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The linkage between Financial Liberalization and Economic Development: Empirical Evidence from Poland

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ABSTRACT

This paper uses time series empirical data on six key indicators of financial liberalization in Poland to explore the linkage between financial liberalization and economic growth. We begin with a survey of the financial liberalization process and then use monthly empirical data covering the period 1990-2002 to examine the linkages between financial liberalization and economic development. The results of our study indicate that not only is there evidence of a long run positive linkage between financial liberalization and economic growth but also that there is strong evidence to indicate that the direction of causation runs from the former to the latter and not *vice-versa*. Evidence from all six of the financial indicators (*Turnover, Capitalization, narrow money M0, broad money M2, Depth and Share Prices*) indicates that they raise industrial production while the latter causes financial development in only two of the cases.

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1. Introduction

This paper investigates the effects of financial and stock market liberalization on economic activity in Poland. We have chosen Poland for our analysis not only because it is one of the most important transition economies in the world, but also because the financial sector has undergone major changes since the late 1980s in a bid to become a more market-based economy. The country is also a likely early candidate for entry into the European Union and by population and the size of its economy by far the most important potential new member. In addition, Poland along with Hungary have been the two economies cited by the European Bank for Reconstruction and Development as being in the lead when it comes to financial sector reform.

The relationship between financial development indicators and economic growth has received a considerable attention in recent empirical literature. Many authors have demonstrated that the development of the financial system has a positive effect on the rate of economic growth and/or the volume and/or efficiency of investment eg: Fry (1997). McKinnon (1973), Shaw (1973), and later authors such as Kapur (1976); Mathesion (1980) and Fry (1989 and 1997) have presented the theoretical background of this relationship. The main policy implication of the McKinnon/Shaw framework is that government restrictions on the financial sector such as interest rate ceilings, high reserve requirements and directed credit policies distort the process of financial development and reduce economic growth. The endogenous growth literature that incorporates both endogenous growth and endogenous financial institutions shows similar results. Financial intermediation is now modeled explicitly. These models suggest that financial intermediation has a positive effect on economic growth, see for example, Greenwood and Jovanovic (1990) and King and Levine (1993b) argue that government intervention in the banking system reduces the growth rate of an economy. By contrast, a small but growing literature such as Van Winjnbergen (1983) and Stiglitz, (1994) emphasize that financial market imperfections, such as, asymmetric information and imperfect competition means that's financial liberalization can have a negative effect on economic growth.

Although the recent studies seem to confirm a positive association between financial development and economic growth, they do not establish the direction of causality between financial development and economic growth. As McKinnon (1988)

puts it, 'What is the cause and what is the effect? Is finance a leading sector in economic development, or does it simply follow growth in real output which is generated elsewhere?' In this paper, we examine the question of the causality of the relationship between financial liberalization and economic growth using time series data from Poland. The aim of this paper is to establish whether or not cointegrating relationship among industrial production and financial development indicators exist, and then to investigate the direction of causality. The use of time series data contrasts to the existing empirical literature such of King and Levine (1993a) which concentrates on using cross sectional and cross-country studies. The paper is constructed as follows; we firstly document the key changes in the Polish financial system and since 1989, we then proceed to describe the data, the econometric methodology, and the empirical results for stationarity, cointegration and causality. The final section presents our conclusions.

2. The Polish Financial Sector

2.1. Financial Liberalization in Poland

In the early 1990s, a new financial infrastructure was built (with its laws and institutions) in Poland as an integral part of moving the country towards a market-based economy. Part of the process of liberalization involved the privatization of much of the financial sectors itself. The rapid development of the financial sector played an important role in mitigating the recession of the early transition stage. In 1993 the government adopted a restructuring program for the banking sector that included recapitalization of the banking system. Also financial sector played a key role in general privatization process undertaken in the economy.

The financial sector's transformation was based on legislation passed in the late 1980s: the National Bank of Poland Act and the Banking Act passed by the Parliament in 1989. These two acts created the base for two-tier banking system of state owned and private banks and also allowed for the introduction of competition in banking and finance. The four main elements of the financial system in Poland are: central banking, commercial banking, the financial markets, and the development of non-depository financial intermediary institutions.

