.35	37.54	35.34
Confidence Level(95.0%)	5.74	8.76	9.51	8.78	9.97	16.13	16.70	18.50	20.13	23.14	26.85	25.28
Metallurgy												
Mean	107.52	104.30	105.67	99.83	70.09	52.33	41.45	40.58	43.22	49.73	49.13	49.95
Standard Error	1.83	2.18	3.08	3.12	3.02	3.01	2.59	2.26	2.24	3.17	3.55	3.87
Standard Deviation	8.77	10.45	14.77	14.95	14.51	14.44	12.42	10.83	10.75	15.18	17.01	18.54
Confidence Level(95.0%)	3.79	4.52	6.39	6.46	6.27	6.25	5.37	4.68	4.65	6.57	7.36	8.02
Food, beverages and tobacco												
Mean	102.49	109.29	98.79	93.85	88.66	70.08	52.60	48.37	45.63	47.58	48.18	43.81
Standard Error	2.73	3.55	3.98	6.32	4.84	4.98	5.84	5.93	5.73	5.91	6.04	6.26
Standard Deviation	10.90	14.20	15.91	25.30	19.36	19.90	23.35	23.72	22.94	23.64	24.14	25.03
Confidence Level(95.0%)	5.81	7.57	8.48	13.48	10.32	10.61	12.44	12.64	12.22	12.59	12.87	13.34
Textiles, clothing and footwear												
Mean	104.14	102.19	99.29	97.75	76.48	64.95	43.73	40.30	35.99	36.13	29.27	27.87
Standard Error	1.03	1.30	2.10	2.28	1.58	2.63	3.32	3.96	4.44	5.04	3.65	3.64
Standard Deviation	4.37	5.53	8.92	9.68	6.68	11.16	14.10	16.82	18.86	21.37	15.47	15.46
Sample Variance	19.13	30.53	79.64	93.69	44.69	124.44	198.79	282.96	355.56	456.48	239.17	239.04
Confidence Level(95.0%)	2.18	2.75	4.44	4.81	3.32	5.55	7.01	8.37	9.38	10.62	7.69	7.69

Wood Processing, Pulp and Paper

Mean	98.99	94.41	91.20	88.90	67.66	51.93	43.25	41.36	39.40	40.08	36.90	36.71
Standard Error	2.48	3.08	4.10	4.39	3.51	2.80	2.66	3.13	3.21	3.03	2.93	3.35
Standard Deviation	8.95	11.12	14.79	15.83	12.64	10.11	9.58	11.28	11.59	10.93	10.58	12.09
Confidence Level(95.0%)	5.41	6.72	8.94	9.56	7.64	6.11	5.79	6.82	7.00	6.60	6.39	7.31

Chemicals

Mean	110.72	105.65	107.29	101.92	69.87	50.54	38.49	35.73	34.86	40.20	34.67	29.52
Standard Error	2.26	2.60	3.17	3.41	2.58	2.04	1.85	2.36	3.10	3.67	3.64	3.94
Standard Deviation	14.66	16.88	20.57	22.13	16.71	13.21	11.99	15.32	20.09	23.79	23.56	25.51
Confidence Level(95.0%)	4.57	5.26	6.41	6.90	5.21	4.12	3.74	4.78	6.26	7.41	7.34	7.95

Rubber and plastics

Mean	100.06	92.36	94.30	86.75	71.14	54.50	41.81	46.92	39.25	41.85	36.81	30.69
Standard Error	2.98	1.24	3.09	3.11	3.14	3.12	6.43	8.89	7.96	9.30	18.50	15.44
Standard Deviation	5.16	2.14	5.36	5.38	5.43	5.41	11.15	15.40	13.78	16.12	32.05	26.74
Confidence Level(95.0%)	12.82	5.33	13.31	13.36	13.49	13.44	27.69	38.26	34.24	40.04	79.62	66.42

Non Metallic Mineral Products

Mean	105.67	102.81	105.52	99.69	73.03	56.31	49.06	47.64	42.19	46.21	47.88	39.21
Standard Error	1.69	3.52	4.41	5.13	4.69	4.47	5.26	6.28	5.20	6.05	6.29	4.95
Standard Deviation	5.35	11.12	13.96	16.21	14.84	14.14	16.63	19.87	16.45	19.13	19.88	15.66
Confidence Level(95.0%)	3.83	7.95	9.98	11.60	10.62	10.11	11.89	14.21	11.77	13.68	14.22	11.20

Machinery and Equipment

Mean	95.07	84.51	86.57	76.79	66.37	48.28	42.18	46.78	42.06	54.13	70.36	110.11
Standard Error	5.13	5.56	6.24	6.84	5.20	5.59	6.69	8.28	12.73	24.29	38.87	83.44
Standard Deviation	29.90	32.40	36.40	39.90	30.29	32.58	38.99	48.25	74.22	141.63	226.67	486.53
Confidence Level(95.0%)	10.43	11.30	12.70	13.92	10.57	11.37	13.61	16.84	25.89	49.42	79.09	169.76

Electrical and Optical equipment

Mean	101.51	90.06	91.56	83.01	77.22	54.36	37.81	51.81	39.52	28.82	26.55	20.10
Standard Error	5.16	6.13	8.87	12.21	9.40	5.70	5.68	12.80	7.55	6.11	5.73	5.01
Standard Deviation	18.59	22.12	31.99	44.03	33.88	20.56	20.49	46.16	27.22	22.03	20.66	18.07
Confidence Level(95.0%)	11.24	13.36	19.33	26.60	20.47	12.42	12.38	27.89	16.45	13.31	12.48	10.92

Means of Transport

Mean	110.57	118.82	104.42	114.86	80.77	59.57	50.63	44.62	30.31	41.20	46.73	28.08
Standard Error	8.14	8.82	9.98	7.95	6.32	6.21	12.21	11.38	8.51	12.56	14.74	9.48
Standard Deviation	31.51	34.16	38.64	30.78	24.48	24.04	47.28	44.06	32.96	48.66	57.10	36.70
Confidence Level(95.0%)	17.45	18.91	21.40	17.04	13.56	13.31	26.18	24.40	18.25	26.94	31.62	20.32

Appendix 5.2: Output of selected industrial items, 1985 =100

Source: my calculations based on physical output data from the national statistical yearbooks (various years)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Hungary										
Crude steel	101.8	99.3	98.3	92.0	81.3	52.9	42.3	48.1	53.1	51.2
Cement	104.6	112.9	105.3	104.9	106.9	68.8	60.8	68.9	75.9	78.2
Sulphuric acid	103.7	110.2	98.5	92.7	46.9	25.7	18.2	13.7	15.4	20.5
Alumina	107.3	107.5	109.5	110.5	103.5	81.8	68.3	52.8	23.1	28.7
Synthetics materials	101.3	125.9	140.5	134.5	113.7	117.4	104.9	95.8	115.2	99.5
Buses	101	97.8	93.2	90.4	60.4	37.5	27	24	12.3	9.1
Cotton fabrics	101.9	108	106.2	104.3	96.1	51	42.7	39.5	36.5	32
Radio receivers	86.7	128.3	215	206.7	110	23.3	0	1.7	3.3	0
Colour TVs	132.9	213.8	201.8	259.3	255.7	176.6	159.3	118	146.1	163.5
Bread	98.5	96.7	94.2	92.1	89.1	77.7	64.2	50.9	44.5	38.8

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Romania												
Crude steel	103.49	100.65	103.76	104.47	70.76	51.69	38.97	39.48	42.04	47.53	44.1	48.39
cement	116.67	111.14	117.29	109.26	84.62	59.81	56.05	55.04	53.61	61.15	62.17	58.57
synthetic rubber	110.90	97.44	103.21	95.51	65.38	35.26	23.08	19.23	17.31	26.28	23.72	18.59
caustic soda	103.93	100.37	100.86	93.73	67.81	56.63	45.70	39.80	35.75	45.70	39.43	39.68
passenger cars	92.54	96.27	105.22	107.46	74.63	62.69	55.22	69.40	64.18	65.67	87.31	94.78
radio receivers	101.58	108.23	109.11	103.33	76.71	76.18	14.54	13.84	4.90	5.08	13.31	4.90
TV sets	101.53	92.72	97.89	97.89	76.82	74.52	60.92	88.89	86.59	70.69	52.68	17.05
washing machines	125.24	115.24	112.38	97.14	97.62	89.52	75.71	76.67	51.90	59.52	65.71	39.05
refridgerators	101.00	105.00	110.50	117.50	98.25	97.25	100.50	108.75	95.75	108.75	111.50	107.25
tractors	55.71	54.29	45.71	24.29	38.57	31.43	30.00	37.14	20.00	21.43	18.57	15.71
beer	107.68	105.25	108.21	116.92	106.91	99.09	101.70	100.83	91.87	89.04	82.44	77.70

Appendix 5.3

KÖZPONTI STATISZTIKAI HIVATAL
Iparstatisztikai főosztály
1025 Budapest II., Keleti Károly u. 5-7.
⊡1525 Budapest 51.
☎: 212-6613, Fax: 212-6985

Budapest, 8 May 1996

From: Hungarian Central Statistical Office,
Industry Statistics Department
Fax number: 212-6985
To: Ms Rachael Walker
Subject: Reply to your questions
Ref: 420-333/1/96

Dear Ms Walker,

I would like herewith to answer to the questions you put in your fax of 23rd April as follows:

1. According to the Law of Statistics and Law of Data Protection (No. XLVI/93 and LXIII/92) we apply the "Data Protection Regulation of HCSO" in our information work. This is the reason for tightening the scope of the industry data published in "Statistical Yearbook of Hungary 1994" compared to the previous years. The product date you mentioned in your fax can't be published because they derive from less than 3 data-suppliers. Unfortunately, the Hungarian economy has much more branches covered by only 1 or 2 producers than in the other economies in Western Europe.

2. The seasonally adjusted volume index with fixed basis indicates the changes of the gross output of industrial activities. The values of production are recalculated to comparable prices, using producer price indices. The performances of the base year are expressed on January prices of 1985. The time series are calculated from multiplication of Paasche type chain indices. The seasonal adjustment is implemented by the computer program package X11ARIMA/88 based on moving averages.

I hope these answers give sufficient explanation to your question. In case you would have more question, please don't hesitate to fax us.

I would like to call your kind attention to one of my department's publications "Yearbook of Industrial and Construction Statistics Hungary" about 1993 and 1994 including much more detailed information about the Hungarian industry than the Statistical Yearbook of Hungary.

Finally, I wish you much success in your research project.

Yours sincerely,

Tamás KOTULICS
Head of Industry Statistics Department,
Hungarian Central Statistical Office

CHAPTER 6

THE SERVICE SECTOR IN TRANSITION ECONOMIES

The treatment of the service sector prior to and during transition typifies the limitations with the conventional approach to the analysis of transitional economies. As I wish to demonstrate in this chapter, both the measurement and methodological framework for analysis of services during transition are erected on *a priori* assumptions that may well be groundless, generating misleading results. The basic presumption is that transition and Soviet type economies can be compared to a norm for market economies' structures, which, in turn, can provide an indication of future patterns of development. In the case of the Soviet type economies, the comparison to a market norm generated the notion that there existed distinct deficiencies in the provision of services in centrally planned economies. This assumption has underpinned the idea that a catch-up effect would take place as these economies moved to market type structures. Growth in transition economies would be driven by the development of service sectors as they became more typical of the structures expected for market economies.

This chapter questions these propositions. Using the framework developed for comparing service sectors with those of the market economies, the analysis presented here shows that the outcomes depend on the dataset used. In this study, the data derived from the International Comparison Programme (ICP) and the European Comparison Programme (ECP) is used for both GDP per capita levels and shares of services. When the ICP and ECP data is used to examine the structures of the service sectors in Eastern Europe, the existence of a negative gap compared to market economies disappears. Further examination of data from the ECP and International Labour Organisation (ILO) shows that the development of services during transition presents a mixed picture. There is no scope for a 'catch up' effect during transition evident from this data.

However, this chapter also presents a more fundamental critique of the treatment of services in these countries. Regardless of whether or not a gap in service sector provision exists, the

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systems of measurement and the methodological frameworks used for service sector analyses are deeply flawed. The fitting of shares of services around some norm for market economies ignores the specificity of the development of services in the centrally planned economies. This chapter examines the evidence that social provisions within industrial firms, a characteristic of Soviet era enterprises, still plays an important role in today's industries. However, the downsizing of enterprises that has accompanied industrial decline and privatisation has lead to a reduction in these services. Measuring the provision of these services is biased both in terms of their classification (for example, are kindergartens provided by a steel works classed as steel employment and output, or as a service?) and the skew induced by their pricing. Transition makes these problems ever greater as the status of these services undergoes major alteration and as their pricing changes.

Treating services in centrally planned and transition economies as comparable to that of market economies ignores the dynamics of their provision. This mistreatment is seen not only in the measurement problem, but also in the framework for analysis based on establishment of market norms. It ignores the important linkage between services and industry in Eastern Europe and their relationship to low wages through free, or cheap, service provision.

This study focuses on Hungary and Poland. These are the only two transition countries for which some consistent data covering periods prior and during transition exists. Even in the case of these economies, significant reclassification of services has taken place during transition, making some datasets, such as the ILO for Hungary, inconsistent.

6.1 The thesis of relative underdevelopment of services in Soviet-type economies

The 'catch-up' expected during transition rests on the notion that all economies are embarking on a development process, which passes through various, identifiable stages as the economy progresses. The main developments are to move from agricultural economies to manufacturing and then, at advanced states of maturity, to a stage where the service sector is responsible for increasing shares both of GDP per capita and employment. Colin

Clark first suggested this three-step development process for economies in general in his seminal work on the processes of economic growth. He referred to the flow of labour into the service sector in 'higher' levels of economic maturity as "Petty's Law" (Clark, 1940: 177).

According to this development model, growth is concomitant with increasing GDP per capita. "For the purposes of measurement, the economic growth of a nation may be defined as a sustained increase in its population and per capita income." (Kuznets, 1965: 6)[1]

It is this combination of theories concerning the measurement of economic growth, namely the increase in GDP per capita, and the stages of structural change during advancement that was utilised by Chenery and Syrquin (1975) in their seminal study of the *Patterns of Development*. Using population and GDP per capita as indicators of growth they compared the structures of economies across the developmental spectrum[2], their aim being to establish uniform features of development affecting all the countries studied. A central point their study made, which also corroborated the view of Colin Clark, was that there was a proportionate increase in the share of services as income rose, "The results indicate a rising share of services at high income levels." (Chenery and Syrquin, 1975: 176)[3]

Two points need to be emphasised concerning the model that they employed. First, it saw development as a 'gradual' process of advancement; "Since structural discontinuities may be ruled out, a logistic curve, which describes a gradual transition from one limit to the other, illustrates the type of function needed for the analysis of these transitional processes". (Chenery and Syrquin, 1975: 8) Progress was posited as taking place through discrete stages and all economies are subject to an inexorable drive to a common endpoint. Just where a particular economy fitted into the overall spectrum of development could then be

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[1] Elsewhere, I discuss the problems with using GDP per capita as a measure of growth with regard to eastern Europe, but for now I wish to point out the way that the issue of economic development has been addressed

[2] In their cross country analysis Chenery and Syrquin (1975) regressed the share of GDP (X) as the dependent variable against the log of GNP per capita (Y) and population (N):

$$X = a_0 + b_1 \ln Y + b_2 (\ln Y)^2 + b_3 N + b_4 (N)^2 + \sum b_5 T + \mu$$

Where T is the time period and μ is the residual.
A variable for the net resource flow (F) can also be included in the estimate of the regression, which would include exports, imports, saving, and investment flows.
The original report covered 101 countries for the period 1950-70.

