Received: 4 November 2022 | Revised: 31 July 2023 | Accepted: 12 January 2024

DOI: 10.1002/ijfe.2942

RESEARCH ARTICLE

WILEY

On stakeholder theory and corporate investment under financial frictions

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Abstract

The view that corporations have a wider focus than just maximising shareholder value has received considerable attention from practitioners, managers, and academics alike. We investigate the Q theory of corporate investment with financial frictions when management maximises stakeholder value instead of shareholder value. Different objective functions are investigated. We characterise the optimal investment and financial policy of the firm. The results show that stakeholder firms invest more than shareholder firms, that is, over invest, and an increase of stakeholder shares increases investment, except when equity issuing firms face severe informational asymmetries or severe cost of external equity. We also discuss different approaches to model investment of stakeholder firms and their implications for empirical analysis.

KEYWORDS

corporate governance, corporate investment, financial frictions, Q theory, stakeholder theory

1 | INTRODUCTION

The view that corporations consider not just the welfare of shareholders but also the welfare of other economic agents has become more prevalent in recent years (Gelles and Yaffe-Bellany (2019), Sundheim and Starr (2020)). There has also been an increased interest in investigating alternative objective functions of the firm (e.g., Azar and Vives (2021), Eeckhout (2021), Fleurbaey and Ponthiere (2021)). The shareholder society (Jensen and Meckling (1976), Friedman (1970)) focuses on the shareholders that own the firms. Firms are viewed as maximising shareholder value. The stakeholder society (Magill et al. (2015), Tirole (2001)) focuses on different groups of economic agents impacted by firms, for example, clients, employees, suppliers, and so forth. Firms are viewed as maximising the welfare of all groups of stakeholders or stakeholder value (Freeman (1984), Donaldson and Preston (1995), Magill et al. (2015), Tirole (2001)).

The implications of the stakeholder view on the behaviour of firms, in particular, their investment and financing decisions have not received an abundance of attention in the economic or finance literature. The main economic model used in analysing corporate investment is Hayashi (1982) investment model with convex cost of changing capital (see also Summers (1981), Chirinko (1987), Hennessy (2004) and Hennessy et al. (2007)) assumes shareholder value maximisation. To the best of our knowledge, there has not been an extension of this model to stakeholder firms due to the difficulties in modelling such stakeholder firms and their investment decisions.

An important recent development in the theory of corporate investment is the focus on financial frictions and working out its implications on the optimal investment of firms. In a seminal paper, Fazzari et al. (1988), empirically assess the importance of financial frictions from the cash flow sensitivity of investment (see, e.g., Ranasinghe (2019) and Adu-Ameyaw et al. (2022)). This approach has been criticised in the literature by, for example, Kaplan and Zingales (1997) and Gomes (2001). The introduction of explicit financial frictions into dynamic structural investment models has been proposed by, among others, Gomes (2001), Cooper and Ejarque (2003) and Hennessy et al. (2007).

We investigate Hayashi (1982) Q theory of corporate investment when managers maximise *stakeholder* value. Our starting point is a model of investment under shareholder value maximisation with financial frictions comprising convex costs of external equity, debt overhang and collateral constraints by Hennessy et al. (2007). We investigate objective functions that are different from shareholder value maximisation analysed in that paper. We characterise the optimal investment and financial policy of the firm. In the main model, stakeholder benefits are modelled as a fraction of net profit, the difference between gross profit and adjustment cost.

Due to the external cost of equity, investment depends on whether external equity is issued, or dividends are paid. The external cost of equity leads stakeholder value maximising firms that issue equity to invest less than stakeholder value maximising firms that pay dividends or do not issue equity, for fixed marginal productivity of investment, q. This result carries over from the case for shareholder firms (see Hennessy et al. (2007)). However, *stakeholder* firms invest more than shareholder firms, or over-invest, and an increase in the stakeholder shares increases investment except in the case of an equity issuing stakeholder firm that faces severe external cost of equity. Intuitively, stakeholder benefits reduce the marginal cost of investment, making investment more attractive.