2.2. The National Bank of Poland

Up until 1988 the National Bank of Poland (NBP) was the main and only deposit accepting institution under the central planning system. In 1989 the building of the foundations of a market economy began and in 1990 the NBP became a fully autonomous entity. The NBP's tasks and the shape of the banking system are specified in Article 227 of the Constitution of the Republic of Poland, the changes that began in 1989 in central banking are summarized in the National Bank of Poland Act, passed by the Parliament on 29th of August 1997. The Act granted the NPB independence in conducting the monetary policy, and introduced two new institutions responsible for monetary policy and banking supervision: *the Monetary Policy Council (Rada Polityki Pienieznej - RPP)* and *the Banking Supervision Commission (Komisja Nadzoru Bankowego - KNB).* The National Bank of Poland – the NBP has a sole right of issuing currency and is responsible is responsible for the financial stability of the banking system as whole. It also has a supervisory role over the commercial banks, mainly to ensure proper compliance with the provision of banking laws. The NBP organizes the system of monetary clearing, current interbank settlements and participates in the interbank money market to ensure sufficient liquidity for the financial system. It also perform regulatory functions with regards to commercial banks, ensures the safety of banks and deposits placed with them, and maintains liquidity in the banking sector. The NBP also acts as the lender of last resort, when banks face temporary liquidity problems. In addition, the NBP provides banking services to the State budget, operates accounts of the government and other state institutions, targets State funds and the State budget entities, and executes their payment orders.

The President of the NBP is appointed by the Parliament at the request of the President of the Republic of Poland, for a six-year term. The President chairs the Monetary Policy Council, the NBP Management Board, and the Commission for Banking Supervision. The Monetary Policy Council has nine members, three appointed by the State President, and six chosen by both houses of Parliament (the Sejm and the Senate). Every year, the council determines monetary policy guidelines and basic principles for it pursuit. The basic tasks of the NBP Management Board are the implementation of resolutions of the Monetary Policy Council, implementation of the NBP plan of activity, and execution of a budget, approved by the MPC.

Since the beginning of the transformation process in Poland, the main objective of the monetary policy was to reduce inflation. The NBP conducts monetary policy using the a combination of instruments such as (i) reserve requirements (ii) the use of a real interest rate policy and (iii) the use of open market operations which began in 1993, and by the late 1990s became the basic tool of central bank intervention. The Medium-Term Monetary Strategy for 1999-2003 reaffirmed that open market operations will remain important in the future.

2.3. Commercial Banking

Commercialization of the banking system was first permitted by the 1988 banking law and led to major changes in the 1989-92 period. Three state owned banks: *Powszechna Kasa Oszczednosci Bank Panstwowy – PKO BP*, *Bank Handlowy SA*, and *PEKAO SA* became were separated from the NBP. The regional branches of the NBP became independent, establishing nine new state owned regional banks. Later they were transformed into joint stock companies owned by the Treasury. More state owned banks were set up: *Bank Rozwoju Eksportu SA – BRE*, *Bank Inicjatyw Gospodarczych – BIG SA*, *Polski Bank Rozwoju – PBR SA*. They were owned by the Treasury, state owned enterprises (SOEs), and government agencies. Several hundred small private banks emerged due to liberalization of entry regulations

The initial state of the Polish Banking system following the process of reform was quite perilous, exacerbated by a recession in the early 1990s and the inevitable problems faced by many companies in the move to a more market based system. According to Tang *et al* (2000) Non Performing loans as a percentage of total loans rose from 16% in 1991 to a peak of 29% in 1994 and 28% in 1995 before a rapid improvement down to 10% in 1998. In 1992 Poland revised the Banking Law giving the central bank, the National Bank of Poland the authority to enforce provisioning requirements, capital adequacy and exposure limits. Poland experienced bank crises (1992-93) due to a general insolvency in the banking sector. To deal with it prudential regulations were introduced in 1993-95, and then tightened in 1998. In 1993 the Capital Adequacy Ratio standard set by the Bank for International Settlements BIS was introduced, and in 1994 International Accounting Standard IAS were taken on board. Most of the banks were recapitalized using funds raised from the issuance of 15 year

governments bonds. In 1998 the European Bank for Reconstruction and Development (EBRD) conducted a ranking of extensiveness and effectiveness of financial laws and regulations, Hungary came in first getting 4 out of 4 in both categories, closely followed by Poland scoring 4 for extensiveness, and 3 for effectiveness .