[3] The evidence for this claim also came from the study by Syrquin in 1974.

determined. Regression analysis based on this model attempts to derive a benchmark for normal market economies which can then be compared to a range of economies in the development process.

Second, it was a model of general equilibrium,

> Since we are concerned with interrelated changes in the structure of the whole economy, the model implicit in our analysis is one of general equilibrium...The regression equations proposed in the following paragraphs for the description of development processes can be thought of as reduced forms of a more detailed general equilibrium system. (Chenery and Syrquin, 1975:10)

The procedures employed by Chenery and Syrquin to investigate the structures of economies in differing stages of development have been utilised for the analysis of Eastern Europe and the comparable size of the service sector in these economies both before and during transition. Yet, Chenery and Syrquin (thereafter C-S) themselves warned against using the communist countries for comparison, "Excluded from this study are most of the communist economies...because of problems of comparability." (Chenery and Syrquin, 1975: 16) This early note of caution against the use of the C-S model of comparison for the purposes of studying the structure of development in Eastern Europe has been disregarded in most of the main studies of the structure of former communist economies and of the catch-up effect during transition.

In using the C-S model to analyse the service sector in Eastern Europe and the former USSR, market economies are deemed to show 'normal' patterns of development. The regression line derived from comparing share of services at differing levels of income in market economies' is intended to calculate 'normal' shares of the services. The 'socialist economies' are then compared to this pattern to see how far they deviate from the norm. Implicit in this procedure is the view that there are 'normal' or uniform patterns of development in market economies and that the socialist economies can be compared to this pattern using the same indicators of growth, that is GDP per capita. To predict the catch-up effect of transforming the former Soviet-type into market economies, the estimated share,

given the economies' income level, is fitted onto the actual service gap. From this the likely growth in services that is necessary to close the gap can be calculated.

Winiecki (1988), Gur Ofer (1973), Easterly, de Melo and Ofer (1994), Dohrn and Heilemann (1996) and the OECD (1986) undertook similar studies, in which the share of the service sector in GNP was regressed against income per capita (and other independent variables such as population and share of agriculture etc). Although these variables differed from study to study - for the purposes of this discussion, GDP per capita can be taken as the main explanatory variable. The OECD study of *Services in Central and Eastern European Countries* (1986) used a simplified version of the C-S model:

$Y = a_0 + b_1 X$

Where:

Y = share of service sector in GDP

X = GDP per capita, either in log or nominal form

The OECD study showed large negative gaps in their share of services both in terms of share of GDP and employment. As reported in the OECD study, "...all points relating to CEECs are located far below the regression lines." (OECD, 1986: 16) In other words, the CEECs show a high negative discrepancy in comparison to market economies for their service sector. The OECD report went on to show that the gap for 'market' services was far greater than the gap for 'government purpose' services, "The share of employment in the government service sub-sector does not differ substantially between CEECs and OECD countries." (OECD, 1986: 19) Thus, the comparison of services at different levels of aggregation can generate a more detailed picture of the gap in services.[4]

That the former 'Soviet' economies showed a gap in the services sector and a bias towards industry has been further substantiated by studies such as that by Jan Winiecki (1988) using a methodological procedure again based on the C-S model. Using 38 countries for the years 1965-1979 with data from the World Bank's *Development Reports* and UNECE, he compared the sectors' shares against GNP per capita and population. His results

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[4] Later I shall discuss how a disaggregated study yields differing results to the ones that analyse 'services' as a homogenous grouping in proportion to GDP.

demonstrated that the former Soviet economies [or Soviet type economies - STEs] showed a clear and significant bias towards the industrial sector; "...the overgrowth of the industrial sector in STEs was strikingly high, as shown by comparison with actual and predicted shares of industry. All STEs showed an extremely high share of industry in GDP, not found in any other country in the same, including countries within the same GNP **per capita** range." (Winiecki, 1988: 80)

One of the most detailed and earliest studies of the service sector in STEs was that undertaken by Gur Ofer (1973). Although concentrating on the service sector in the USSR, he widened his survey to include the other 'socialist' economies to see if any distortions were common to the Soviet type growth model. His method for establishing distortions was again based on the C-S model. However, Gur Offer's study attempted to disaggregate the service sector by separating the commerce sector (C) and other services (OS) in comparing the service sector across the countries. He then proceeded to analyse more detailed studies of trade and unrecorded activities etc. Gur Ofer's overall conclusion was that; "There are large deficiencies in the service industries and they are concentrated mainly in the C [commerce] sector and in public administration and personal services." (Ofer, 1973: 37) Again, the data was derived from the UN yearbook, whereby GNPs are converted by exchange rates and employment data from the ILO.

Thus, it has become the accepted view become hat the STEs showed distorted structures with low shares of both employment and GDP in the service sector. This has been the starting point for the studies that attempt to show how transition to market economies will affect the structure of the economies. A World Bank paper, attempting to predict how the service sector will grow in the former USSR during transition, starts from the premise that, "It is well known among Soviet specialists that the structure of the USSR economy, and to a lesser extent other socialist economies, was distorted compared to other countries...with a large industrial base and a small service sector." (Easterly, deMelo and Ofer, 1994: 4)

Although the CEECs show a smaller distortion compared to the former USSR, they are nevertheless significantly biased against services according to these studies. Before I look at

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the consequences of this view of a negative gap in services for the changes during transition, I shall look at the reasons put forward to explain this gap under Soviet development.

It has been the main position of all the works cited in this discussion that the underdevelopment of the service sector was a feature peculiar to the 'socialist' economies. Ofer, (1975) again used econometric regressions to investigate the role of 'socialist' development in the bias against services, and estimated the significance of the gap for all the Soviet regimes. His conclusion is that, "This short investigation of changes in the Soviet industrial structure since 1926 in the main supports the hypothesis of this chapter that the socialist system is responsible for a persistent gap in the service industries..."(Ofer, 1973: 147)

Why should the 'socialist system' lead to a bias against the growth of the service sector?

The first explanation was that the Soviet model of growth was based on an ideological doctrine whereby labour employed in the service sector was deemed unproductive and so inferior to the industrial, material sector. Helen Boss (1990) traces this ideology directly to the Marxist distinction between productive and unproductive labour,[5]

> An imperfect but recognizable post-capitalist version of the Smitho-Marxian doctrine of the inferior productiveness of services private and public was nevertheless built into the Soviet information-processing network in the earliest years of the regime. (Boss, 1990: 160)

The OECD survey concurred with the view that the bias against services was, in part, generated by the emphasis of the Soviet regimes on materiality. Its authors argue that,

> The first reason [for the underdevelopment of the service sector] is rooted in the economic doctrine, which was prevailing in the CEECs and still prevails in some of them, according to which there are two spheres of the economy: productive and unproductive. (OECD, 1986: 13)

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[5] I shall not attempt to enter into the debate concerning the productive/unproductive labour in Marxist, or even Soviet, thought, other than to say that the materialist stance of the Soviet regimes were based on a very crude understanding of Marxist thought, as Helen Boss herself acknowledges;

> The heavier pro-material stance [of the Soviet regimes] as compared with sophisticated readings of *Das Kapital* or the *Wealth of Nations* can no doubt be laid down to the common, not to say 'vulgar', error of identifying 'necessity' with 'materiality', and 'luxury' with its 'opposite'. (Boss, 1990: 160)

The second explanation for the gap in service provision lies in the actual model of 'Soviet' growth. This pattern of growth emphasised on the industrial sector, with the heavy industrial sector taking precedence, so that relatively autarkic economies could be developed. As Jan Winiecki put it,

> ...the overgrowth of the industrial sector may be expected from the inward-oriented economic development and the concomitant import substitution-oriented strategy pursued under one or another name during the last 40 (and in the Soviet Union, during the last 60) years. (Winiecki, 1988: 74)

Lastly, the affect of central planning itself was recognised as causing the gap in the service sector. With money playing a passive role, there was no need for a developed banking and commercial sector. The state directed investment, owned enterprises and determined supply. The financial institutions that typify market economies, such as capital markets, insurance activities and other financial instruments, were simply not necessary under central planning. Thus, the orthodox view of services under central planning held that for ideological and practical reasons services were underdeveloped relative to Western market economies. Regression analysis using market norms for the share of services at different stages of economies' development confirmed this thesis. However, without going into detail at this stage, this view overlooks the particular nature of service provision in Eastern Europe. An important feature of Soviet-type enterprises was the social provision of services under the auspices of individual enterprises in return for lower wages. Conventional models cannot explain these characteristic interlinkages between industry and services in Soviet-type economies. Also, it is a truism that there will be underdeveloped financial sectors in centrally planned economies when compared to market-type ones. Yet, this tells us very little about the dynamics of the centrally planned economies. Whilst there is likely to be a lower share in say, the banking sector, will the bureaus of central planning entail a larger share in other services, such as central administration or military sectors? Does the framework employed account for the different dynamics operating in these economies?

More recent theories concerning the general role of services in development have emphasised the important role of these interlinkages. Rather than depict development as one of the consecutive stages as posited by Chenery-Syrquin *et al*, they suggest that services

make an important contribution for the progress of industry. "Services are therefore inextricably linked with the rest of the economy." (UN, 1985, 15) This points to a further shortcoming in the conventional treatment of services; the comparison with market structures omits the importance of these interlinkages. It also ignores the possibility that Eastern Europe may have developed its own particular interlinkages between services and industry. Given the provision of social services within industrial enterprises, characteristic of the Soviet-type economies, the specificity of these interlinkages seems highly relevant.

6.2 Catch-up in services during transition

It is expected that as the former Soviet-type economies move to market-type economies, the service sector will flourish. This, in turn, will restructure these economies (in a macroeconomic sense) as they approach the pattern of development predicted by the C-S model for their level of income - they will move to become 'normal' structures given their level of GDP per capita.

The C-S model is used to show not only the gap under the previous regime, but to predict the pattern of growth in the service sector during transition in several key studies. Dohrn and Heilmann (1996) make predictions of the future structure of the economies of central Europe, using GDP converted into 1987 US dollars again using data from World Bank and UN sources. They assume a doubling of per capita income within ten years of the start of transition - an assumption that seems optimistic given the real difficulties these economies have faced. However, within this scenario of fairly rapid growth, they predict that Poland would show a 2.6% increase in marketed services between 1988 and 1993 with manufacture falling by 15.8%. In Hungary the predicted growth of marketed services was 12.6%, with manufacturing declining by 3.6%.

This hypothesis of growth in services during transition is further seen in the World Bank's *Development Report* (1996):

> Services have been the second [the first being external liberalisation] major source of growth in transition economies. One study estimated that reversing the past repression of services in the NIS could increase national income by more than 10

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percent and generate around 6 million additional jobs, substantially compensating for declines in other sectors. Service sector output has indeed soared during transition, especially where liberalization is more advanced. In the leading reformers the initial 'service gap' (the shortfall in the service sector share of GDP relative to that in established market economies) has essentially been closed. (World Bank, 1996: 32)

The leading reformers are Hungary, Poland and the Czech Republic. The report goes on to estimate that the gap in services for this group of countries in 1989 was 9 percent of GDP in comparison to the 'normal share' as the table below illustrates:

Table 6.1

	Change in Share of GDP			Share of services in GDP (%) 1989-1994 (%)			Percentage of 1989 services gap filled
	Ag	Ind	Services	actual 1989	normal share	Gap in 1989	in 1994
Group 1*	-4	-12	16	42	51	9	173

* Group 1 Includes: Poland, Slovenia, Hungary, Croatia, FYR Macedonia, Czech Republic and Slovak Republic.
source: World Bank, *Development Report*, 1996: 33

The impression given by this report is that the transition has indeed led to a fundamental restructuring of the former 'socialist' economies. The share of industry and agriculture has fallen drastically, in the case of industry declining by 12 percent between 1989 and 1994, with services having increased by 16 percent over the period. The evidence presented by the World Bank suggests that the gap in the service sector has been more than closed - it excelled in its growth. The gap that existed in 1989 had been filled 173 per cent by 1994 in these countries. On the surface, this report appears to provide further evidence of the creative destruction process that has been undertaken in the transition, the decline in industry and the spectacular growth of services. The growth in services has redressed an imbalance that, according to Petty's law, indicates that these economies are moving to maturity.

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Further justification for the hypothesis of a dynamic service sector serving as an 'engine of growth' is advanced by a World Bank study by William Easterly, Martha de Melo and Gur Ofer (EMO). Its very title is suggestive of their approach, *Services as a major source of growth in Russia and other Former Soviet States* (EMO, 1994). Although this study concentrates on the former USSR, its analysis provides some insight into the general analysis of services as a major component of growth during transition.

The central point in this study is that the engine of growth derived from the services sector arises from two sources, first the catch-up effect as the underdeveloped service sector inherited from the pervious socialist regimes develops into a sector more fitting for a market economy, second externalities arising from the linkage between the service sector and the goods sector. This latter point refers to benefits generated for the goods markets by the development of services:

> ...we set forth a view that services, and in particular business and consumer services, could be a major source of growth in Russia and other former Soviet states in the coming years. This view was based on two phenomena - the existence of a large gap in service activity, which will be closed with the transition to a market economy, and the existence of externalities arising from the contribution made by services to productivity increases in the goods sector. (EMO, 1994: 18)

This matter is controversial. In the same paper the authors note that there is considerable disagreement about the contribution of the service sector to the productivity of the economy as a whole. But, as the authors themselves note with regards to the hypothesis of increasing productivity from services externalities; "Although plausible, such ideas are not yet backed up with empirical work." (EMO, 1994: 7) Further, the methodological framework of their analysis, the use of regressions to explore the comparison the Western market economies, does not address these interlinkages.