The implementation of the stakeholder society requires several conditions, which makes the analysis of stakeholder firms difficult. Maximising total stakeholder value requires the identification of groups of stakeholders and the definition of their respective stakeholder values, including trade-offs between the stakeholder values of different stakeholder groups. Incentives for managers need to be provided so that they implement the maximisation of total stakeholder value (Magill et al. (2015)). Magill et al. (2015) provide an economic model that shows how the stakeholder society can be implemented in a consistent economic model. The measurement of the stakeholder values of the different groups and the trade-offs between different stakeholder values are important. Liquid markets that can evaluate stakeholder value may not exist, in contrast to stock markets measuring shareholder value (Tirole (2001)), complicating the analysis.

We focus on objective functions of the firm and stakeholder values that can easily be obtained and do not depend on stakeholder values obtained through market prices on exchanges. We also assume that the trade-offs between shareholder and stakeholder value of other stakeholder groups are given. In addition, there is a single-valued objective function that the managers maximise to avoid the issues raised by Jensen (2001). We abstract from the problem that the nature or identity of the stakeholder impacts corporate investment.

The plan of the paper is as follows. In Section 2, we present the notation and the shareholder model of investment with financial friction (Hennessy et al. (2007)). In Section 3, we generalise the investment model to include stakeholders. In Section 4, we parametrize the adjustment cost function and external equity cost function and then derive the main results and comparative statics of investment of a stakeholder firm. In section 5, we conclude.

2 | CORPORATE INVESTMENT UNDER SHAREHOLDER VALUE MAXIMISATION

The corporate investment model that allows for agency problems is based on the Q model with financial frictions in Hennessy et al. (2007), pp. 695–699. We describe the model of Hennessy et al. (2007) and use their notation in what follows. This model includes financial frictions like convex cost of external equity, debt overhang and collateral constraints on borrowing. The firm maximises shareholder value.

Firm's capital stock in period t, K_t, evolves according to $K_t = (1-\delta)K_{t-1} + I_t$, with investment I_t in period t and depreciation δ. Gross profit $\mathrm{F}(K_t, \varepsilon_t)$ depends on the capital stock K_t and the state variable ε_t reflecting variations in input and output prices and productivity. Considering capital adjustment cost $\mathrm{G}(I_t, K_t)$, net profit is $\mathrm{F}(K_t, \varepsilon_t) - \mathrm{G}(I_t, K_t)$. Gross profit and the capital adjustment cost satisfy standard assumptions: F is twice continuously differentiable, strictly increasing and homogenous of degree one in the capital stock and G strictly convex and homogenous of degree one in its arguments.

External equity finance $X_t > 0$ is costly. Dividend payments to shareholders, $X_t < 0$, incur a negative cost. The impact of asymmetric information (Myers and Majluf (1984), Wu and Wang (2005)) in equity financing is modelled by a cost of equity function $\mathrm{H}(X_t, K_t)$ with $\mathrm{H}(X_t, K_t) = X_t$ for all $X_t \leq 0$. H is twice continuously differentiable, strictly increasing and convex in X_t; decreasing and convex in K_t, and homogeneous in (X_t, K_t).

The firm obtains credit with an endogenous credit line balance B_t, a state variable. The bank requires a collateral $B_t \leq L(\varepsilon_t)K_t$, where $L(\varepsilon_t)$ is the liquidation value of a unit of capital K_t. The interest on the bank credit line, r, is risk free due to the collateral. The firm's deposit earns an interest rate of $r_s < r$. The effective interest rate is ρ. The financial policy g_t gives the changes in the credit line balance so that $g_t = B_t - B_{t-1}$. The collateral constraint requires that $g_t \leq \gamma[L(\varepsilon_t)K_t - B_t]$. The firm closes the gap between the bank credit line balance and its upper bound LK at the rate γ. If $g_t > 0$ and $B_t > 0$, the firm uses the credit line. If $g_t > 0$ and $B_t < 0$ the firm reduces the cash balance. If $g_t < 0$ and $B_t > 0$, the firm pays debt. If $g_t < 0$ and $B_t < 0$ the firm increases the cash balance. The firm faces a pre-existing, non-negotiable public debt or debt overhang D (Myers (1977)). The permanent coupon payment on this debt is $b > 0$. Recall that managers maximise shareholder value.

Mykhayliv and Zauner (2013) extend the model to include private benefits of control and soft budget constraints and bring this model to the data (see also Mykhayliv and Zauner (2017)).