Under Polish banking law, banks can take on three legal forms: state banks, co-operative banks, and joint stock companies. In 1999 only two state-owned banks were not transformed into joint stock companies: *PKO BP* and *Bank Gospodarstwa Krajowego – BGK*. Most of the banks take the form of co-operatives but their market share is relatively insignificant (4.3% of total sector net assets in 1998). Joint stock companies, with state, foreign, and domestic private capital shares, are by far the most important institutions within the banking sector. Changes in the ownership structure of the banking sector over the 1993-98 period are shown in Table 1.

Banking privatization began in Poland in 1991, but it was not until 1998 that the sector could be formally called private, with a share of private and co-operative banks exceeding 50% in total assets of the banking sector (see Table 1). The privatization of state-owned banks started in 1991-93 when banks such as *BIG*, *BRE*, *Wielkopolski Bank Kredytowy – WBK*, and *Bank Slaski – BSK* were privatized. At the time the privatization approach aimed at selling a block of shares (50–60%) in an initial public offering (IPO) to domestic and foreign investors, giving some shares to bank employees (5–7%), and retaining a controlling stake (20 – 30%). This sell-off strategy was necessary (Gorski, 2001) as banks found themselves in difficult situation due to a high proportion of bad loans in their portfolios (3). The IPO sales of privatized banks' shares with a pre-set price usually ended up with high reductions in the number of shares sold to investors as compared to the numbers ordered.

From 1993 onwards share offer prices were set by tender or at a special stock exchange session. Foreign investors were encouraged to get involved in banks' privatization through the issue of Global Depository Receipts (GDRs) and American Depository Receipts (ADRs). In the second half of the 1990s banks 'consolidation' accompanied the privatization process, the three remaining regional state-owned banks were incorporated into the structure of the *Pekao SA Bank*. Following an initiative of the central bank and the Banking Guarantee Fund, an incentive scheme was developed to encourage banks that were doing well to take over banks on the verge of bankruptcy by

offering partial or complete exemption from obligatory reserve requirements. The NBP encouraged domestic banks to purchase the remaining Treasury shares in banks, for example, *BIG SA* was encouraged to buy into *Bank Gdanski* and *Kredyt Bank SA* was encouraged to buy into *Polski Bank Investycyjny*. The NBP promoted both voluntary mergers and hostile takeovers of domestic private banks, for example, the acquisition of a small listed bank- *Polski Bank Rozwoju SA* by the larger *Bank Rozwoju Eksportu (BRE)*, and later in mid 1999 merger of the *BRE* with *Bank Handlowy (BWH).* Consolidation of the Polish banking sector continues with foreign capital becoming more and more involved.

By mid 1999, the foreign capital accounted for more than 50% of shareholders' funds of banks operating in Poland. This happened because 53% of the shares of the second largest bank in Poland - *PeKaO SA* were sold to *UniCredito Italiano*, and 80% of the equity of the tenth largest bank – *Bank Zachodni* to the Irish *AIB plc*. Over 1993-99 foreign capital entered the Polish banking system in (Gorski, 2001) significant way. The main reason behind the decisions of foreign investors to enter Polish banking was a positive assessment of progress achieved in economic transformation, together with encouraging economic prospects, including Poland's anticipated EU accession.

2.4. The Capital Markets

Two legal Acts were responsible for setting the scene for capital markets development in Poland in the early 1990s: the 1991 Acts on the commercialization and privatization of state-owned companies and the law on public trading in securities and in trust funds. In particular, the second law permitted the establishment of institutions necessary for the operations of a Polish capital market based on western patterns. These institutions include: *The Securities and Stock Exchange Commission (Komisja Papierow Wartosciowych i Giełd – KPWiG),* the agency responsible for whether securities can be publicly traded, including admission procedures to the Stock Exchange, granting of brokerage and investment advisor licences, supervision of the stock market, protecting investors' interests and ensuring fair competition;

The Warsaw Stock Exchange, WSE (Warszawska Gielda Papierow Wartosciowych – WGPW) is the only stock exchange in Poland, on which shares, pre-emption rights, treasury and corporate bonds, foreign exchange, and stock exchange index derivatives are

traded. At the end of 1997 some 47 Brokerages operated in Poland, with 16 directly owned by banks. In 1996 an over-the-counter (OTC) market (*Centralna Tabele Ofert – CeTO*) was established as a public market separate from the Stock Exchange.