6.3 Was there a gap in services in Soviet-type economies?

What I wish to demonstrate in this section is that the studies of services in Eastern Europe are likely to be subject to significant bias arising first, from the data and, second, from the methodological framework in which it is analysed. The first bias arises because the prices of many services under the Soviet-type system were either very low or free. As stated in the OECD report, "If the relative importance of the service sector is measured by shares in GDP one should recall the deficiencies of the price structure in CEECs."(OECD, 1986, 16) Kravis, Heston and Summers (1982) in the ICP project further point out regarding the low service prices at national prices for the socialist economies; "This is in part because more services are provided free in these countries. The availability of free services may make wages be less at the same real income; this in turn would produce lower prices for labour-intensive goods, such as services." (ICP, 1982: 193) This has important ramifications for measurement in the CPEs,

> However, an important reservation concerning prices has to be made. For social policy reasons the prices charged for non-material services are kept low and, in addition, most of these services are non-marketed services. Because of such distortions, the contribution to the economy of services in the socialist countries of Eastern Europe is best not measured on the basis of national income/GDP figures. (UN, 1985, Annex 1, P6)

 Second, the available data is unlikely to capture the full extent of the service sector in the CEECs due to the high level of vertical integration. Employment data is likely to understate service sector employment as many services were not provided by independent units of production but were provided by industrial enterprises and so would be included under manufacturing employment.

Third, the omission of non-material services in official estimates of national output means that any attempt to generate GDP figures for these countries requires a significant element of guesswork Moreover, the guesses are likely to be prejudiced by the notion that services were underdeveloped. "Efforts are underway, at both national and the international level, to

adjust the national accounts of the socialist countries to make them comparable to those of the developed market-economy countries. (SNA)." (UN, 1985, Annex 1,6)

The following study makes use of the data provided by the International Comparison Programme (ICP). It attempts to establish a data set that is adjusted to minimise bias arising from domestic price differences.

6.3.1 The framework for comparison of the share of services using ILO and ICP data for 1985

The aim of this analysis is compare data on the shares of the service sector derived from the International Comparison Project for Hungary and Poland in 1985 to 54 countries at varying levels of development (as defined by GDP per capita). Data on employment in the services sector by the ILO in 26 countries were also used to analyse the trade and banking sectors. An indication of the comparative position of the service sector in these eastern European countries prior to the transition will be obtained from this analysis.

The conceptual framework

The methodological framework used here was derived from OECD (1986) study and the World Bank paper by Ofer, de Melo and Easterly (1994) - both these studies aim to analyse the 'gap' in the service sector prior to transition in eastern Europe and USSR respectively using the framework outlined below.

To overcome the possibility of bias arising due to the low prices of services in Eastern Europe, I have undertaken the same regressions as those in the studies noted above, but used data from the International Comparison Project (ICP). As explained below, this data attempts to overcome the problems caused by pricing deficiencies in inter-country comparisons by looking at 'international prices' for defined products. This form of multilateral PPP constructed by the ICP attempts to take the biases caused by different price structures across the countries into account. The main authors of the ICP, Kravis, Heston

and Summers, draw a conclusion that is relevant to the question of the service sector in Eastern Europe. They dispute 'Petty's Law' that the service sector grows in proportion to increasing GDP per capita as proposed by Chenery and Syrquin and contend that the increasing share of services is in fact a reflection of increasing prices in the services as income increases. This view supports the earlier hypothesis of Balassa-Samuelson that exchange rate converted GDPs will bias results in inter-country comparisons. As Zvi Griliches noted,

> Their main finding [that is Heston and Summers] is that the real share of services rises very little with income but that nominal service shares rise primarily because of higher relative service prices in higher-income countries. This finding is consistent with Baumol's hypothesis that the relative labour intensiveness of services raises their price as income and real wages goes up. Combined with the relatively low-price elasticities estimated by Heston and Summers, it will result in an ever-growing nominal share of these industries in consumption and GDP. But the higher nominal shares do not imply a higher real consumption of such services, only a higher expenditure on them. (Griliches, 1992: 18)

The analysis presented below questions the conventional view that there was a significant gap in service production under Soviet-type economies resulting in major growth in service production during the transition to market economies, a sort of 'catch-up' effect for the service sector. According to the work presented here the gap in services prior to the transition was a result of the bias in price structures in Eastern Europe. This study takes the possibility of price distortions into account and tries to show that it is price distortions alone that give rise to the negative gap in service production in economies prior to transition highlighted in the conventional analysis.

The analysis is undertaken on disaggregated data for the service shares rather than on an aggregate for service sector production. It is the contention of this thesis that services by nature are a heterogenous grouping and that analysing the data in disaggregated form reveals a more complex picture than that ascertained from an aggregate service sector. As Gur Ofer stated regarding the non-commercial service sector in the USSR in his work on the Soviet service sector; "It is particularly important to disaggregate this sector because it

contains many heterogenous services that may respond quite differently to changes in the level of development..."(Ofer, 1973, 33)

The ICP data employed in this study is for 1985 (published in 1994). The results give an indication of the position of Hungary and Poland prior to transition only. The data is not available for later years as yet, although I have attempted to obtain later data from Eurostat, they have stated that the data for the nineties is in a very crude form and subject to mistakes as a result.

A note on the problems of data on the service sector during transition

The data for employment across the sectors of the economies contained within the national yearbooks for Hungary and Poland has undergone major changes in categorization for the service sector so that comparison of pre- and transition data is not possible. For Hungary, the labour data for services pre-1990 are divided into material and non-material services following the Net Material Product convention used for national income accounting in the Soviet economies. Post-1990, labour data is divided into groups more compatible with SNA accounting, but not with the NMP. In 1992, the Hungarian Central Statistical Office adopted a new classification system, ISIC, based on the UN ISIC revision 3. So comparison across the two periods using national data is implausible in the case of Hungary. The ILO data is equally prone to problems of comparability over the periods, pre- and post- transition.

The methodological framework

A semi-log or numerical linear equation is used for cross-sectional analysis for a particular year.

$$Y = a_0 + a_1 X + a_2 D + \mu \quad \dots 1$$

Or

$$Y= a_0 + a_1(\log X) + a_2 D + \mu \quad ...2$$

The variables:

The dependent variable (Y) is the share of a particular service in GDP per capita. As the specification relies on the aggregation of the sum of shares equaling 100% the non-logarithmic form is used.

In the second set of regressions undertaken in this study, Y_e are the shares of services employment as a proportion of total employment as defined by the ILO in 1985. Thus, the equations used for employment shares are,

$$Y_e = a_0 + a_1 X + a_2 D + \mu \quad ...3$$
$$Y_e = a_0 + a_1(\log X) + a_2 D + \mu \quad ...4$$

Per capita GDP (X) is derived from the International Comparison Project (ICP) data for 56 countries in 1985. The ICP data measures final expenditure of GDP per capita in 'International dollars'.[6] The GDP per capita variable is used in both numerical and logarithmic forms following the procedure of the OECD.

The dummy variable (D) is used to test the statistical significance of the share of services in both Hungary and Poland against the other countries. If the parameter, a_2, for the dummy variable are significantly below zero, then the assumption of a negative gap in the services sector for Hungary and Poland would be correct. Thus a one-tail test on the t-values for variable D is undertaken to check for any significant negative affect in these centrally planned economies

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[6] For more on the ICP methodology, see Appendix C.

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Disaggregation

The share of services was analysed in a disaggregated form using the specific categories detailed in both ILO and ICP reports. A list of specific variables follows later.

6.3.2 The ICP and ILO data

The United Nations International Comparison Project carried out several benchmark studies, the one utilised in the following analysis is for 1985 using 56 countries, including Hungary and Poland. Each study defined in close detail a number of final products, both goods and services, and then ascertained a price for the product in each participating country.

The ICP gave clear specifications for each product and then derived an 'average price' for the product taking quality considerations into account. It then adopted an aggregating method to attain multilateral PPPs. This procedure meant re-pricing each of the countries' quantities for its different products at a set of common 'international prices'. The international prices are a weighted average of international relative prices. (Heston and Summers, 1982: 496)

The treatment of services in ICP data

The ICP followed SNA convention except that medical and education categories are transferred from government expenditure to consumption. All government expenditure is treated as service spending and about one-third of spending on consumption is composed of services. The ICP augmented data includes weighting to take the variance of trade and transportation in the consumption of commodities into account.

The ICP outlined three categories of service that they deemed to be 'comparison-resistant' as they were non-priced. These were education, healthcare and government. The procedure

adopted for estimating these problem categories is detailed in the ICP (1982) report, but its basics involve input determination for these categories.

The ICP services analysed

The following is a list of the categories of services analysed from the ICP estimates:

Cafes...   restaurants, hotels and cafes.

Comm... communications

Ed   ... education

Govt   ... collective consumption of government

Med   ... medical care

Reced   ... recreation and education

Rent   ... gross rents

RPF   ...Gross rents, fuel and power

TC   ... Transport and communications

Trans ... Transport

The ILO services analysed

Bank ... employment in the banking sector

Social ... employment in the social sector

Trade ... trade and retail employment

Trans... transportation employment

6.3.3 Regressions

The results of the regressions on the ICP and ILO data are recorded in appendix 6\A for both X and logX. The parameters for each regression, a_1, a_2, a_3, are presented along with their t-ratios in brackets and the F-value of each regression.

To test the overall significance of the regressions, the critical F-value for 3 and 52 (ICP) and 25 (ILO) degrees of freedom was compared to the estimated F-value at 95% significance levels.

To test the significance of the growth elasticity parameter a_1, the two-tail test of significance on the t-ratios was performed.

For the ICP regressions:

All regressions are 95% significant except for government, reced, rent and rpf. In the log of GDP per capita, all regressions are significant except for Reced, Rent and Rpf. ie taking the logX results in government becoming significant.

Parameters a_1 are significant at 95% confidence, except for govt, reced, rent, rpf - for both X and logX.

For the ILO regressions:

All regressions, the F-values for both X and logX, are significant, except for transport.

The parameter a_1 is significant at 95% confidence except in trade and transport for both X and logX.

The dummy variable test

To test if the category of services is significantly negative for Hungary and Poland, a one-tail test was performed on the t-ratios of a_2. All parameters for both ICP and ILO data, X and logX, are insignificant, except for TC, that is $a_2=0$ at 95% confidence for all categories except TC. However, the dummy variable was insignificant for the more disaggregated categories of ICP data. Transport and communication when analysed separately are insignificant, which suggests that it is the aggregation of transport and communications in TC that leads to the significant negative gap. One possible explanation is that as storage is included in the aggregate, TC, it is storage that is relatively underdeveloped in comparison to other economies.

The possibility of mis-specification of the regression

The possibility that the regression is mis-specified exists for the following categories of services:

ICP: rent, RPF for both X and logX and trans, cafes, and comm for logX

ILO: transport, social

Where regressions may be mis-specified the possibility exists that the results of the tests on the variables may be biased. For the ICP data, this concern applies to the categories of rent and RPF. For ILO data, results for both transport and social may be biased and so should be treated with caution. In Appendix 6/B I have further tested the data to take into account the possibility of heteroscedasticity. I have then transformed the regressions where appropriate to adjust for the presence of heteroscedasticity.

If the regressions were mis-specified then this would point to the weak relation between income and growth of the service sector share. What would be useful for further analysis of the relationship between income growth and the share of the service sector would be an analysis of the share of the service sector to income over time using the ICP data. However,

this goes beyond the current question of the development of the service sector in Eastern Europe. What is important is that the assumption that the operation of Petty's Law would lead to an increasing share of service production as the former Soviet economies move to the market is doubtful.

6.3.4 Implications of the 1985 ICP and ILO study

In all the regressions undertaken, only in the category of TC (transport and communication together) was there any evidence of a negative gap in services compared with other economies at differing levels of development. This study supports the view of Kravis, Heston and Summers (1982) that any discrepancy in service production as income rises is generated by the existence of lower prices for services at lower income levels. For Hungary and Poland this is particularly poignant for the economies prior to transition operated with very low, even free prices for services in return for very low wages. This was the 'social wage' characteristic of these economies.[7]

Could the lack of any negative gap in service shares arise from bias in the ICP data? In chapter 4, the argument of Marer *et al* (1985), that ICP is skewed towards inflating the service share in lower income countries (including the CPEs) was discussed. However, this argument underlines the difficulty of establishing the share of services in these countries. Certainly, the ICP took their estimates of quality and prices of services into account and adjusted the data accordingly. They did so on the basis of surveys conducted in the countries. Kravis *et al* respond to the suggestion that the ICP data is biased by stating that, "safeguards ...were built into the program precisely to avoid the kinds of biases with which the ICP has been charged." (Marer *et al*, 1982: 36). These safeguards against bias included: specialists with long experience of the countries acting as the advisors; prices supplied by the authorities of the CPEs; adjustments undertaken on the basis of detailed surveys (Marer *et al*, 1982: 36). The point is that whilst the ICP did acknowledge the likelihood of service shares being reduced by lower relative prices in lower income economies and attempted to

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[7] Later in this chapter I discuss in more depth the role of service provision in STEs and transition economies.

adjust for this effect; exchange rate converted data ignores the problem altogether. All of which underlines the difficulties associated with measuring service sector shares. If the prices of services are free, or very cheap, commensuration becomes difficult. It cannot be said with certainty that the ICP data is unbiased. However, it can also be stated that there is a high probability that exchange rate data understates the actual level of service shares. The problems of measuring service shares are discussed in more detail below. Using the ILO data of employment levels in this study confirms the ICP results. The implication is that the ICP data is not significantly biased in estimating shares of services for the CPEs.

If the negative service gap in the socialist economies was the result of pricing bias then this has very important implications for transition. The 'catch-up' effect that has been the subject of leading studies of service sector changes in transition will not be forthcoming, given that there was no gap in the real level of service production in the first place. Instead, a rise in prices of service production can be expected, so growth in service production may be seen in nominal terms, but this may not be indicative of real growth.

The results of the regressions provide mixed evidence for the relationship between the share of service sector and GDP per capita. The relationship between government expenditure and GDP per capita was statistically insignificant, as was recreation and education, rent and rent, power and fuel (although for these last two categories the possibility of mis-specification may bias the results.) For education and transport, this relationship was negative. Several categories of services may have been mis-specified, a further indicator that the relationship between service growth and income growth is very weak at best.

From this analysis there is little to indicate that services may act as 'an engine of growth' during the transition to market economies in Hungary and Poland. I can find no evidence of a negative services gap prior to transition when the data that is used that takes different pricing structures into account.

6.4 The Change in Services During Transition

6.4.1 Evidence from employment data

Some picture of the changes in the service sector during the transition itself can be gleaned from ILO and national yearbooks. However, all employment data in the ILO yearbook underwent reclassification in the 1996 edition as the ISIC rev 3 replaces ISIC rev 2. For Hungary and Poland this means that there is no direct comparison of ILO data before and after 1992 when the reclassification came into effect. For Hungary, the national statistical yearbooks' employment data underwent substantial revision in 1992. Thus categories of services before and after 1992 are also non-comparable. As stated earlier this is due to the material/non-material classification of services prior to transition. However, figure 6.1, based on ILO data, classified according to ISIC rev 3[8], provides some evidence of the changes in the sectors after 1992. Taking 1992 as the base year, it can be seen that many sectors declined, including the important transport and communication that showed a deficit in the previous analysis. Growth areas include financial intermediation and public administration.