3 | STAKEHOLDER VALUE MAXIMISATION

In contrast to Hennessy et al. (2007), we now assume that, in addition to shareholders as in the model above, there is also one stakeholder group. Extensions to more stakeholders are possible and straightforward. A stakeholder share parameter c, where $1 > c > 0$, is used to measure the stakeholder benefit of the group. In each period, the stakeholder earns a fraction c of the gross profit net of the adjustment cost, $c(F(K_t,\varepsilon_t) - G(I_t,K_t))$. The payment of the stakeholder benefits, $c(F(K_t,\varepsilon_t) - G(I_t,K_t))$, is financed by the firm and leads to the firm's budget constraint given by

$$X_t + g_t + F(K_t,\varepsilon_t) = I_t + G(I_t,K_t) + b + \rho B_t + c(F(K_t,\varepsilon_t) - G(I_t,K_t))$$

The cash inflows comprise external equity, borrowing or changes in the cash stock and gross profits. The payments on the right-hand side comprise investment cost, capital adjustment cost, debt, interest, and the payment of stakeholder benefits. Rearranging, the budget constraint can be rewritten as

$$X_t = I_t + (1-c)G(I_t,K_t) + b + \rho B_t - g_t - (1-c)F(K_t,\varepsilon_t)$$

We turn to the objective function of this stakeholder firm and the incentives of the management to implement this objective. The principal-agent problem suggests ways to disciplining the managers using incentive contracts. The benefits to each stakeholder group as well as the relative weights to the benefits of shareholders and stakeholders require precise specification (Magill et al. (2015)). Another important issue is the difficulty of introducing liquid markets and a price system that can evaluate the benefits to the stakeholder groups like stock exchanges evaluating shares (Tirole (2001) and Magill et al. (2015)).

For simplicity, we assume that the management of the firm maximises (the present value of) a combination of the value of equity $-H(X_t,K_t)$ and a fraction of gross profit, $cF(K_t,\varepsilon_t)$. The trade-off between dividend payments and the gross stakeholder benefits are given by c and are linear. Implicitly, the managers put a bigger emphasis on the stakeholder benefits than the payments to stakeholders would suggest, as the objective function does not reflect the convex capital adjustment costs. This is a crude way to overcome the evaluation of stakeholder benefit through a functioning liquid market like an exchange. This assumption also allows to simplify the development to obtain a closed form solution for the optimal financial and investment policy of the firm. We come back the more general problem again below. We also cast the problem in discrete time similar as in Mykhayliv and Zauner (2013) assuming standard regularity conditions are met. The problem can also be solved in continuous time using a Bellman equation using the techniques employed in Hennessy et al. (2007).

Given state (K_t,B_t,ε_t), at each t, the management chooses a financial policy g_t and investment policy I_t and an optimal time to default T

$$max_{g_t,I_t,T_{t=0}^T} E_0 \sum_t \beta^t[(-1)H(X_t,K_t) + cF(K_t,\varepsilon_t)],$$

subject to $K_t = (1-\delta)K_{t-1} + I_t$,

$$g_t = B_t - B_{t-1},$$

$$g_t \leq \gamma[L(\varepsilon_t)K_t - B_t], \text{and where}$$

$$X_t = I_t + (1-c)G(I_t,K_t) + b + \rho B_t - g_t - (1-c)F(K_t,\varepsilon_t).$$

Given $\lambda_{t,K}, \lambda_{t,B}, \lambda_t$, the Lagrange multiplier of the first, second and third constraint above, the Lagrange expression is.where X_t is given as above.

We derive the optimal financial policy. The first order condition of the Lagrange expression with respect to the financial policy g_t gives $-\lambda_{t,B} = H_{X_t}(\cdot) - \lambda_t$. The Kuhn-Tucker conditions imply that if $\lambda_t > 0$, then $-\lambda_{t,B} < H_{X_t}(\cdot)$ and $g_t = \gamma[L(\varepsilon_t)K_t - B_t]$. If $\lambda_t = 0$, then $-\lambda_{t,B} = H_{X_t}(\cdot)$. In other words, if the collateral constraint is not binding,

$$L = E_0\left\{\sum_t \beta^t\left[(-1)H(X_t,K_t) + \mathrm{cF}(K_t,\varepsilon_t) + \lambda_{t,K}(I_t + (1-\delta)K_{t-1} - K_t) + \lambda_{t,B}(g_t - B_t + B_{t-1}) + \lambda_t(\gamma[L(\varepsilon_t)K_t - B_t] - g_t)\right]\right\},$$

the marginal cost of equity financing, H_{X_t}, is equal to the shadow cost of bank debt, $-\lambda_{t,B}$. If $\lambda_t > 0$, then $H_{X_t} > -\lambda_{t,B}$. In other words, if the collateral constraint is binding, the marginal cost of equity financing is larger than the marginal cost of bank debt, due to credit rationing.