The development level of a stock exchange can be measured through the market value of quoted companies (market capitalization). At the end of 1998, the WSE capitalization exceeded $20.5 billion or around 14% of Poland's GDP (Czekaj & Owsiak, 1999). This number is very important, since at the end of 1997, the capitalization accounted only for 5-6% of GDP. In 1999 the shares of six Polish companies were trading as Global Depository Receipts in London. In anticipation of future EU accession competition has began between Central European exchanges: Prague, Vienna, Budapest and Warsaw for the regional leadership in the capital market. Gorski (2001) argues that in near future alliances will emerge between these centers. The Warsaw Stock Exchange also considers trading shares of companies from other Eastern European countries: Lithuania, Latvia, and Ukraine.

The second major supplier of tradable securities to the stock exchange is the State Treasury. In 1997 Treasury bonds represented almost 20% of the entire value of turnover on the Exchange. Investor's interest in the bonds has grown together with their development over longer maturity periods (from 1 to 10 years) and in variety (e.g. variable and fixed yield bonds). In the early 1990s state Treasury instruments dominated the bond sector, and from 1996 corporate bonds started to appear. The relatively late introduction of corporate bonds was partly the result of non-existence of appropriate legal regulations and partly the due to persistently high inflation, which made it difficult to calculate future returns. However, by the end of 1990s the bond market has become an attractive source of capital for many companies.

The municipal sector also issues bonds but because it is situated at the lowest level of local authority structure, the value of bonds issued is not very high. The highest issues run at a level of around $6 million and the bonds issued by the municipal sector are generally not even publicly traded publicly. At the turn of the century, Treasury paper and shares dominated the Polish capital market only towards the mid 1990s did other financial instruments such as corporate bonds, municipal bonds and derivatives emerge.

2.5. Non Deposit Accepting Institutions

Non Deposit Accepting Institutions in Poland are dominated by the Pension Funds and Insurance companies with a negligible role for Investment Banks or Open Ended or Closed Investment Funds. Pension funds began to be established in Poland only in 1999. The pension system assumes that employees can be insured under three pillars: Pillar I, an obligatory insurance in the state *Zaklad Ubezpieczen Spolecznych (ZUS)*, to which 15% of pension premiums go; Pillar II, an obligatory insurance in open pension funds, managed by *Powszechne Towarzystwo Emerytalne SA (PTE)*, and which gets 9% of premiums; Pillar III, voluntary private employee pension fund. In the first half of 1999 21 PTE companies were granted licenses from the Pension Funds Supervision Office. By mid 1999 the market leaders were established, with a combined market share of 70%: four pension funds established by *Commercial Union,* the banks *BHP SA* and *WBK SA*; *PZU Zycie*; *Nationale Nederlanden*; and *Norwich Union*.

At the end of 1998, 55 insurance companies operated in Poland, of which 24, conducted businesses in life assurance. The capital raised by insurance companies has been growing. Over the period 1996-98 the annual growth rate in the life assurance sector amounted to approximately 30%. Over the same period, insurance companies raised almost three times more capital than investment trust funds and have become the largest non-banking financial intermediary in Poland. Despite the large number of companies, the insurance market is highly concentrated with *Powszechny Zaklad Ubezpieczen (PZU),* and *Warta SA* being the dominant players. Four companies with total market share of 98% dominate the life assurance business: *PZU Zycie, Commercial Union Poland, AIG Poland, and Nationale Nederlanden*. At the end of 1997, the investment portfolios of insurance firms in Poland were composed mostly of T-bonds and T-bills (88%), with the value of shares not exceeding 6%. This is because of the high yield and safety generated by Treasury securities and also the lack of alternatives on the market, such as mortgage loans, mortgage bonds and corporate bonds.