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[8] ISIC rev 3 categories used here are as follows:

G – Wholesale and retail trade; repair of motor vehicles, motor cycles and personal and household goods

H – Hotels and restaurants

I – Transport, Storage and communications

J – Financial intermediation

K – Real estate, renting and business activities

L – Public administration and defence; compulsory social security

M – Education

N – Health and social work

Fig. 6.1
Hungary, changes in service sector employment growth using ILO data,
1992=100
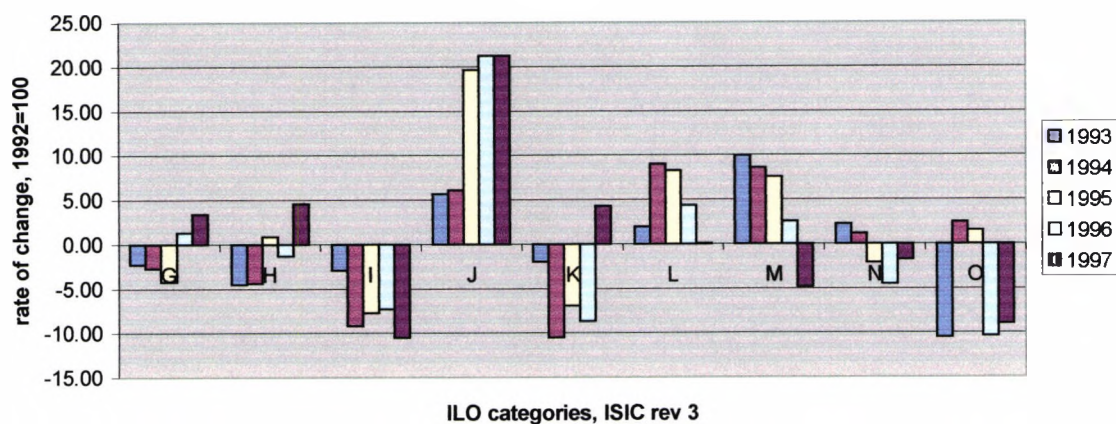
Employment data for Poland is more available, but, again, due to the change in classification of ILO data, there is discontinuity at 1992. I present two charts here. One based on ISIC rev 3 data that uses 1994 as the base year. The other chart uses the earlier classification, ISIC rev 2[9] and uses 1985 =100. There is some growth in the categories of trade and social sectors, but declines in transport and finance services.

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[9] ISIC rev 2 classifications used here are as follows:

6 – Wholesale and retail trade; hotels and restaurants

7 – Transport, storage and communications

8 – Financing, Insurance, real estate and business services

9 – Community, social and personal services

Fig. 6.2
Poland, change in service sector employment growth using ILO data,
1985=100

ILO category, ISIC rev 2
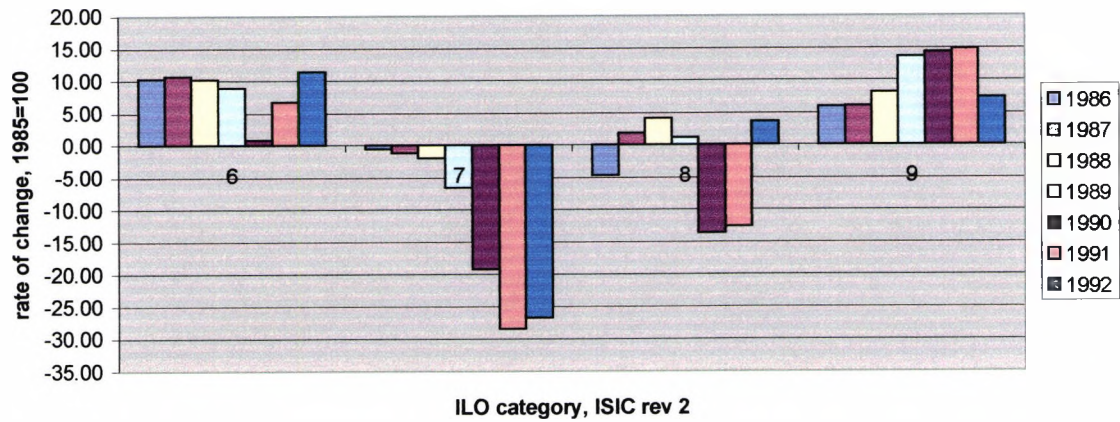
Fig. 6.3
Poland, change in service sector employment growth using ILO data,
1994=100

ILO categories, ISIC rev 3
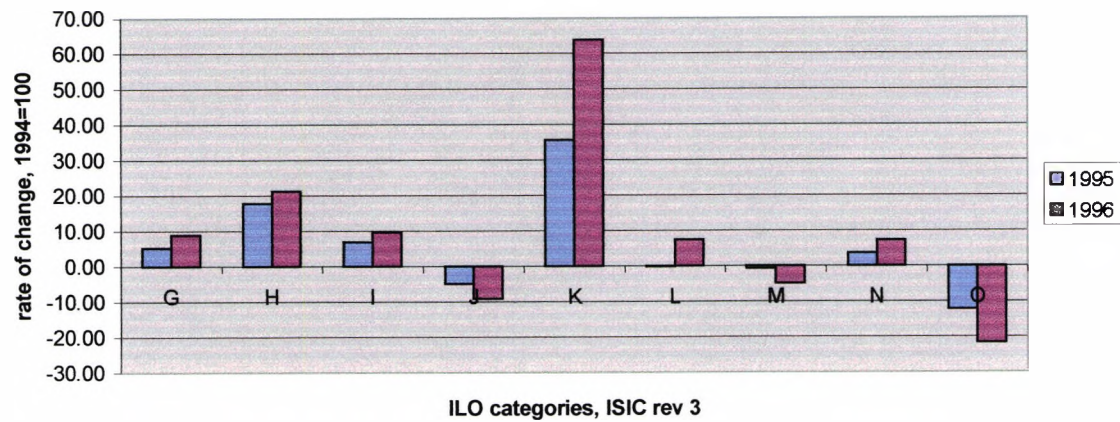
The picture painted by the employment data alone is a mixed one and should be interpreted with caution. There appears to be some growth, but declines can be seen in some of the key sectors such as transport and communications. The data for both Hungary and Poland is limited by the changes in classification during transition. As pointed out above, there is also the problem of how services, previously included in manufacturing due to high levels of vertical and horizontal integration during central planning, are now classed as enterprises

downsize and spin-off operations.[10] The evidence from employment data must be treated with caution as the evidence may well be biased due to the reclassification of service employment during transition.

6.4.2 Evidence from the European Comparison Programme

The European Comparison Programme (ECP) provides further data. The importance of this dataset is that it covers the periods before and during transition. This dataset is built on the same methodological basis as the ICP data but is concentrated on the European region only. Austria is the reference economy and is used as a bridge for comparison between the various groups of European economies. Using data from 1985, 1990 and 1993, the same analysis used above has been utilised to measure the changes in services. 19 countries are used in the European study. Again, the transition economies are Hungary and Poland. The results of the regressions are given in appendix 6/C.

Results of the ECP study

1985

- All regressions for GDP per capita are insignificant, except GOVT
- All regressions for log GDP per capita are insignificant except GOVT.
- The dummy variable test in the GDP regressions to establish the likely presence of a negative gap in each service sector for Hungary and Poland indicates that the dummy variables are all insignificant in a one-tail test of t-values, except GOVT and TC where the dummy variables are significant. When log GDP is used, only GOVT is significantly negative.

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[10] Evidence for the continued role of social service provision within the enterprise sector is discussed in a

1990

- In the regression of GDP per capita, RENT, MED, TC, RECED, ED and GOVT are all significant.
- In the semi-log regressions, RPF, RENT, RECED, ED and GOVT are all significant.
- For GDP per capita, GOVT is the only variable where the dummy variable test is significant. For log GDP, the dummy variables test for GOVT and RENT are significantly negative.
- For GDP per capita, the dummy variable test indicates that in the sectors MED, RECED and ED they are positively significant. For log GDP, MED, RECED and ED are significantly positive.

1993

- In the GDP per capita regressions, RPF, RENT, MED, RECED, ED and GOVT are all significant.
- In the log GDP regressions, RFP, RENT, MED, RECED, ED and GOVT are significant.
- Only GOVT is significantly negative in the dummy variables test for both GDP and log GDP
- For GDP per capita, RPF, RENT, MED, RECED and ED are significantly positive in the dummy variable test. For log GDP, RFP, MED, RECED and ED are significantly positive.

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later section of this paper.

Rates of growth in the service sectors using ECP data

Fig. 6.4

Poland, percentage share of services in GDP per capita using ECP data
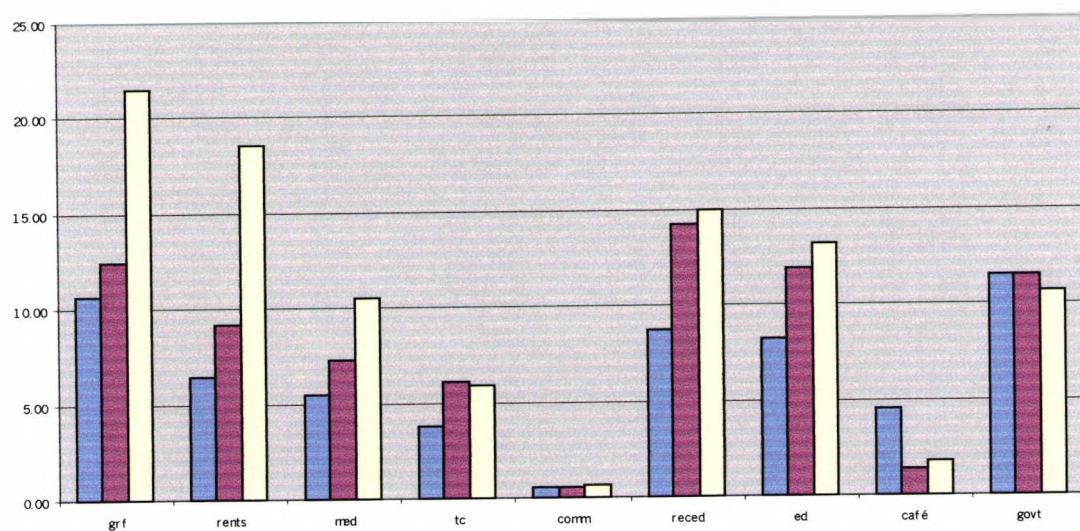
The services growing in Poland are the housing sector, mainly as a result of rising rents, medical care and recreation and education. Surprisingly, communications does not indicate growth during transition. Cafes, hotels and restaurants and government consumption declines.

Fig 6.5

<u>Hungary, percentage shares of services in GDP per capita using ECP data</u>
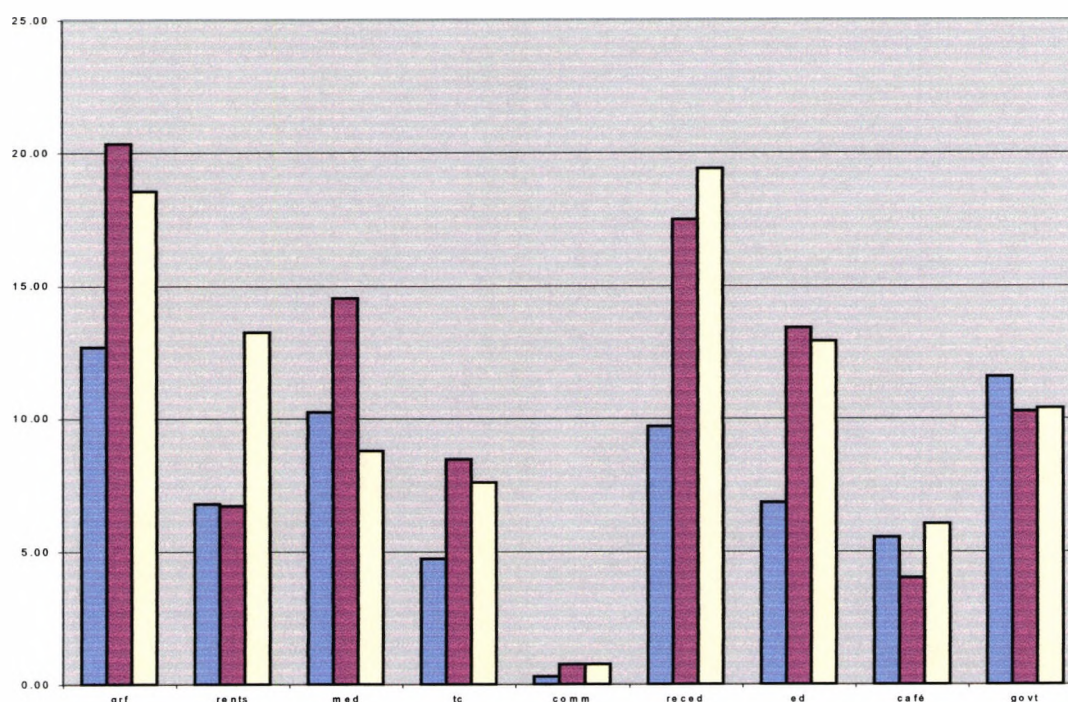
Changes in rents in Hungary again indicate significant growth, along with recreation and education. Medical care, which had been a positive outlier in regressions against market economies for Hungary, has declined. Communications does not indicate significant positive growth. Hotels, cafes and restaurants also present a mixed picture. Government consumption, the negative outlier from regression analysis, is declining.

Implications of the ECP regressions

The overall significance of the relationship between the share of services and GDP per capita, as measured by the F-tests, increases over the time period examined. Although further work will be required to examine the dynamics of this relationship, a conclusion that can be drawn from the current study is that the significance of the coefficient for the share of

services and GDP per capita increases over the period studied. The significance of the relationship increases in the semi-log function as well.

The low significance of the regressions undertaken using 1985 data makes drawing firm implications for this year difficult. However, the results tend to point to the same conclusions derived in the study of ICP data for the same year. Again, it would seem that there is no evidence of a negative gap in service sector shares relative to GDP per capita for the centrally planned economies. Only government consumption indicates the presence of a negative deficit compared to the norm for European market economies.

At the start of the transition period, the year 1990, the sectors of medical care, recreation and education point towards the existence of a significantly positive gap compared to the European market economies' norm. This positive gap in the transition economies continued into 1993.

The overall implication of this study is that there is little scope for a 'catch up' effect in services during transition. The negative gap in services during the era of central planning does not seem to have existed, with the exception of government consumption. Also, positive gaps in several services exist at the very start of transition. Looking at the growth rates of these services during the period 1985-93, again there is a mixed picture. Some services, such as medical care in Hungary, decline. Growth in the communications sectors was stagnant in both countries, and government consumption also fell. Sectors showing growth included rents (used here as a proxy for housing) and certain recreational services, including education.