We derive the optimal investment. The first order condition of the Lagrange expression with respect to investment, I_t, is

$$\mathrm{q} \equiv \lambda_{tK} = H_{X_t}(\cdot)(1 + (1-c)G_{I_t}) = (\lambda_t - \lambda_{tB})(1 + (1-c)G_{I_t}),$$

where the last equality follows from the optimal financial policy given in the previous paragraph. Marginal q, by definition, the shadow value of capital, λ_{tK}, is equal to the marginal cost of investment reflecting the cost of funding and the stakeholder benefits, $\mathrm{c}(F(K_t,\varepsilon_t) - G(I_t,K_t))$. When comparing the marginal investment cost between a stakeholder firm ($c>0$) and a shareholder firm ($c=0$) in the above equation, the marginal investment cost of a stakeholder firm is lower than that of a shareholder firm as the term $\mathrm{c}G_{I_t} > 0$. Intuitively, the marginal cost of investment is reduced due to the stakeholder benefits that depend on the difference between gross profits and adjustment cost.

After re-arranging, we can obtain optimal investment of total shareholder and stakeholder benefit under financial frictions, which is

$$G_{I_t}(I_t^*, K_t) = \frac{1}{(1-c)}\left(\frac{q}{H_{X_t}} - 1\right).$$

Note that the stakeholder parameter c enters the optimal investment policy.

4 | PARAMETRIZED CONVEX ADJUSTMENT COST AND COST OF EQUITY OF STAKEHOLDER FIRM: RESULTS

We derive the implications of the model using functional forms for F and G that are widely used in investment with Tobin's Q and satisfy the requirements above (see, e.g., Hennessy et al. (2007, pp. 700-703) which we closely follow). For the adjustment cost function, with $\alpha > 0$ the convex curvature and $\delta > 0$ the depreciation rate, we use

$$\mathrm{G(I,K)} = \frac{1}{2}\mathrm{K}\alpha\left(\frac{I}{K} - \delta\right)^2.$$

For the convex cost of equity function, we use

$$\mathrm{H}(X,K) = \mathrm{X} + 1_{\{X>0\}}\left[\frac{1}{2}\phi K\left(\frac{X}{K}\right)^2\right],$$

where $\phi > 0$ is the convex curvature parameter of the equity cost function and $1_{\{X>0\}}$ is the indicator function for the issue of equity, $X>0$, meaning it is 1 for $X>0$ and 0 otherwise. We also normalise investment and write i for I/K and normalise equity and write x for X/K. We can now write the derivative of G with respect to I as $\alpha(i-\delta)$ and the derivative of H with respect to X as $1 + 1_{\{X>0\}}\phi\mathrm{x}$.

The optimality condition of investment is, therefore,

$$i = \frac{1}{\alpha(1-c)}\frac{q}{1 + 1_{\{x>0\}}\phi x} - \frac{1}{\alpha(1-c)} + \delta$$

After a first-order Taylor expansion with $x>0$ *and* close to 0, we can approximate $\frac{1}{1+1_{\{x>0\}}\phi x}$ by $1 - 1_{\{x>0\}}\phi x$ to obtain optimal investment as

$$\begin{aligned} i &\approx \frac{1}{\alpha(1-c)}\left(1 - 1_{\{x>0\}}\phi x\right)q - \frac{1}{\alpha(1-c)} + \delta \\ &= \frac{1}{\alpha(1-c)}q - \frac{1}{\alpha(1-c)}\left(1_{\{x>0\}}\phi x\right)q - \frac{1}{\alpha(1-c)} + \delta \end{aligned}$$