3. Empirical Analysis

3.1. The Data Set

The data set used in estimation and testing consists of monthly observations spanning the period from January 1990 to November 2001. To measure the effect of financial liberalization we have selected a number of monthly indicators, ranging from money supplies, financial depth, and stock market indicators. Since real GDP data was not available for the whole sample period we have followed Gupta (1984) in using industrial production as a monthly indicator for economic development. The data were obtained from Information Bulletins and Annual Reports of the National Bank of Poland.

To capture the monetary effects of financial liberalization, we used data on two different definitions of money: the narrow definition of money M0 and the broader M2. We also constructed a proxy variable to measure financial deepening, this is the ratio of credit to the private sector over the nominal value of industrial production. According to the McKinnon and Shaw model, the supply of credit to the private sector is ultimately responsible for the quantity and the quality of investment and, in turn for economic growth. As such, we can expect the financial deepening variable to exert a casual influence on the level of industrial production. We also used data on the three-month treasury bill interest rate, credit to non-financial sector, credit to the government, zloty deposits of non-financial sector in commercial banks, zloty deposits of non-financial sector in both the NBP and commercial banks and data on minimum reserve requirements.

To examine the connection between economic growth and the stock market we used two indicators of stock market development, the average market capitalization and the 'turnover ratio'. The average stock market capitalization is the ratio of total value of the stock market over the nominal GDP. The 'turnover ratio' is defined as the value of trades of the stock market over the market capitalization. We used data on the value of share price index given by the Warsaw Stock Exchange Index (Warszawski Index Gieldowy - WIG).

2.3. Unit Root Tests for Stationarity

The order of integration of each variable needs to be identified before any sensible econometric analysis can be undertaken and so the first step in our empirical analysis is to apply the Augmented Dickey-Fuller (ADF) test. We assume the lag length to be 4, and then proceeded to identify the probable order of stationarity. The results of the tests for all the variables and for the three alternative models: constant, constant and trend, and none are presented in Table 2. First we have results for their logarithmic levels and then – in cases were we found that the series contain a unit root – for their first differences. The results show that each of the series is non-stationary when the variables are defined in terms of levels. First-differencing the series removed the non-stationarity components in all series, concluding that all our series are integrated of order one.

3.3. Cointegration Tests

Having established the stationarity order, we moved to cointegration tests. We use the Engle-Granger cointegration test and the maximum likelihood method proposed by Johansen and Juselius. By definition two variables can be cointegrated only if they are integrated of the same order. In our analysis we found that all the series are integrated of order one. To check whether financial deepening, share prices, reserve requirements, money supply M0, money supply M2, turnover ratio, and average market capitalization are cointegrated with industrial production we performed the Augmented Dickey-Fuller test on the residuals to determine their order of integration. We assume the lag length to be 1. The results of the tests for the residuals for the one model are presented in Table 3. The ADF statistic is smaller than the critical value in all cases, therefore, the error terms are stationary. Hence we conclude that all financial development indicators are related in the long run with the industrial production series.

Next we present further evidence supporting cointegration using the technique developed by Johansen (1988, 1991), and Johansen and Juselius (1990, 1992). Johansen and Juselius proposed a maximum-likelihood testing procedure for the number of cointegrating vectors that also include testing procedures for linear restrictions on the cointegrating parameters. Any p-dimensional vector $\{x_t\}$, which follows a Gaussian VAR process with lag order $_{K+1}$ and a drift μ can be written as:

$$\Delta X_t = \sum_{i=1}^{k} \Gamma_i \Delta X_{t-1} + \Gamma_{k+1} X_{t-k-1} + \mu + \varepsilon_t \qquad (1)$$

where $t = 1, \ldots, T$, and ε_t is an independently and identically distributed p-dimentional vector, and T is the sample size.