6.5 The treatment of services during transition

The analysis implies that the choice of dataset used to make comparisons of service sector provision between transition and market economies significantly alters the results. The trends in service sector output also provide a mixed picture, with certain key sectors declining since the onset of transition. Further weight is added to these conclusions by studies undertaken at firm level. Mark Schaffer (1995) summarises several surveys of industrial firms in Poland and Hungary and concludes that although social benefit provision by firms is still widespread in Eastern Europe, there is evidence of downsizing. The role of service provision, which includes housing, kindergartens, health clubs and holiday provision, by the Eastern European firms has played an important role in maintaining low labour costs. Evidence suggests that this characteristic of the Soviet firm have been retained during transition, "Although affected by all the changes since the start of transition, 'welfare' benefits from employers – almost a symbol of the command economy – absorb a similar relative expenditure as in pre-transition years." (Fajth and Lakatos, 1995: 255)

However, there is also evidence of considerable downsizing of these provisions in the service sector. The study by Fajth and Lakatos (1995) into social service provision by industrial firms in Hungary shows that,

> Between 1988 and 1993 divestiture of welfare services was considerable in large enterprises, where employee benefits were traditionally the most comprehensive, according to data from a survey of 96 firms with over 800 workers in early 1994. (Fajth and Lakatos, 1995: 257)

Their study attempts to generate an overall measure of the loss in service sector provision by adding up the impact of reductions in individual services. "Combining all the above expenditures, [these include housing, meals subsidies, childcare provision, holiday homes and libraries] a 28% decline has occurred in real terms as compared with 1988" (Fajth and Lakatos, 1995: 258)

The analysis presented in this chapter indicates serious shortcomings in the conventional approach to services. These shortcomings can be seen at a number of different levels.

- The problem of comparability between transition and market economies. The studies by Chenery and Syrquin (1975) and Gur Ofer (1973) noted that comparability between Soviet type economies and market economies was limited. The analysis presented in this chapter implies these difficulties extend to the transition economies. Establishing a norm for market economies and then attempting to see where the transition economies fit into the pattern generates misleading results. Bias arises from the data used in this analysis, but also from the classification of services. Transition also involves major transformations in the way services are provided. This further limits the comparability with market economies and increases the likelihood of significant bias.

- The effect of price distortion on measuring the gap in the service sector and the sector's growth during transition also generates significant bias. Kravis, Summers and Heston's (1982) study for the World Bank's International Comparison Project pointed towards the existence of price distortions in the service sectors of Soviet type economies. When the ICP measured the share of services in *national* prices in 1975, Hungary and Poland both showed a low share of services, 20.4% and 18.8% respectively, compared with other countries of comparable levels of development.[11] These findings tend to support the conclusions of the conventional analysis outlined earlier, that Eastern Europe had a deficiency in the service sector under central planning. The results of the ICP at *national* prices also corroborate the Clark thesis of increasing shares of the service sector as income per capita rises. But the results are different when international prices are used. At *international* prices the shares of services for both Hungary and Poland increase significantly to 30.0% and 28.7% for the respective countries. The ICP also found that the share of services in GDP per capita stayed relatively even as GDP rose across the groups. As the authors noted in their 1975 study, "The price of services in this relative sense rises with per capita income sharply but somewhat irregularly, with the largest

increases from Group 1 to Group II and after group IV. The socialist countries tend to have low service prices relative to their income levels". (ICP, 1982: 193) The analysis here confirms this view.

- The ICP conducted comparisons at international prices for various years, 1975, 1980 and 1985 - all surveys showed the same results; that the prices of services were low at lower levels of income. These findings bring the whole thesis of 'Petty's Law', of rising shares of services as income per capita rises, into doubt. As the authors state; "...it is the rise in prices of services and not the rise in quantities that plays the main role in pushing up service expenditures as income increases." (ICP, 1982: 23) and further; "...the actual composition of GDP quantities between poor and rich countries is quite different from what would be inferred from exchange-rate conversions." (ICP, 1982: 23)

- The analysis of ECP data for 1985, 1990 and 1993 showed that this distortion in the data continues over the time period. There was no evidence of any negative gap in service provision in centrally planned economies in 1985, except, rather surprisingly, in government consumption. Hungary and Poland already had a significant positive bias in the provision of several key services at the onset of transition. However, the same studies also pointed to difficulties in price comparability between transition and market economies in Europe. The ECP undertakes adjustments to the data to take into account differences in quality. The ECP also manipulated the data to adjust for productivity differentials. These adjustments are arbitrary by nature,

> It should be stressed that any quality adjustment includes a subjective adjustment. Even if carried out with great care it is far from yielding a perfectly "scientific" result. ...It is not often easy, if possible at all, to determine how the change in a given quality characteristic would affect the price and what weights should be given to various quality characteristics of a product. (ECP, 1993: 34)

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[11] Italy has a share of 33.7% and Spain 29.4% for the service sector.

This is a further example of how subjective judgements concerning the nature of provision of services in Eastern Europe biases measurement.

Provision of services, particularly at enterprise level, underpinned lower wages both pre- and during transition, "Services such as subsidized meals in the work canteen, or other services provided to current workers in the course of their employment, could be regarded as part of a worker's remuneration, and to the extent they benefit the worker can in principle be balanced by lower cash wages." (Jackson, 1995: 251) This imparts a bias in measurement, whether by cost of inputs (especially wages) or by output. It is this distortion in prices that is reflected in the differences in shares between market and transition economies.

- The definition of the service sector generates further distortions when analysis is conducted at a high level of aggregation. The service sector is far from a homogenous grouping; it is, in fact, heterogenous. Even the definition of the 'service' sector is fraught with problems. The conventional distinction between services and commodities are that services are 'nontangibles' that cannot be stored. As Kravis, Heston and Summers (KHS) point out,

> Final product services constitute a heterogenous collection of goods. They are alike in that the production of each is necessarily simultaneous with its consumption, and consequently none of them can be stocked. In few other respects, however, do all final-product services share common characteristics. (KHS, 1982: 189)

Yet, this distinction is fraught with difficulties both as a definitional device and an empirical measure. One can think of many examples when storable items are classed as 'nontangibles'; as Cohen and Zysman (1987) point out, recent technological advances have enabled much data to be stored, "...on-line data banks, an archetypal post-industrial service, do just that: they store intangible information."(C&Z, 1987: 52) They add that some services take their final form as goods, such as architecture, product design. Further there this is the problem that services require commodities as intermediates to production; health care requires

numerous products such as pharmaceutical, machinery, to name two examples. Thus the very definition of services is highly problematic. According to George Stigler, "There is no authoritative consensus on either the boundaries or the classification of service industries." (quoted in C&Z, 1987: 52) The good/ service distinction can be traced back to Colin Clark, who treats services as the residual after agriculture and industry are subtracted. Again to quote Cohen and Zysman,

> Classification - even by final product - is tricky and rubbery. Software is a service; computer chips a good. But what about 'firmware', a program on a chip? A movie broadcast on TV is a service; on a cassette a good - that is, if it is purchased; rented, it is a service. (C&Z, 1987, 52)

This is a problem for measurement in the market type economies, but for transition economies it is a minefield.

As KHS explain, there exist some categories of services that are very difficult to measure, such as healthcare and education. Measures of these categories make use of inputs, but then the distinction between goods and services really does become extremely fuzzy. KHS term these as 'comparison-resistant' services. Yet, these are the very sectors Eastern Europe excels in - healthcare, education and possibly government services – and these are the very ones where there are the greatest difficulties, both conceptually and empirically, of measurement. Add to this difficulty the fact that some of these services may be undergoing transformation from government-provision to market-provision. This implies changing the basis for measurement, which generates further bias.

The difficulties in making a firm distinction between good and service and the linkages between the two distinctions are manifold with regards to transition economies. It is widely accepted that the Soviet type economies were characterised by high levels of integration at the level of the enterprise. Kindergartens, housing, healthcare, not to mention administrative work and research establishments, were often undertaken within the auspices of individual enterprises. A central feature of central planning was the creation of large enterprises, and within these gigantic firms many service activities were undertaken. Given the good/service dilemma outlined above, this high degree of integration in Eastern Europe makes separating goods from service activities a highly dubious procedure and renders them incomparable

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with other structures, i.e. market type structures as in the C-S model. Gur Ofer in his account of the service sector in Soviet economies stated that,

> ...the country data on the industrial distribution of the labour force are not entirely comparable. Despite the efforts of the United Nations to standardize accounting practices, international differences in the conceptual and definitional framework and in statistical methods persist. Some of these are due to differences in industrial organisation and as such cannot be ironed out by a uniform set of definitions; it is this type of divergence which is particularly important as regards the Soviet Union with its radically different economic system."(Ofer, 1973: 39)

The possibility of these service sector workers and their output being included as manufacturing is significantly high. Other economies would include these as service activities because they are undertaken by independent units- this must surely be one explanation for the gap revealed in the previous studies and is also a consideration that makes the attempts to compare Eastern Europe to a 'normal' structure practically meaningless. Transition has involved a further source of dislocation. Downsizing of firms has lead to the spinning-off of a number of these activities. Several studies of the provision of social benefits by transition firms' point to the reduction of social assets held by individual firms, "State-owned and privatized firms are downsizing their social benefit provisions, decreasing their social asset investment programmes, and, rather more slowly, disposing of assets." (Schaffer, 1995: 249)

Transition involves significant reclassification of employment in services. This reclassification is reflected in changing categories of employment in service sectors in both the national statistical yearbooks for Hungary and Poland, as well as in the ILO data. Again, the change in classification of employment in these sectors is indicative of the scale of the problems in measuring service sector provision during transition.

- One last point concerning the problems of measurement of services as regards Eastern Europe and its noncomparability to market structures concerns the role of defence production. Many western organizations invested vast resources in an attempt to ascertain a measure of the level of defence procurement in the eastern bloc countries,

including the CIA and US Defense Intelligence Agency (DIA). Analysis of the size of the defence sector is hazardous given that it is traditionally shrouded in secrecy. The difficulties are compounded by the incomparability of many prices and goods in this sector. The analysis of ECP data generated the surprising result that the one sector that demonstrated a negative bias was government consumption.[12] Yet, military production and activities were a vitally important element of the *raison d'etre* of the centrally planned economies. Some estimates of defence activity have suggested that the share of defence in GDP in 1982 were around 7% in Poland and 4.5% in Hungary (Thad Alton, reported in Eyal and Anthony, 1988: 110) But point here is that much of this activity was secret and official estimates of both employment and production of defence are likely to greatly understate the true level of activity. Eyal and Anthony (1988) discussed the problems of estimating the true size of the military sector in the former Soviet economies,

> No agency can plausibly present its figure as an absolute measure of the Soviet defence effort and, while many will be proud of their conclusions and may wish to stand by them, they would usually recognize the limitations inherent in the analysis method which they chose to use. (Eyal and Anthony, 1988: 4)

As defence can be viewed as a 'service' activity (although the goods produced would be classed as manufacturing) understatement of this key area, would, correspondingly, understate the level of service activity in CPEs. Eyal and Anthony (1988) argued that the estimates provided by various western agencies of Soviet defence expenditure are not absolute measures, only trends can be ascertained given the difference in figures produced according to which method was employed by the respective agency. (Eyal and Anthony: 1988: 122pp) If estimates of the scale of Soviet defence are limited to trends for the pre-transition era, this generates a problem for measurement during transition. Each estimate may provide a trend, so long as there is no massive structural change. Transition is just such a structural change that generates discontinuity. Despite this, evidence from numbers of personnel, procurement of military equipment etc suggests that the share of the defence

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[12] Using ECP data for 1985 and 1990.

budget in both Poland and Hungary has fallen markedly during transition. Also, there has been a shift from investment in military hardware to a rise the share of the budget going to wages of personnel,

> Poland's experience is similar to that of other Central and Eastern European countries. Under pressure for reductions in military outlays, cuts in equipment procurement are much easier to achieve than reductions in salaries, pensions and other payments to personnel. (Loose-Weintraub and Anthony, 1994: 51)

When the actual nature and composition of service sector in the Soviet type economies is taken into consideration the comparability of the aggregate 'service' activity with other countries is misleading. It is not whether a gap in service sector provision exists or not, but that the attempt to fit these economies into some standard for market-type economies itself which generates meaningless results. The economic structures of the CPEs were such that much of service activity was carried out under the auspices of the enterprise making the service/commodity distinction questionable. The conventional framework for analysis omits the most significant changes in service provision during transition; the change from enterprise provision to independent, private provision of services, the changing interlinkages between industries and services, and the changes in public provision – all are ignored in the conventional analysis. As transition entails a whole-scale transformation of these relationships, orthodox means of measurement and analysis will only serve to cloud the true picture.

Appendix 6\A

RESULTS OF REGRESSIONS

Table 6\A.1

ICP DATA FOR 1985

Critical t-value for dummy variable test at 95% confidence: $a_2 = -1.68$
Critical F-value at 95% confidence: 2.80

	a_0	a_1	a_2	F-value
1. Cafes	0.74 (2.3)	0.0002 (5.13)	2.17 (1.98)	14.74
2. Comm	0.36 (3.1)	0.00006 (4.12)	-0.18 (-0.47)	8.71
3. Ed	10.57 (12.41)	-0.0004 (-3.62)	-0.42 (-0.14)	6.56
4. Govt	14.2 (8.3)	-0.0003 (-1.5)	1.3 (0.22)	1.17
5. Med	4.74 (7.83)	0.0004 (5.4)	4.95 (2.36)	16.99
6.Reced	11.26 (12.7)	-0.0001 (-0.85)	-2.02 (-0.66)	0.56
7. Rent	16.53 (8.7)	-0.0003 (-1.5)	-4.06 (-0.62)	1.24
8. RPF	17.6 (10.98)	-0.0003 (-1.32)	-0.898 (0.16)	0.87
9.TC	3.9 (11.4)	0.0002 (4.7)	-2.097 (-1.77)	13.0
10. Trans	5.96 (9.3)	-0.0003 (-3.6)	-1.64 (-0.74)	6.74

Table 6\A.2 RESULTS OF REGRESSIONS ON ILO DATA FOR 1985

Critical t-value for dummy variable test at 95% confidence: $a_2 = -1.72$
Critical F-value at 95% confidence: 3.07

	a_0	a_1	a_2	F-value
1. Bank	0.78	0.0005	-0.75	20.5
	(0.79)	(5.7)	(-0.49)	
2. Social	12.13	0.0013	-0.71	7.34
	(2.94)	(3.34)	(-0.15)	
3. Trade	11.81	0.0004	-4.58	5.79
	(4.62)	(2.02)	(-1.5)	
4. Trans	5.85	0.00002	1.68	0.91
	(5.3)	(0.25)	(1.29)	

Table 6\A.3
REGRESSIONS ON LOG ICP DATA FOR 1985

	a_0	a_1	a_2	F-value
1. Cafes	-6.3 (-4.47)	2.34 (5.94)	1.62 (1.56)	19.36
2. Comm	-1.27 (-2.29)	0.56 (3.63)	-0.33 (-0.81)	6.79
3. Ed	21.65 (5.39)	-3.81 (-3.37)	0.54 (0.18)	5.69
4. Govt	20.92 (2.59)	-2.45 (-1.08)	1.99 (0.34)	6.26
5. Med	-7.73 (-2.73)	4.24 (5.33)	3.89 (1.85)	16.47
6. Reced	13.56 (3.28)	-0.81 (-0.69)	-1.8 (-0.59)	0.44
7. Rent	26.57 (3.0)	-3.45 (-1.39)	-3.19 (-0.48)	1.11
8. RPF	28.02 (3.78)	-3.4 (-1.63)	-0.13 (-0.024)	1.34
9. TC	-1.27 (-.076)	1.81 (3.85)	-2.58 (-2.07)	9.18
10. Trans	12.38 (3.94)	-2.32 (-2.63)	-0.98 (-0.424)	3.61

Table 6\A.4
REGRESSIONS ON LOG ILO DATA FOR 1985

	a_0	a_1	a_2	F-value
1. Banks	-33.3	9.89	-0.24	18.16
	(-4.52)	(5.37)	(-0.14)	
2.Social	-71.76	24.31	0.03	7.00
	(-2.39)	(3.25)	(0.005)	
3.Trade	-19.82	9.16	-4.3	5.71
	(-1.08)	(1.99)	(-1.38)	
4. Trans	4.16	0.49	1.69	0.91
	(0.53)	(0.25)	(1.27)	

APPENDIX 6/ B

Testing for Heteroscedasticity in the data for 1985

The assumption of homoscedasticity assumes constant variance over all the residuals, μs. This may not hold in the regressions undertaken in this analysis i.e. the value of GDP per capita (X) influences the variance of each μ, so that:

$$\sigma^2_{\mu i} = f(X)$$

It seems plausible that at lower levels of GDP per capita the variance in the residual may increase as factors other than income per capita affect the level of service expenditure. To test to see whether the assumption of homoscedasticity is indeed violated, which in turn would affect the regression results presented in the previous section, I employ the Goldfeld-Quandt test for heteroscedasticity.