4.1 | Dividend paying stakeholder firm

We can now derive some implications of this model. First, we look at the case of a *dividend paying firm*, $x < 0$, and where $q > 1$. This implies that $\left(1_{\{x>0\}}\phi x\right) = 0$ and

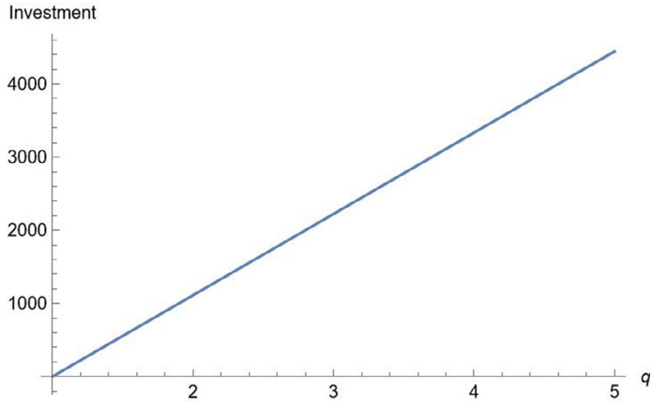

FIGURE 1 Optimal investment as a function of q for a stakeholder firm ($c = 0.1$, $\alpha = 0.001$, $\delta = 0$). [Colour figure can be viewed at wileyonlinelibrary.com]

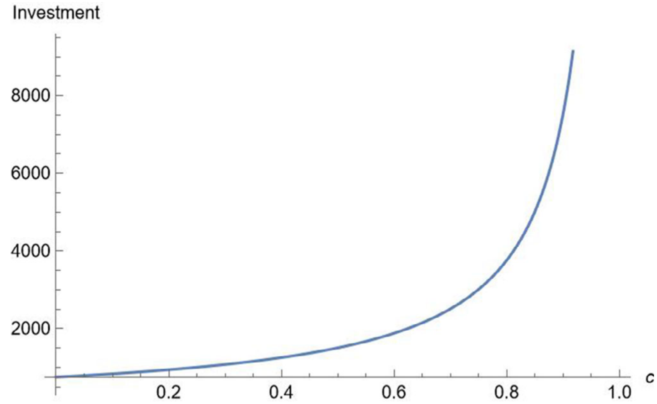

FIGURE 2 Optimal investment of dividend issuing stakeholder firm as a function of the stakeholder parameter c ($q = 1.751$, $\alpha = 0.001$, $\delta = 0$). [Colour figure can be viewed at wileyonlinelibrary.com]

the second term above drops out. Therefore, optimal investment of a dividend-paying firm is given by

$$i \approx \frac{1}{\alpha(1-c)} q - \frac{1}{\alpha(1-c)} + \delta$$

We can now investigate comparative statics for investment of a dividend paying stakeholder firm. To do that, we specify parameter values for the adjustment cost parameter α, and the depreciation rate δ and the stakeholder parameter c, and marginal q. The adjustment cost parameter α is set to 0.001 as the pooled estimate in Groth and Khan (2010, p. 1491), the depreciation rate δ as 0, and the stakeholder parameter c as 0.1. First, we can see that higher marginal $q > 1$ implies higher optimal investment in Figure 1 below.

Next, we plot optimal investment as a function of the stakeholder parameter c assuming the mean value of q of 1.751 for an equity non-issuer in the data of Hennessy et al. (2007, Table 1, p. 705). Firm's investment increases in the value of the stakeholder parameter. Figure 2 below displays the result.

We investigate whether a dividend paying stakeholder firm with $1 > c > 0$ invests more or less than a dividend paying shareholder firm, where $c = 0$. We find that a dividend paying stakeholder firm invests more than a dividend paying shareholder firm as $\frac{1}{\alpha(1-c)} > \frac{1}{\alpha}$. To see this in a different way, we can compute the difference in investment i between a dividend paying stakeholder firm ($1 > c > 0$) and a dividend paying shareholder firm ($c = 0$), which gives.

$$\frac{1}{\alpha(1-c)} q - \frac{1}{\alpha(1-c)} + \delta - \left(\frac{1}{\alpha} q - \frac{1}{\alpha} + \delta\right)$$
$$= \left(\frac{1}{\alpha(1-c)} - \frac{1}{\alpha}\right)(q-1) = \frac{c}{\alpha(1-c)}(q-1) \geq 0$$