The dimension of the cointegrating vector is given by the rank of matrix $-\Gamma_{k+1}$. When the rank is r, we can decompose Γ_{k+1} into:

$$-\Gamma_{k+1} = \alpha \beta' \tag{2}$$

where α and β are $p \times r$ matrices. The rows of β' from the r represent cointegrating vectors. If we regard the elements of the $r \times 1$ vector $\beta' X_{t-k-1}$ as 'error correction' terms then the elements of matrix $(-\alpha)$ show the speed of adjustment of the dependent variables towards the equilibrium. Johansen (1988, 1991) proposed how to derive maximum likelihood estimates of α and β. He also suggested two likelihood ratio test statistics to determine the rank of the cointegration space. With the trace statistic, the null hypothesis is that there are at most r cointegrating vectors. With the maximum eigenvalue statistics, we test for the presence of r versus $r + 1$ cointegrating vectors.

The Johansen-Juselius maximum likelihood estimates of the Trace and Maximal eigenvalue test statistics are shown in Table 4. In all cases we reject the null hypothesis that there is no cointegrating vectors in favour of the alternative hypothesis that there is one cointegrating vector. This implies that all our financial development indicators are cointegrated with industrial production, as detected earlier on by the Engle-Granger tests.

3.4. Granger Causality Tests

When a set of variables is stationary or cointegrated, causality tests can be conducted (Granger, 1988). Following the work of Granger (1969) an economic time series x_t is said to "cause" another series y_t if $E(y_{t+1}|\Omega_t) \neq E[x_{t+1}|\Omega'_t)$ where Ω_t is the information set containing all available information whilst Ω'_t excludes the information in past and present x_t.

The testing procedure for the identification of causal directions when, as is common in macroeconomic time series, the variables have unit roots, such as in our case, requires that after testing for the existence of cointegration to run Error Correctiom Models as follows:

$$\Delta y_t = a_0 + a_{1i} + \sum_i^m \Delta y_{t-i} + a_{2j} \sum_j^n \Delta x_{t-j} + a_3 \varepsilon_{t-1} + u_t \tag{3}$$

where $\varepsilon_{t-1}=y_{t-1}-b_1x_{t-1}$, is the residual of the cointegration equation.

This means that there are two sources of causation for *y*, either through the lagged terms Δx or through the lagged cointegrating vector. This latter source of causation is not detected by the standard Granger causality test. The null hypothesis can be rejected if either one or more of these sources affects *y* (ie the parameters are different from zero). The hypothesis is again tested using a standard F-test. Following Granger and Lin (1995), the conventional Granger causality test is not valid, because two integrated series cannot cause each other in the long-run unless they are cointegrated. Therefore, we test for causality among the variables that are found to be cointegrated, using the VECM representations for the cointegrated variables. Results of those causality tests are presented in Table 5.

According to Granger and Lin (1995) causality in the long-run exists only when the coefficient of the cointegrating vector is statistically significant different from zero. In our analysis we apply variable deletion (F-type) tests for the coefficient of the cointegrating vector and for the lagged values of the financial proxies for the growth of industrial production VECM and vice versa (testing for the validity of the supply leading and demand following hypothesis respectively)[1]. The results reported in Table 5., show the coefficients of the ECM components in the VAR-ECM models with the residuals obtained from the Johansen Cointegration tests described above and also reports statistical values of F-type tests for variable deletion to check for causality in the long-run (ie checking for both the ECM term and the short-run dynamics in the VAR model). The coefficients of the ECM terms in all cases for the regressions having industrial production as dependent variable prove to be highly significant. By contrast, when the financial development proxies are dependent variables, the results show that only two out of the six indicators appear to be significant. This can be interpreted as evidence in favour of the supply-leading hypothesis. However, to be more confident about it we also have to look at the F-type tests. From those tests and specifically for the long-run coefficients there is strong evidence in favor of the supply leading hypothesis. In all cases, the causality direction runs from the financial proxy variable to industrial production, while the opposite hypothesis that industrial production causes financial development is strongly

[1] In theoretical endogenous growth models there is no certainty about the direction with which finance affects growth leading to those two competing hypothesis. For more details see Asteriou and Price (2000).

rejected in four out of the six possible cases. For the cases of *Depth* and *M2* the result suggest that there is bi-directional causality, without shedding light on which hypothesis should be accepted, but having the four other proxies (*Turnover, Market Capitalization, M0,* and *Share Prices*) showing strong evidence in support of the supply leading hypothesis we conclude in favour of the proposition that is mainly financial development that causes growth.