The Goldfeld-Quandt test (from Koutsoyiannis, 1977)

First step is to order the variables according to the magnitude of X. The entire sample is then divided into two groups, omitting the central observations so that the variance in the two extreme groups of observations can be compared to ascertain if the variation depends on the explanatory variable, X. For the ICP data the central 14 observations are omitted and for the ILO data the central 5 observations are omitted. A separate regression is fitted to each sub-sample and the sum of squared residuals ascertained. The ratio of the two variances from the sub-samples is then calculated as:

$$F^* = \Sigma e^2_2 / \Sigma e^2_1 \qquad \text{where } \Sigma e^2_2 > \Sigma e^2_1$$

To test whether the assumption of homoscedasticity holds for the regressions:

H0: $\sigma^2 = 0$ – homoscedasticity

H1: $\sigma^2 \neq 0$ - heteroscedasticity

Results:

From the tables of results presented in table 2, the following variables show heteroscedasticity:

GDP per capita	log(GDP per capita)
cafe	cafe
education	communication
government	education
reced	government
trans	reced
social	trans
	social

The Glejser Test

The Goldfeld-Quandt test indicates which regressions are subject to heteroscedasticity, but we do not yet know the functional form in which that heteroscedasticity arises. To ascertain this the Glejser test is performed. The residuals are ascertained from each of the original regressions. The absolute values of these residuals is then computed, e_i

The absolute values of the residuals are then regressed on different forms of the explanatory variable X.

$$e = a_0 + a_1 X$$

$$e = a_0 + a_1 1 \backslash X$$

$$e = a_0 + a_1 X^2$$

$$e = a_0 + a_1 \log X$$

The results for the Glejser test are presented below.

In education, government and reced, for both X and log X, the variable responsible for heteroscedasticity is X.

In trans X^2 is responsible.

In Cafes, the inverse of X, $1 \backslash X$, causes heteroscedasticity.

For Trans, cafes and comm in log X data, the specific functional form of heteroscedasticity was not found. This was true also for social in the ILO data. One explanation for this is that the heteroscedasticity may be due to the mis-specification of the regression. If mis-specification was responsible for causing heteroscedasticity then it may bias the results of the original regressions. The significance of the F-value may be biased in these regressions, along with the dummy variable test. This possibility should be borne in mind in interpreting the results.

Transformation of the regressions

Where the functional form of the heteroscedasticity could be ascertained from the Glejser test, the original regressions can be transformed to reduce any disturbance caused by the heteroscedasticity. This transformation can be undertaken by dividing the original regression by the term causing the heteroscedasticity.

For education, reced and government, the following regressions were undertaken:

$Y \backslash X = a_0 \backslash X + a_1 + a_2 D \backslash X + \mu \backslash X$

For trans, divide by X^2:

$Y \backslash X^2 = a_0 \backslash X^2 + a_1 X \backslash X^2 + a_2 D \backslash X^2 + \mu \backslash X^2$

For cafes, divide by the inverse of X:

$YX = a_0 X + a_1 X^2 + a_2 DX + \mu X$

For education, govt and reced in semi-logarithmic regression, divide by X:

$Y \backslash X = a_0 \backslash X + a_1 (\log X) \backslash X + a_2 D \backslash X + \mu \backslash X$

The justification for these transformations is that the procedure adopted is equivalent to the method of weighted least squares. Division by the functional form of the explanatory variable thought to be responsible for causing the heteroscedasticity means that more weight

is given to the observations that show more constant variations in their residuals and less weight to the observations with irregular variance in the residuals.

The results of the transformations are presented below.

It can be seen that all the regressions are significant from their F-values. Also, none of the dummy variable parameters, a_2, are significant. Thus, after transforming for heteroscedasticity, the conclusion that there is no evidence of a negative gap in the services analysed still holds.

Table 6\B.1
THE GOLDFELD-QUANDT TEST

F*>F $\Rightarrow$ HETEROSCEDASTICITY

Critical F-values:
2.27

	GDP PER CAPITA	LOG(GDP PER CAPITA)
1. Cafes	14.23	13.83
2. Comm	1.54	3.5
3. Ed	9.71	9.22
4. Govt	22.55	14.42
5. Med	1.56	1.54
6. Reced	3.10	2.75
7. Rent	1.57	1.52
8. RPF	1.81	1.63
9. TC	2.19	2.10
10. Trans	2.95	2.76

Critical F-values:
3.79

1.Banks	1.26	1.25
2. Social	4.45	4.85
3. Trade	3.16	3.42
4. Transport	2.32	2.21

Table 6\B.2
 GLEJSER TEST RESULTS FOR GDPCAP

Critical t-values at 95% confidence   +/-2.01
Critical F-value at 95% confidence: 4.04

	X	LOGX	X^2	1\X
1. Ed	9.56	4.85	9.85	5.74
	-4.2	-2.04	-3.77	1.68
	17.6	4.14	14.2	2.8
2.Govt	7.48	4.0	7.52	4.38
	-3.56	-1.85	-3.05	1.37
	12.7	3.4	9.33	1.9
3.Reced	9.41	5.03	10.17	6.36
	-3.6	-1.98	-3.47	1.58
	12.9	3.9	12.0	2.5
4.Trans	8.66	4.08	9.46	5.38
	-3.64	-1.42	-3.72	1.81
	13.3	2.02	**13.9**	3.3
5.Cafes	4.47	2.11	6.371	8.89
	1.98	0.92	1.17	-2.50
	3.93	0.84	1.37	**6.27**

Table 6\C.3
GLEJSER TEST RESULTS FOR LOG(GDPCAP)

	X	LOGX	1\X	X²
1.Ed	8.49	4.9	6.41	9.23
	-2.98	-1.99	0.89	-2.81
	8.87	3.9	0.79	7.90
2.Govt	6.68	3.72	4.59	6.98
	-2.87	-1.62	0.74	-2.59
	8.23	2.6	0.54	6.69
3.Reced	9.53	5.21	6.49	10.37
	-3.63	-2.1	1.49	-3.56
	13.17	4.4	2.22	12.65
4.Trans	6.79	3.56	6.79	7.96
	-0.96	-0.51	0.72	-0.98
	0.92	0.26	0.52	0.96
5.Cafes	4.27	2.10	6.87	5.79
	1.09	0.51	-1.17	0.58
	1.19	0.26	1.36	0.33
6.Comm	5.03	1.54	6.33	6.41
	0.245	1.23	-0.12	-0.14
	0.06	1.52	0.01	0.019

Table 6\B.4
GLEJSER TEST RESULTS FOR EMPLOYMENT DATA

Critical F-value at 95% confidence: 4.32
Critical t-value at 95% confidence: 2.064

1. GDPCAP

	X	LOGX	1/X	X²
Social	0.51	-1.46	4.24	1.97
	1.38	1.72	-1.89	0.95
	1.91	2.97	**3.59**	0.89

2.LogGDP

	X	LOGX	1/X	X²
Social	0.59	-1.35	4.08	2.02
	1.25	1.60	-1.79	0.807
	1.57	2.57	3.19	0.65

Table 6\B.5
RESULTS OF TRANSFORMED REGRESSIONS

Critical t-values at 95% significance:
 two-tail test: +/- 2.01
one-tail test: - 1.68
Critical F-value at 95% significance:
3.19

	a_0	a_1 (t-values)	a_2	F-value
1. Education	0.94 (13.83)	-0.0001 (-0.17)	-1.04 (-0.085)	96.63
2. Govt	0.75 (8.90)	0.001 (0.92)	-1.37 (-0.07)	40.04
3. Reced	0.89 (13.70)	0.0004 (0.61)	-3.28 (-0.26)	95.06
4. Trans	2.02 (10.30)	-0.014 (-4.45)	-1.25 (-0.01)	107.48
5. Cafes	6.13 (6.13)	-0.00008 (-0.88)	0.87 (0.47)	36.96

Logarithmic Variables

1. Education	1.34 (3.69)	-1.67 (-1.11)	-0.49 (-0.04)	65.13
2. Govt	0.49 (1.07)	1.54 (0.61)	-1.88 (-0.09)	26.49
3. Reced	1.39 (4.03)	-2.22 (-1.46)	-2.55 (-0.21)	65.42

APPENDIX 6/C

REGRESSIONS ON ECP DATA FOR 1985, 1990 AND 1993

Table 6\C.1

1985 and GDP per capita

Critical t-value for dummy variable test at 95% confidence: -1.75
Critical F-value at 95% confidence: 3.63

	a_0	a_1	a_2	F-value
1. **Cafes**	8.20 (2.86)	-0.00022 (-1.29)	-1.47 (-0.48)	0.85
2. **Comm**	0.96 (1.76)	0.0000041 (0.13)	-0.57 (-0.97)	0.685
3. **Ed**	4.97 (3.29)	0.00000068 (-0.076)	2.59 (1.59)	1.69
4. **Govt**	19.72 (12.42)	-0.0006 (-6.39)	-3.58 (-2.1)	20.95
5. **Med**	3.25 (2.31)	0.0000089 (0.60)	1.42 (0.582)	0.22
6. **Reced**	9.43 (4.27)	0.0000036 (0.27)	-0.48 -0.20)	0.12
7. Rent	10.51 (4.17)	0.000016 (-1.06)	-2.27 (-0.99)	0.72
8. **RPF**	13.91 (4.88)	-0.00014 (-0.825)	-1.20 (-0.69)	0.34
9. **TC**	10.15 (3.54)	-0.0000056 (-0.33)	-5.45 (-1.77)	1.72

Table 6\C.2

<u>1985 and log GDP per capita</u>

	a_0	a_1	a_2	F-value
1. **Cafes**	31.65 (1.18)	-5.21 (-1.01)	-1.16 (-0.36)	0.51
2. **Comm**	0.28 (0.56)	0.14 (0.15)	-0.56 (-0.95)	0.69
3. **Ed**	5.62 (0.41)	-0.15 (-0.06)	2.61 (1.59)	1.69
4. **Govt**	102.88 (6.98)	-17.94 (-6.30)	-3.82 (-2.19)	20.34
5. **Med**	-9.1 (-0.39)	3.15 (0.71)	1.59 (0.59)	0.29
6. **Reced**	1.42 (0.71)	1.66 (0.42)	-0.29 (-0.12)	0.16
7. **Rent**	23.99 (1.016)	-3.098 (-0.68)	-2.26 (-0.81)	0.38
8. **RPF**	26.60 (1.01)	-2.88 (-0.56)	-0.89 (-0.28)	0.16
9. **TC**	16.16 (0.61)	-1.34 (-0.26)	-5.37 (-1.72)	1.69

Table 6\C.3

1990 and GDP per capita

	a_0	a_1	a_2	F-value
1. **Cafes**	5.71 (2.39)	-0.000041 (-0.36)	-3.11 (-1.27)	0.91
2. **Comm**	1.58 (2.70)	-0.00000076 (-0.27)	-0.93 (-1.55)	1.47
3. **Ed**	5.53 (5.42)	0.0000011 (0.23)	5.75 (5.50)	21.45
4. **Govt**	18.88 (10.11)	-0.000046 (-5.14)	-5.39 (-2.82)	13.23
5. **Med**	2.61 (1.92)	0.000019 (2.98)	5.34 (3.83)	7.81
6. **Reced**	7.23 (4.40)	0.000017 (2.20)	5.57 (3.31)	5.56
7. **Rent**	17.95 (6.02)	-0.000043 (-3.03)	-4.65 (-1.52)	4.64
8. **RPF**	16.73 (6.31)	-0.000025 (-2.02)	-0.30 (-0.11)	2.86
9. **TC**	4.26 (2.36)	0.000023 (2.69)	0.38 (0.20)	4.95

Table 6\C.4

1990 and log GDP per capita

	a_0	a_1	a_2	F-value
1. **Cafes**	1.45 (0.70)	0.65 (0.16)	-2.35 (-0.93)	0.85
2. **Comm**	3.41 (0.67)	-0.38 (-0.39)	-0.98 (-1.59)	1.52
3. **Ed**	4.07 (0.46)	0.32 (0.19)	5.74 (5.33)	21.41
4. **Govt**	97.53 (6.52)	-16.64 (-5.89)	-6.18 (-3.43)	17.31
5. **Med**	-31.22 (-2.73)	7.14 (3.30)	5.72 (4.15)	9.11
6. **Reced**	-22.93 (-1.63)	6.37 (2.39)	5.91 (3.48)	6.13
7. **Rent**	98.65 (4.13)	-16.9 (-3.75)	-5.87 (-2.04)	7.06
8. **RPF**	68.79 (3.17)	-10.84 (-2.64)	-1.33 (-0.51)	4.41
9. **TC**	-34.12 (-2.18)	8.15 (2.75)	0.67 (0.36)	5.13