FIGURE 3 Difference in Investment between a dividend paying stakeholder firm and a dividend paying shareholder firm as a function of Tobin's q ($\alpha = 0.001$, $c = 0.1$, $\delta = 0$). [Colour figure can be viewed at wileyonlinelibrary.com]

as all terms in the last expression are positive. Therefore, a dividend paying stakeholder firm will always invest more than a dividend paying shareholder firm. We illustrate the difference in investment between a dividend paying stakeholder firm and a dividend paying shareholder firm in the next two Figures. Figure 3 plots this difference as a function of marginal q, where $\alpha = 0.001$, $c = 0.1$, $\delta = 0$.

Figure 4 plots it as a function of the stakeholder parameter c, where $\alpha = 0.001$ and $q = 1.751$, $\delta = 0$ as above.

4.2 | Equity issuing stakeholder firm

Second, we look at an *equity issuing firm*, where $x > 0$. Assume profitable investment or marginal $q > 1$. Equity issue $x > 0$ implies that $\left(1_{\{x>0\}}\right) = 1$ and investment is given by

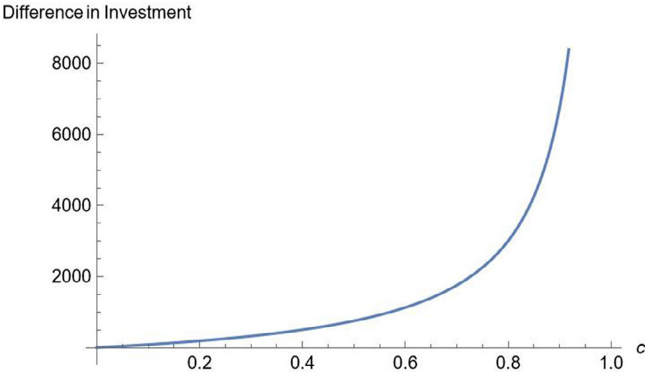

FIGURE 4 Difference in investment: Dividend paying stakeholder versus Shareholder firm as a function of stakeholder parameter c ($\alpha = 0.001$, $q = 1.751$). [Colour figure can be viewed at wileyonlinelibrary.com]

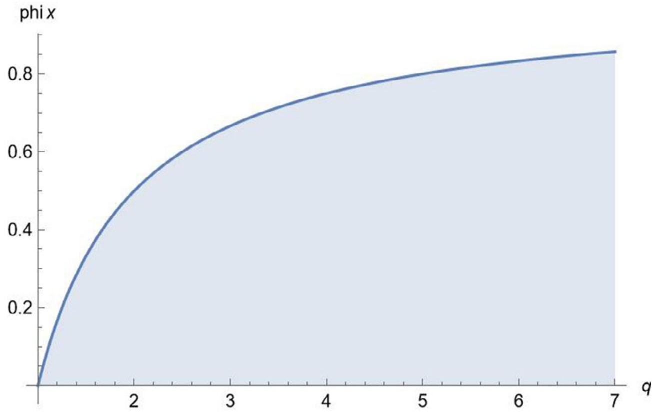

FIGURE 5 Difference in investment between an equity-issuing stakeholder versus shareholder firm ($\alpha = 0.001$, $\delta = 0$). [Colour figure can be viewed at wileyonlinelibrary.com]

$$i \approx \frac{1}{\alpha(1-c)}q - \frac{1}{\alpha(1-c)}\phi xq - \frac{1}{\alpha(1-c)} + \delta$$

For given q, an equity issuing stakeholder firm invests less than a dividend paying stakeholder firm as the second term above $\frac{1}{\alpha(1-c)}\phi xq$, the interaction term between equity issue and marginal q, ϕxq, enters investment negatively. If the effects of the informational asymmetries reflected by the ϕx term are important, an equity issuing stakeholder firm invest lots less than a dividend paying stakeholder firm. In economic terms, as for shareholder firms, the external equity cost makes investment less attractive by increasing the shadow cost of funds. This may also be the reason why firms prefer not to finance projects by equity issues when facing financial frictions.