Similar conclusions are drawn from the results for the causality test of the dynamics in the VAR-ECM with the exception that the stock market financial development proxies do not reject the null in both cases suggesting no short-run causality at all. In sum, we found that there is causal relationship and this runs from the financial development side to the economic development in most cases, supporting the findings of the supply-leading hypothesis.

4. Summary and Conclusions

The evidence presented in this paper supports the view that finance is a leading sector in the process of economic development at least in the case of Poland. Since the early 1990s a new financial infrastructure (with its law and institutions) has been built in Poland and we found strong evidence in favour of the supply-leading hypothesis, especially in the long-run. This indicates that the causality direction runs from all the financial development indicators (*Turnover, Capitalization, M0, M2, Depth and Share Prices*) to industrial production. We find that industrial production does not cause financial development in four cases: *Turnover*, *Stock Market Capitalization*, *Share Prices* and *narrow definition of money M0*. The results also suggest that the relationship between financial development and economic growth is bi-directional, for the cases of *Depth* and *broader definition of money M2*. However this does not mean that 'finance follows growth' as the four other financial development indicators show strong evidence in support of the supply-leading hypothesis, hence, we favour the proposition that 'finance leads to growth' in the long-run.

When we look the direction of causality in the short-run the outcome is quite similar with the exception of the stock market development indicators. There is no short-run causality at all. These findings should not come as a surprise, the Capital Market in

Poland is relatively new and relatively small. According to Czekaj and Owsiak (1999) a stock exchange plays an important role in an economy only once the market capitalization reaches around 20-25% of GDP the Polish exchange has not achieved that level yet. Treasury paper and shares have dominated the Polish capital market, and only at the end of 1990s were other financial instruments such as corporate bonds and derivatives were introduced. Investment funds play only a marginal role in accumulation of funds for the capital and money markets. In conclusion, our results support the view that in the case of Poland financial liberalization and reform has been an important cause of economic development .

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Table 1: The Polish Banking Scene, 1993 - 1998						
Types of banks	End 1993		End 1996		June 1998	
	No of banks	Total net assets (%)	No of banks	Total net assets (%)	No of banks	Total net assets (%)
All banks	1,740	100.0	1,475	100.0	1,329	100.0
Commercial banks	87	93.4	81	95.4	84	95.7
Banks with majority state ownership	29	80.4	24	66.5	15	48.3
Directly owned by the Treasury	16	76.1	8	51.1	6	37.5
Indirectly owned by the Treasury	11	-	11	-	8	-
Owned by the NBP	2	-	3	-	1	-
Private banks	58	13.0	57	28.7	69	47.4
Majority owned by Polish capital	48	10.4	32	15.1	38	30.9
Majority owned by foreign capital	10	2.6	25	13.7	31	16.5
Co-operative banks	1,653	6.6	1,394	4.6	1.245	4.3

Source: Hajkiewicz-Gorecka (1999, p.97)

Table 2: Augmented Dickey – Fuller Test Results

$$Model: \Delta y_t = c_1 + by_{t-1} + c_2 t + \sum_{k=1}^{p} d_k \Delta y_{t-k} + v_t ; H_0 : b = 0; Ha : b > 0$$

Unit Root Tests at Levels			
Variables	**Constant**	**Constant and Trend**	**None**
Unit Root Tests at Logarithmic Levels			
Average Market Capitalization (Lcapit)	-2.591*	-1.845*	1.297*
Financial Deepening (Ldepth)	0.590*	-3.271*	-1.511*
Industrial Production (Lindpr)	-4.067	-1.509*	4.174*
Share Price (Lp)	-3.167	-2.566*	0.940*
Reserve Requirements (Lreserve)	-0.553*	-1.885*	-1.237*
Money Supply M0 (Lm0)	-2.248*	-0.843*	2.462*
Money supply M2 (Lm2)	-2.535*	0.270*	2.116*
Turnover Ratio (Lturn)	-1.759*	-3.359	-0.683*
Unit Root Tests at First Differences			
Average Market Capitalization (ΔLcapit)	-5.486	-6.081	-4.769
Financial Deepening (Δ Ldepth)	-6.798	-7.250	-6.494
Industrial Production (Δ Lindpr)	--	-8.864	-4.791
Share Price (ΔLp)	--	-3.614	-2.947
Reserve Requirements (ΔLreserve)	-4.794	-4.839	-4.648
Money Supply M0 (ΔLm0)	-4.754	-5.231	-3.828
Money supply M2 (ΔLm2)	-5.532	-6.028	-1.397*
Turnover Ratio (ΔLturn)	-5.673	-5.741	-5.700