Table 6\C.5

<u>1993 and GDP per capita</u>

	a_0	a_1	a_2	F-value
1. Cafes	6.12 (2.54)	-0.000006 (-0.59)	-1.74 (-0.68)	0.26
2. Comm	0.85 (1.75)	0.00000023 (1.14)	-0.35 (-0.68)	2.20
3. Ed	6.36 (4.81)	-0.000042 (-0.75)	6.97 (5.00)	24.54
4. Govt	16.97 (10.22)	-0.000033 (-4.75)	-4.00 (-2.29)	11.62
5. Med	4.30 (2.27)	0.000014 (1.71)	4.38 (2.19)	2.59
6.Reced	8.67 (4.12)	0.000006 (0.68)	8.05 (3.62)	8.56
7. Rent	11.78 (5.67)	-0.00012 (-1.39)	4.99 (2.27)	8.97
8. RPF	12.03 (5.51)	-0.000028 (-0.31)	8.24 (3.58)	11.55
9. TC	5.22 (2.91)	0.000015 (2.02)	0.44 (0.23)	2.88

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Table 6\C.6

1993 and log GDP per capita

	a_0	a_1	a_2	F-value
1. **Cafes**	10.59 (0.46)	-1.09 (-0.25)	-1.33 (-0.46)	0.11
2. **Comm**	-3.90 (-0.84)	0.99 (1.14)	-0.24 (-0.42)	5.07
3. **Ed**	12.55 (0.99)	-1.34 (-0.56)	6.99 (4.43)	24.05
4. **Govt**	78.95 (4.55)	-13.03 (-4.01)	-5.04 (-2.34)	8.35
5. **Med**	-31.07 (-1.81)	7.21 (2.24)	5.68 (2.66)	3.66
6. **Reced**	-16.69 (-0.87)	5.01 (1.39)	9.49 (3.97)	10.04
7. **Rent**	43.78 (2.29)	-6.52 (-1.82)	3.79 (1.59)	10.27
8. **RPF**	27.10 (1.32)	-2.94 (-0.77)	7.28 (2.85)	12.15
9. **TC**	-23.76 (-1.37)	6.08 (1.87)	0.96 (045)	2.58

CHAPTER 7

CONCLUSION

The use of aggregative measures of national output has become an essential tool in economic analysis. Economies' relative performances are judged using these measures, in both inter-temporal and inter-country comparisons. Yet, even in countries with a long tradition of using aggregative techniques that meet international standards, index numbers are used with qualification. The literature on index number problems is vast, with difficulties ranging from changing quality and tastes, to choice of base year. Certainly, no index number is immune from these problems, and some of these more common difficulties have been discussed in relation to the transition economies. However, what has also been argued in this thesis, is that the difficulties associated with using index numbers in transition economies go far beyond the more usual index number problems. We are dealing with economies undergoing profound systemic change during transition. What has been argued in this thesis is that the deep structural changes that have taken place since the collapse of central planning make index numbers highly questionable and that there are likely to be serious biases inherent in these aggregative measures of performance.

In referring back to the literature on the problems inherent in Soviet indices of output, in particular the work of Alexander Gerschenkron, the relevance of these studies to today's transition economies has been acknowledged. What was clear from the studies of Soviet output measures was that aggregate measures were liable to be misleading given the extent of changes in these systems. What has been argued here is that many of the factors recognised as having caused profound bias to Soviet indices of output are relevant to aggregative measures used during transition.

Index numbers are likely to have painted a misleading picture of the evolution of output during transition. The scale of discontinuity in the systems of valuation that arose with the collapse of central planning invalidates aggregative measures that rely on comparisons between the periods. From the analysis presented in this thesis, it can be

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said with certainty that the aggregate measures of output during transition are significantly biased. However, the discontinuity in the economic systems also means that it is not possible to calculate an estimation of the extent of the bias. We are left with nothing to compare this bias against and so are left without a measure that could be used to make adjustments to the aggregates and so correct for the bias. At best, all we can say is that we have no way of calculating with confidence the extent and direction of the bias to the aggregative measures of output. However, the analysis undertaken in this study of aggregate measures also points to the possibility of significant underestimation of the output decline in all three economies studied during the transition period.

The implication from this analysis is that we are left without an accurate measure for these economies' performance. The standard macroeconomic indicator of growth for an economy misrepresents the changes taking place during transition. This has been proven both empirically, using the 'Gerschenkron' test for index number bias for industrial output, and conceptually, by examining index number theory. That the aggregative measures of output are biased has consequences for empirical and econometric studies that rely on these measures.

Econometric studies of the transition region are only as accurate as the data that they rest on. As Kasper Bartholdy, when editor of the EBRD, *Transition Report,* stated, "For many years we will not be able to rely with any confidence on econometric modelling methods, as most available data series are seriously flawed by measurement problems and structural breaks." (Bartholdy, 1995:1) Yet, many studies of these countries' pattern of change during transition have relied on econometric techniques. Most studies have made qualifications about the reliability of the statistics, but have continued to use the aggregate measures. Given the profound bias in the figures for national output, the implication drawn here is that econometric studies that have relied on this data are also significantly biased. If empirical studies of the economies in the region rely on misleading figures, then their results are also dubious.

Another reason why the aggregate measures cannot be corrected is because estimation of the bias would assume that we have an accurate measure of output before transition, an assumption that has been dispelled in this thesis. As has been shown, the attempts to derive a plausible estimation of the level of national output under central planning

resulted in highly divergent measures. Thus, even estimating the starting point for transition, that is, the level of national output prior to the collapse of central planning, was highly dubious. Attempting to correct for the bias during transition also assumes that some 'true' measure of the economy's productive potential can be determined during transition. Again, it has been argued that this is not possible given the scale of change experienced by the transition economies. For the productive potential of these economies has also radically altered, the loss of the Soviet market had a profound impact on the underlying structures of these economies.

Are these arguments appropriate only to the base-weighted indices? Can alternative aggregative measures be used instead? Although a case can be made for the use of current-weighted indices, the analysis of this thesis argues that they are also subject to significant bias. First, the period of inflation that was experienced in transition economies causes difficulties. The rise in input prices and rapid devaluations generated strong and persistent inflationary pressures even in the more advanced economies in the region. Again, misleading results inevitably arise from measures that rely on prices in periods of high and protracted inflation. Second, the suggestion that bias may be present in the Laspeyres index so the Paasche could provide an unbiased alternative, overlooks the link between the two indices. As the Paasche and Laspeyres form the upper and lower bounds around some 'true' measure of productive potential, they are inter-related. So much so that Allen (1975) argues that, "The basic form is the Laspeyres; the Paasche form is derivative and dependent on the Laspeyres form selected." (Allen, 1975: 46) Bias in the Laspeyres implies that the Paasche is also subject to distortion. An extension of this argument concerns the changing efficiency of production. If the Laspeyres index cannot take into account changes in quality or efficiency, then neither can the Paasche. Given the generalised rise in prices during transition, rises in the prices for particular goods that can be attributable to improved quality may be attributable to a rise in the costs of production; the difference is not be discernible in either index.

However, there is an even more fundamental case against the use of Paasche indices as alternatives to real GDP measures. For economists working on these countries, the ability to judge economic performance in comparison to that of the Soviet era is an essential aspect of the political economy of this region. How has output changed since the demise of central planning? This is a crucial question for those interested in these

economies. Can Paasche indices of national output provide an answer? They cannot, for as current-weighted indices they provide information on the current period only. Even if backward comparisons were made using current-weighted indices, these would provide misleading results. The prices from the soviet era have no correspondence to those of current-weighted aggregates during transition. Thus, Paasche indices can provide only limited information and are unable to allow comparison to the pre-transition period.

Underlying the problems of both measures is the difficulty of measuring output when the system of valuation itself is being transformed. However, there are indices that attempt to stand apart from value aggregates for these very reasons – the physical indicator approach is an often-used example. Could this be a useful alternative measure? Here again, the problems of commensurability of the transition economies and market type economies emerge. Underlying the methodology of the physical indicators approach is an in-built assumption that the efficiency of investment and consumption can de derived from market norms and then applied to Eastern European economies. As reported in chapter 4, the argument of Lancieri applies here, "As for the ECE approach [physical indicators measures], objections must be raised to the in-built hypothesis of the same 'quantitative' efficiency in Eastern European countries as in Western ones." (Lancieri, 1993:164) It is the assumption that the Eastern European economies and market ones can be compared that has been questioned throughout this thesis. The methodological frameworks that support these comparisons, such as physical indicators, ignore the crucial features of these economies. It is precisely because they have unique features that Eastern European economies cannot be compared to market type ones.

Thus, different aggregate measures of national output are not likely to be accurate during transition. However, the argument presented in this thesis goes beyond the attempt to derive more accurate aggregations. The case has been here that aggregation itself rests on clear theoretical premises, that statistical measures and theory are inter-connected. The theoretical basis for aggregation in national income statistics is the competitive market criteria.

Using aggregative measures of output assumes that market prices can convey information about the productive potential of an economy. It is this very notion that has

been disputed in this thesis. Prices during transition could not convey this information because the price system itself was undergoing profound change, and also because the productive potential of the economy itself was altered. However, there was a more fundamental objection made to the use of market criteria for the measurement of these economies. There has been an in-built assumption that these economies have headed along a pre-determined path towards market practices. This underlying assumption has been the justification for the use of aggregative measures that rest on market criteria. It has been assumed that prices can convey information about the productive potentials of these economies because the economies are becoming functional market economies and that the economic structures have altered to become more market-oriented.

Thus, the measures of economic performance used in these countries have pre-judged the outcome of transition. It has been assumed that these economies are developing into functional market economies, so the measures used have fitted this view; they are market based statistical measures. What has also been argued in this thesis, is that the use of market-based measures of output has painted a distorted picture of the changes in these economies. These measures fail to capture the changes in these economies. Not only are the statistics biased, but also the use of them creates a misleading image of how these economies are working. The picture presented in this thesis is one of complex change. A number of changes have been highlighted in the foregoing analysis. First, the price system has radically altered, but not necessarily towards market based prices, as the continued use of subsidies implies. Second, the institutions that have been formed are not necessarily market based, but may contain elements of the previous centrally planned system. Third, there may be growth of products that are competitive by world standards, but the demise of other industries has been dramatic. All of these changes suggest a complex development that market measures of economic activity not only fail to capture, but have provided a distorted view.

The argument presented here does not rule out the development of markets altogether, nor does this analysis conflict with the view that certain economies or sectors within an economy may develop more market-oriented practices. Certain economies in the region, including two of the economies included in this study, have sectors that are more market-oriented, but the process has been uneven and gradual. Trying to summarise the complexity and unevenness of the changes in these countries in a single figure based on

competitive market criteria fails to capture the nature of the changes. It has created a misleading picture that is distorted and fitted to a known outcome; in so doing, it has omitted features of transition that may provide important insights into how these economies are really working.

7.1 Implications for policy-making during transition

The standard transition model has suggested that following an initial decline in output, which was likely to have been exaggerated by GDP measures, transition economies have recovered, depending on the extent of market reforms. As these economies opened-up to world trade and foreign investment flows, combined with closer integration (or orientation) to the European Union structures, some form of 'catch-up' would take place. Convergence with western European market economies has been a key expectation of the transition process. The analysis presented in this thesis disputes this view. The decline in industrial output in many sectors has been very steep, even in the so-called advanced reformers. Industrial output measures have failed to capture the extent of the decline during transition. Also, the extent to which these economies can benefit from catch-up in previously underdeveloped sectors, such as the service sector, has also been disputed in the analysis presented here. Again, the conventional model fails to take into account the complex relationships that underpin the service sector, namely the interlinkages between industry and services, and the likely bias in measures caused by the reclassification of economic units. However, the thesis does not rule out growth in these economies completely, certainly there has been sectors that have faired relatively well. What is argued here, is that growth in these sectors will inflate the indices of output and so present a misleading picture of the overall changes in these economies. Instead a process may be taking place that has been likened to 'cathedrals developing in a desert'[1]. The question of what is underlying the sectors that have grown becomes important when assessing their durability.

An implication that stems from this thesis is the danger that policy-making has been, and continues to be, based on misleading indicators of performance. This has

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[1] Comment made by Al Rainnie, co-author of *Restructuring Krakow*, (1996) in personal communication.

consequences for the policy instruments chosen and applied during transition. An illustration of the sort of difficulties faced in making judgements when using misleading indicators is the European Union enlargement process. EU enlargement entails assessing the readiness of countries in the region for membership. The economic conditions for accession laid down by the EU require an assessment of whether the applicants have functioning market economies and whether they have the capacity to cope with competitive pressure and market forces within the European Union. The assessments include the use of aggregative measures; "In judging whether the applicants have functioning market economies, the [EU] Commission draws on many of the standard, accepted indicators of macroeconomic performance and stability of transition." (Grabbe and Hughes, 1998: 47) The implication from the analysis presented in this thesis is that using national output figures as an 'accepted indicator of macroeconomic performance' does not provide 'safe' assessments of the ability of transition economies to withstand competition within the EU. Again, it was likely that the bias inherent in the output indices has provided misleading indicators of the relative performance of transition economies.

Further, providing a link between microeconomic studies of case studies of individual enterprises and industries, which have proved to be a rich source of research enquiry in the field, and the macroeconomic performance has been found wanting in transition economies. A comment made at a conference on Russia at CIS/ME centre of LBS in 1998 was that the microeconomic case studies did not seem to correspond to the macroeconomic indicators. At that time the Russian economy had shown to be improving (just before the crisis in the summer of 1998) whilst the case studies of industries pointed to serious ongoing problems. Other authors of microeconomic case studies in Poland have noted the 'obvious disparity' between growth figures and the experiences at the enterprise level (Hardy and Rainnie, 1996: 3). They went on to argue that,

> "There are well-attested problems of reliability with statistical data from state sources in former centrally planned economies, but the problems do not stop there. We were warned at a very early stage about putting too much reliance on the information that organizations gave us concerning their financial position..."
> (Hardy and Rainnie, 1996: 5)

If the practice of using biased and unreliable measures of aggregate output as the basis for decision-making is continued, then the expectation is that policies pursued must also be biased. The danger is that the policies effected in these countries may well not be suitable for the conditions really existing there. Critics of the "Washington Consensus" have long argued the inappropriateness of the policies to the conditions of transition. This thesis is a contribution to this debate. But the argument presented here goes beyond just criticising policies pursued and suggests that the very way these economies are being modelled and measured is likely to be distorted. The statistical analysis applied to transition economies is shaped by in-built assumptions about how these economies are to develop; this in turn moulds the policies pursued. The very methodology of economic analysis of transition has been determined by the view that these economies are becoming market-oriented, as demonstrated by the comparison of service sector shares. The use of market based measures of aggregate performance has in turn provided self-fulfilling estimates of the extent of progress in these economies.