Whether an equity issuing *stakeholder* firm invests more or less than an equity issuing *shareholder* firm depends on magnitude of the informational asymmetries reflected in the term ϕx, where, recall, ϕ is the parameter of the curvature of the convex external equity cost function and x is the normalised equity issue. For example, assuming the median values of normalised equity issue $x = 0.076$ and Tobin's q, $q = 2.880$, of the equity issuing firms in the sample used in Hennessy et al. (2007, Table 1, p. 705), the crucial cut-off value for ϕ is 8.5892, In this case, for values of the convex curvature parameter ϕ of the external equity cost function below 8.5892, a *stakeholder* firm invests more than a shareholder firm; for values above 8.5892 a stakeholder firm invests less than a shareholder firm. As this appears to be a rather large cut-off value, this seems to suggest that in the typical case an equity issuing *stakeholder* firm invests more than equity issuing shareholder firm.

More generally, we can compute the difference in investment i between an equity issuing *($x > 0$)* stakeholder firm ($1 > c > 0$) and an equity issuing *($x > 0$)* shareholder firm ($c = 0$), which gives.

$$\begin{aligned}&\frac{1}{\alpha(1-c)}q - \frac{1}{\alpha(1-c)}\phi xq - \frac{1}{\alpha(1-c)} + \delta \\ &- \left(\frac{1}{\alpha}q - \frac{1}{\alpha}\phi xq - \frac{1}{\alpha} + \delta\right) \\ &= \left(\frac{1}{\alpha(1-c)} - \frac{1}{\alpha}\right)(q - \phi xq - 1) \\ &= \frac{c}{\alpha(1-c)}(q - \phi xq - 1)\end{aligned}$$

Whether an equity issuing stakeholder firm invests more or less than an equity issuing shareholder firm depends on the sign of the term $(q - \phi xq - 1)$ which we now investigate (since the first term is positive). An equity issuing stakeholder firm will invest more if $(q - \phi xq - 1) \geq 0$ or $\phi x \leq (q-1)/q$, where ϕ is the cost of equity parameter, x is the normalised equity issue and q is the profitability of investment, or marginal q. In Figure 5 below, we illustrate the region $\phi x \leq (q-1)/q$ where a stakeholder firm invests more than a shareholder firm in the shaded area.

We can look at how the optimal investment of an equity issuing stakeholder firm depends on the stakeholder parameter c. To do this we specify parameter values for cost of equity parameter ϕ, the adjustment cost parameter α, and the depreciation rate δ and values for the equity issue x and marginal q. We take the pooled estimate of the adjustment cost parameter α in Groth and Khan (2010, p. 1491) of 0.001. We specify the external equity cost parameter ϕ as 0.0001, the depreciation rate δ of 0 and take the median values of the equity issue x of 0.076 and marginal q of 2.880 of equity issuing firms in

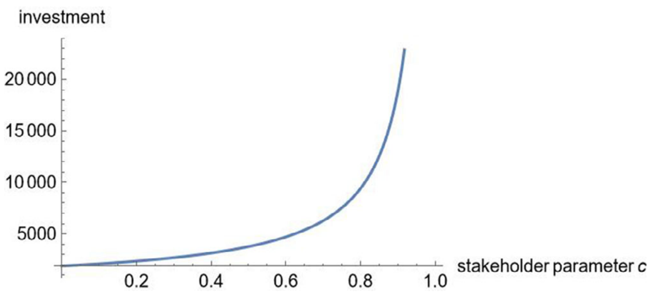

FIGURE 6 Optimal investment of an equity issuing stakeholder firm as a function of the stakeholder parameter c ($\alpha = 0.001$, $\delta = 0$, $x = 0.076$, $q = 2.880$, $\phi = 0.0001$). [Colour figure can be viewed at wileyonlinelibrary.com]

the sample of Hennessy et al. (2007, p. 705). For these values, we plot the optimal investment as a function of the stakeholder parameter c in Figure 6.

As we can see from Figure 6, an increase in the stakeholder parameter increases optimal investment for the parameter values given. More generally, as long as we are in the shaded area in Figure 5, where $\phi x \leq (q-1)/q$, that is, where the informational asymmetries reflected by the cost of external equity, the term ϕx, play a minor role, we have that optimal investment is increasing in the stakeholder parameter c. Intuitively, in the region where $\phi x \leq (q-1)/q$ optimal investment looks (qualitatively) similar to Figure 2.