* Denotes evidence of existence of unit root, at the 5% significance level the null hypothesis can not be rejected

Critical values obtained are –2.88, -3.45 and –1.94

Table 3: Engle-Granger Cointegration Tests results	
ADF Tests on Residuals of the Cointegration Equation: $log\ Y_t = a + b\ log\ X_t + \varepsilon_t$	
Unit Root Tests on Residuals	
Variables	**None**
Residuals for depth	-3.748*
Residuals for share prices	-3.386*
Residuals for m0	-7.650*
Residuals for m2	-7.594*
Residuals for turnover	-3.238*
Residuals for capitalization	-4.618*
Residuals for reserve requirements	-9.181*

*Denotes significance at 5% level and rejection of the null hypothesis of non-stationarity
$log\ Y_t$ is the logarithm of industrial production
$log\ X_t$ is the logarithm of the financial development indicators presented in each row above

Table 4: Johansen-Juselius Maximum Likelihood Cointegration Tests[A]					
Sample (adjusted): 1992:06 – 2001:11					
Included observations: 114 after adjusting endpoints					
Cointegration tests of Industrial production with	**Trace**		**Maximal eigenvalue**		VAR lags
	r = 0	r ≤ 1	r = 0	r ≤ 1	
Turnover	30.99*	8.36	22.63*	8.36	4
Capitalization	29.32*	8.98	20.34*	8.98	4
M0	22.58*	4.42	18.33*	4.24	4
M2	34.44*	4.87	29.57*	4.87	4
Depth	36.41*	16.39	20.02*	16.39	4
Share Prices	27.13*	7.77	19.37*	7.77	4
Critical values at 95%[B] (Osterwald-Lenum)					
	15.41	3.76	14.07	3.76	

[A] Estimates correspond to a model where restricted constant is included in the cointegrating equation.
[B] A small sample adjustment has been made in all the likelihood ratio statistics, equal to

$-2\ ln\ Q = -(T - kp) \sum_{i=ro+1}^{k} \ln (1 - \lambda^*)$ as suggested by Reinsel and Ahn (1988).

Table 5: Granger Causality tests on the ECM representations				
Sample (adjusted): 1992:06 – 2001:11				
Included observations: 114 after adjusting endpoints				
$\Delta y/\Delta x$	**Eigen vectors**	**Coefficient of ECM term**	**F-stat for ECM term**	**F-stat for lagged Δx terms**
Supply Leading Hypothesis Tests				
Ind. Prod. / Turnover	1	-0.054 (-4.62)*	5.687*	2.074*
Ind. Prod. / Capitalization	1	-0.020 (-3.64)*	3.034*	0.516
Ind. Prod. / M0	1	-0.045 (-4.01)*	21.237*	2.293*
Ind. Prod. / M2	1	-0.042 (-3.25)*	11.096*	4.620*
Ind. Prod. / Depth	1	-0.010 (-2.54)*	2.065*	5.177*
Ind. Prod. / Share Prices	1	-0.553 (-5.69)*	10.994*	0.599
Demand Following Hypothesis Tests				
Turnover / Ind. Prod.	1	-0.099 (-1.23)	1.684	1.785
Capitalization / Ind. Prod.	1	-0.081 (-1.37)	1.643	0.552
M0 / Ind. Prod.	1	-0.022 (-1.83)	1.876	0.977
M2 / Ind. Prod.	1	-0.018 (-5.39)*	2.201*	3.030*
Depth / Ind. Prod.	1	-0.036 (-2.09)*	3.248*	9.370*
Share Prices / Ind. Prod.	1	-0.097 (-0.52)	0.024	1.788

The null hypothesis is that of no-causality.
* indicate the rejection of the null hypothesis for the 95% significance level.