7.2 Future research

Economic research has become reliant on the use of aggregate measures for analysis and policy-making. However, what has been argued here is that only by recognising the inherent bias in measures of output during transition can we begin to develop a clearer picture of what has taken place in these economies. Complex econometric assessments of the relationships within an economy have an important place, but they can obscure a more accurate image if they rely on dubious data. This was a point made by Keynes in his debate with Tinbergen over the use of econometric studies of the business cycle,

> The notion of testing the quantitative influence of factors suggested by a theory as being important is very useful and to the point. The question to be answered, however, *is whether the complicated method here employed does not result in a false precision beyond what either the method or the statistics actually available can support.* It may be that a more rough and ready method which preserves the original data in a more recognizable form may be safer. (Keynes, 1938: pp 288-9 – my emphasis)

Instead, the recommendation from this study is for research that is not reliant on aggregative measures of output. The following are suggestions for further research stemming from this thesis:

- A study of the change in relative prices would provide insights into the changing system of valuation during transition. De Masi P. and V. Koen (1996) have undertaken a study for Russia on relative price convergence. What is suggested here, is that further enquiries into the change in relative prices be made for Eastern European economies. The outcome of price liberalisation has by-and-large been assumed. Given the high levels of continued subsidisation in certain transition economies, the nature of the price system that is developing and its relationship to output changes needs to be further explored.

- The relationship between changes in export competitiveness and output is a further avenue of enquiry. The data in chapter 5 on industrial output indicates that output changes for individual commodities has been dramatic but not apparent in more aggregated data. Certain industries that have been important export industries westwards would appear to have suffered from widespread output decline. Research into the correlation between changes in exports, possibly using data from the Eurostat[2], and output decline may provide insights into the role of trade in the economies' performance.

- A third line of enquiry would involve matching case study material to the industrial output data. The study of the deviation of aggregate measures of industrial output from individual items in chapter 5 raised questions over the change in output of certain items. An example was the change in output of iron and steel in Hungary, a series that was omitted from more recent tables of output in the national statistical yearbook. The evolution of output in more high-tech industries, such as computers, would also provide an interesting study when combined with the national output data and export data. Developing the links between the micro- and macro- studies,

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[2] I am currently conducting research into the changing competitiveness of exports from transition economies into the EU as part of an ESRC project with Alan Smith of SSEES/UCL. Using unit values and data from Eurostat's COMEXT database I am trying to calculate the change in these values from 1988 to 1998. This research will provide the basis for a forthcoming paper, see also Alan Smith (2000).

so as to avoid these incongruities, would form a valuable project for further research.

- The analysis presented in chapter 6 on changes in the service sector during transition points to further enquiries into the alteration of service provision. The question raised in that chapter was how enterprise-based welfare, defence, and other services' provision have changed during transition. To what extent has any rise in the output of the service sector arisen from the rise in prices, or has there been a real rise in this sector's output? The aggregate data did not provide a definite answer to this. Studies, such as those undertaken by Fajth and Lakatos (1995) for the Hungarian enterprise service provision should be extended to compare economies in the region. In the post-privatisation conditions, how has shifting to the private sector effected the provision of these services today? These microeconomic case studies may then be combined with studies of state expenditure on services, such as defence and health care, along with further research into the nature of private sector service provision.

- An important reason for the demise of central planning was that it had failed to deliver more efficient production methods. During transition it was hoped that there would be a shift towards more competitive, efficient production; that is, these economies would move from extensive to intensive methods of growth. However, the extent to which this has taken place needs to be verified. If we cannot rely on aggregate industrial output indices, then calculating the overall performance of the economy is difficult. A recommendation from this study is for detailed input/output analysis to be undertaken. This would provide an insight into changes in the value-added. The likely problem in conducting this research is the availability of data to support such a project. However, the use of surveys, case studies etc. could be used in this analysis.

The overall conclusion from this thesis is that aggregative measures of output during transition are highly biased and present a misleading indication of these economies' development. The use of aggregate output measures has legitimated the claim that markets are evolving, whilst relying on the in-built assumption that these economies are

moving towards functioning market economies. What has been suggested here is that the picture is in reality far more complex and that aggregate output measures are concealing a view of how these economies are actually working. Underlying these changes has been a profound alteration in these economies' systems of valuation. Central planning involved production on the basis of planner's priorities; the price system reflected these priorities. Understanding the nature of the value systems prior to and during transition would provide an insight into a unique event. The main point made in this thesis is that market based measures cannot capture these changes as they presuppose the existence and functioning of market-based measures of value.

Appendices

Methods of Calculating GDP

Appendix A

Official Sources

Hungary: Gross domestic product is estimated from three approaches: production, expenditure and cost structure. The main approach used for GDP estimation is the production approach (UN, 1999: 1649) From 1991 the estimations have been in accordance with 1993 SNA and ISIC rev. 3. Substantial changes have taken place since 1991. The most important changes are as follows: a) the output of financial intermediaries was estimated on cost level before the revision, now it is accounted as the output; b) owner-occupier dwellings are valued on imputed rents (they were accounted for as costs before 1991); c) consumption of fixed capital has been changed from historic costs before 1991 to replacement costs today; financial leasing and capital contribution are not included in gross fixed capital formation. Also, in 1992, the Central Statistical Office introduced the classification of economic units according to the Hungarian Standard Industrial Classification of All Economic Activities (*TEÁOR*). The base years used for constant price estimations are 1976, 1988 and 1991 up until 1995. From 1996, 1995 is the base year used.

Romania: For calculations of GDP in constant prices for the period 1990-1996, the European System of Accounts (ESA) has been used. Prior to this, the System of Material Product Balances was used. For the period 1980-1983, the base year used was 1981. It is unclear which base year was used for the period 1985-1992. For the years 1984 to 1989, an index based on the prices of the previous period seems to have been used. For the period 1992 to 1995, 1991 was the base year. Since 1995, 1994 has been the base year.

Poland: The UN SNA system replaced the System of Material Product Balances (MPS) in 1991. Since 1991, 1990 has been used as the base year. Important differneces since 1991 include the following: a) finance and insurance were estimated at cost level. They are now estimated at output level; b) until 1991, manufacturing included gas; c) before 1988 'electricity, gas and water' item excluded gas and operation of irrigation systems; d) until 1991, all types of repair services were included in the relevant industries; e) until 1991 the item ' Producers of government services' included non-profit institutions.

Sources: Poland; *Produkt krajowy brutto* (1991), Central Statistical Office

Romania: *Anuarul Stastistic al Romaniei*, (various years), National Commission for Statistics

Hungary: *Statisztikai Evkonyv*, (various years), Central Statistical Office

United Nations, (1999)

Appendix B

The World Bank *Atlas* method

The World Bank *Atlas* method of converting data into US dollars is based on taking the average exchange rate for a particular year and the two preceding years whilst adjusting for between differing rates of inflation between the country and G-5 (France, Germany, Japan, the UK and US). The aim of averaging is to smooth fluctuations in exchange and inflation rates. The resulting calculations of GNP in US dollars are then divided by midyear population to obtain GDP per capita in US dollars. (World Bank, 1995: x) To try to keep a satisfactory level of consistency with the origin and source of resources, the series accords with the SNA revision 3. For long-term trend analysis, and to facilitate international comparisons, and include the effects of changes in intersectoral relative prices, constant price data for most economies are partially rebased to three base years and linked together. The year 1970 is the base year for data from 1960 to 1975, 1980 for 1976 to 1982, and 1987 for 1983 and beyond. These three periods are 'chain-linked' to obtain 1987 prices throughout all three periods.

Chain-linking is accomplished for each of the three sub-periods by rescaling: this moves the year in which current and constant price versions of the same time series have the same value, without altering the trend of either. Components of GDP are individually rescaled and summed to provide GDP and its subaggregates. In this process, a rescaling deviation may occur between the constant price GDP by expenditure. Such rescaling deviations are absorbed under the heading private consumption on the assumption that GDP by industrial origin is a more reliable estimate than GDP by expenditure.

This method takes into account the effects of changes in intersectoral relative prices between the original and new base periods (original base periods are noted in the country list...). Because private consumption is calculated as a residual, the national accounts identities are maintained. This method of accounting does, however, involve 'burying' in private consumption whatever statistical discrepancies arise on the expenditure side in the rebasing and chain linking process. Large discrepancies are flagged in the general notes. (WB, 1995 x-xi)

Source: World Bank, *Tables*, (1995)

Appendix C

International Comparison Project

The aim of the ICP is to calculate estimates of GDPs and GDP components that are comparable between countries. The ICP acknowledges the problems of international comparability associated with using exchange rate conversions or bilateral PPPs. Neither of these measures will reflect the comparative purchasing power of national currencies; instead, an element of the domestic or comparator countries price system would be reflected in the volume GDPs.

There have been several phases of the ICP; its reference years include, 1970, 1973, 1975, 1980, and 1985. In the analysis undertaken in chapter 6 of this thesis, I use the latest ICP results from the 1985 phase. This latest phase for 1985 estimates was conducted by using regionally based groups of countries, a difference from the earlier phases. The groups were decided on the basis of similar economic structures and income levels. Hungary, Poland, Romania and Yugoslavia were included in Group II countries. However, Romania later withdrew before the computations were completed for this phase.

The ICP methodology is based on the following:

- The GDP of each country is broken down into a number of homogenous product groupings, known as "basic headings". There are 151 commodity groups.

- Within each product group, national prices for selected representative goods and services are recorded. Price ratios of these individual items in different countries are aggregated to produce PPPs at the basic heading level. These PPPs are then weighted with the expenditure structure weights to derive PPPs at aggregation levels up to GDP level.

- The values of final expenditure on GDP in national currencies for all levels of aggregation are converted into 'internationally comparable' values using their

respective PPPs. The results from this are known as 'real values' as opposed to 'nominal values' expressed in national currencies.

The basic approach is based on deriving volume comparisons by means of the price and expenditure components. It uses the accounting identity that;

$$I_q = I_e / I_p$$

Where; I_q is the quantity ratio, I_e the expenditure ratio, and I_p the price ratio.

Thus, using 'direct' price comparisons can be used to calculate the 'indirect' volume comparisons. Where it is more appropriate to use direct volume comparisons, such as in non-comparable services, then rearranging the accounting identity can derive the price comparisons. Underlying the use of this accounting identity to derive either volume or price comparisons is a requirement that prices are consistent with expenditures. If they are inconsistent then direct volume comparisons are made.

In phase III of the programme, a key innovation introduced was the derivation of 'international prices'. These are quantity weighted averages of the detailed PPPs, so that each country's prices help form these international prices and are weighted by the share in world GDP for those countries.

Goods and services selected for comparison must fulfil two basic requirements:

1. Comparability: no difference in quantitative or qualitative parameters that would significantly affect the product's price. The ICP undertook precise specifications of the products requirements.
2. Representativeness: selected goods and services should have a significant share in the given basic heading. Selected items should be broadly consumed across the domestic market.

Differences in quality are adjusted for in the ICP comparison, the methodology is discussed in the appendix on ECP estimates of GDP below.

The concepts underlying the price and quantity measurements conform closely to the United Nations, *System of National Accounts* (SNA). However, where the ICP and SNA classifications differ is in the division between household and government consumption. As the ICP is attempting comparisons between countries, if the division of payments between these two categories differed significantly from country to country, this would not permit a proper inter-country comparison. To overcome this, the ICP have assigned consumption of each category, such as medical care and food, to the general category, regardless of whether it is paid for by government or by household. 'Government consumption' under the ICP categories, is thus focussed on administration and defence expenditure.

Sources: ICP, (1982); ECP, (1993); Marer *et al*, (1985)

Appendix D

European Comparison Programme

The European Comparison Programme (ECP) uses the ICP methodology described above. It is the regional group for the recent phases of the programme. There have been three phases of ECP; 1985, 1990 and 1993. Although the ECP follows closely the ECP methodology, there are several key differences, which are discussed below.

The ECP is carried out under the auspices of the Conference of European Statisticians of the Statistical Commission of the UNECE. There are two main groups in the ECP study. In 1993, the groups had expanded to reach thirty-four countries, including the twelve countries from Eastern Europe listed below. These Eastern European countries are included in group II, along with Austria. Austria is also included in group I and so acts as a 'bridge' between the groups. Group IIA has been organised in a 'star' shape with Austria as the centre of the star and direct bilateral comparisons with each 11 countries.

Group IIA: Austria, Poland, Czech Republic, Slovak republic, Hungary, Slovenia, Croatia, Romania, Bulgaria, Belarus, Russian Federation, Ukraine

The ECP differs from the ICP by increasing the number of items included in the surveys from 151 commodity groups for the ICP to 300 for the ECP, although the same main headings are used for both projects. The data collection is based on several questionnaires for a wide range of products and services. The first is a price questionnaire composed of a basic list, with a detailed specification of items (840 consumer items, 314 producer durables, 7 construction projects) There is also an expenditure questionnaire for 295 headings. Non-marketed services questionnaire form a third questionnaire, which includes a rent questionnaire. There is also an additional questionnaire for productivity.

For most countries, the CPI database was used, but price data also included special surveys because of non-comparability of some categories. An instance of this was in the

price data on capital goods achieved by special surveys "…since such information does usually not exist in any national statistical services." (ECP, 1993: 2)

Bilateral parities for each country were calculated. For each basic heading an unweighted geometric average of individual PPPs was then compiled which was the basis for conversion of the detailed expenditure data. Reference PPPs were used where price data was not provided for a heading. Once the price base for the basic headings was fixed further aggregation calculations done in a consecutive way. At all levels beyond the basic headings, average PPPs have been calculated using the weighting scheme either the Austrian schilling (Laspeyres-PPP) or the comparing countries expenditure structure (Paasche-PPP). The obtained PPPs were used to calculate the real values and the corresponding volume indices (Austria =100). For all levels a Fisher version has been complied.

A number of problems arose in the ECP estimations for the latest phase. First, a wide range of goods and services were not comparable for group II countries with those of Austria.

> "A relatively high number of price quotations submitted by the countries turned out to be not comparable with Austrian prices…This was mainly due to the quite different circumstances (consumption and investment patterns, supply of domestic goods on the domestic market) between Austria and most of the partner countries. Since the goods and services were often of different kind/character and substitution articles with more or less big discrepancies in terms of quality (or even quantity) had to be accepted in the first instance. This was mainly the case in machinery and equipment where only relatively small amount of price quotations were immediately comparable." (ECP, 1993: 31)

The solution adopted by the ECP was either to change the observation, modify the description of the item, omit the item, or to adjust the price to make the item comparable.

A difference in quality of goods and services was also problematic. Thus, "Even more problematic were the differences in quality. These discrepancies being generally less or not at all comparable by quantitative units but readily observed in the comparing countries could significantly distort the price ratios between Austria and the partner country." (ECP: 1993: 13) Again, the solution adopted by the ECP was to undertake adjustments. The adjustments were based on subjective judgments,

Even if carried out with great care it is far from yielding a perfectly 'scientific' result. Differences may be observed with regard to many qualitative characteristics of the same product, some of which are very difficult to quantify. It is not easy, if possible at all, to determine how the change in a given quality characteristic would affect the price and what weights should be given to various quality characteristics of a product. (ECP, 1993: 34)

Productivity adjustments were also undertaken in the estimations. Only group II estimates were adjusted for productivity differentials in 1993. These adjustments were based on rough estimates of productivity.

Sources: ECP (1985, 1990 and 1993)

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