However, note that if the informational asymmetries are severe, then the second term above may dominate. This is the case when $(q - \phi x q - 1) \leq 0$ or $\phi x \geq (q-1)/q$ or when we are above the shaded region in the positive orthant in Figure 5. This means that a stakeholder firm may optimally *invest less* than a shareholder firm. In this case, an increase in the stakeholder parameter c decreases the optimal investment. This result is reminiscent to the simulation results of Wu and Wang (2005) regarding the effects of asymmetric information on investment. In the case considered, we observe underinvestment and a negative impact of the stakeholder share on investment. However, note that we always focus on optimal investment and derive an explicit expression of these effects without relying on simulations.

The results presented depend on how the stakeholder benefits are modelled. Above we chose the formulation that the stakeholder benefits depend on net profit, making the stakeholder benefits depend on the capital adjustment costs. Another important issue is the objective function of a stakeholder firm.

Looking at a slightly different model, we could assume that the management of the firm maximises (the present value of) a combination of the value of equity $-H(X_t, K_t)$ and a fraction of net profit considering also the adjustment cost, $c(F(K_t, \varepsilon_t) - G(I_t, K_t))$. This model would lead to the following optimality condition for investment

$$
\begin{aligned}
q \equiv \lambda_{tK} &= H_{X_t}(\cdot)(1 + (1-c)G_{I_t}) + cG_{I_t} \\
&= (\lambda_t - \lambda_{tB})(1 + (1-c)G_{I_t}) + cG_{I_t}
\end{aligned}
$$

The conclusions obtained from this model appear to be similar to the model presented above with additional complications from deriving a tractable regression equation. A similar model was used by Mykhayliv and Zauner (2013) to analyse private benefits of control in a transitional economy.

We could also consider a model where the stakeholder value is given by a fraction of the value of equity, $cH(X_t, K_t)$. In this case, the stakeholder parameter c would drop out of the optimization and we would be back to a model with financial frictions and shareholder value maximisation as in Hennessy et al. (2007). In addition, we could consider that the stakeholder value would be measured by a different function than $H(X_t, K_t)$, say, $S(X_t, K_t)$. In general, corporate investment would depend on the financial frictions, including convex cost of equity and stakeholder benefit and the precise specification of the trade-off between shareholder value and stakeholder value. These challenging issues and bringing the model to the data is left to future research.

5 | CONCLUSIONS

We consider the theoretical approaches to a firm's objective value function and its implication for firm's behaviour. Two different perspectives about the objective function of a firm are related to the shareholder society (e.g., Friedman (1970), Jensen and Meckling (1976)) and the stakeholder society (e.g., Tirole (2001), Magill et al. (2015)). The former, which focuses on maximising shareholder value, argues that the primary goal of a firm is to generate profits for its shareholders. The latter argues that the goal of a firm is to maximise the welfare of all stakeholders, for example, employees, suppliers, and so forth in their decision-making process. We investigate how these two perspectives are fashioned into corporate investment models under financial frictions and delves into the concept of stakeholder value as a potential approach to extending the theory of the firm in terms of the alternative objective function.

In the model we investigate the stakeholder benefits that are paid to stakeholders depend on net profit, that is, gross profit net of adjustment cost. In such a model, intuitively, the marginal cost of investment is lower for a stakeholder firm than a shareholder firm. This leads to the results that a stakeholder firm invests more than a shareholder firm and that investment is increasing in the stakeholder share unless the informational asymmetries modelled as cost of issuing equity are significant. Investigating different formulations of investment in a stakeholder firm as well as bringing the model to the data are left for future research.

ACKNOWLEDGEMENTS

We are very grateful to the Editors, an Associate Editor, two anonymous referees, Antonio Scrocco, Georgios Voucharas, Sławomir Śmiech, and the seminar audience of the Parallel Session 6 B at the 20th Annual European Economics and Finance Society Conference 2022 at the Cracow University of Economics in Kraków, Poland, for very helpful comments. All errors are our own.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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How to cite this article: Mykhayliv, D., & Zauner, K. G. (2024). On stakeholder theory and corporate investment under financial frictions. *International Journal of Finance & Economics*, 1–8. https://doi.org/10.1002/ijfe.2942