



HAL
open science

Tobin's Q and shareholder value: Does “shareholder return” impede investment?

Nicolas Piluso

► **To cite this version:**

Nicolas Piluso. Tobin's Q and shareholder value: Does “shareholder return” impede investment?. Review of Financial Economics, In press, <10.1002/rfe.1214>. <hal-04699405>

HAL Id: hal-04699405

<https://hal.science/hal-04699405v1>

Submitted on 16 Sep 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Copyright - All rights reserved

Nicolas Piluso

Université Toulouse 3 Paul Sabatier-Université Toulouse 2 Jean Jaures

CERTOP CNRS (UMR 5044)

Published in Review of financial Economics (august 2024):

<https://doi.org/10.1002/rfe.1214>



Tobin's Q and shareholder value: Does 'shareholder return' impede investment?

Abstract

Many economists have demonstrated that shareholder return constraints can negatively affect investment managers' decisions. While most studies are empirical, their findings are mixed. The real options literature provides a theoretical foundation for why a simple Net Present Value rule based on a firm's cost of capital could lead to either insufficient investment or excessive investment. This study analyzes how the pursuit of shareholder value impacts optimal investments using a Tobin's Q model in perfect competition. The study demonstrates that Tobin's Q, modified by shareholder constraints, can either hinder or promote optimal investment, thereby explaining the divergent results of empirical studies on this issue.

Keywords: firm beta, financialization, investment, EVA

JEL classification codes: E22. G10. G30. G50

1. Introduction

Economic literature extensively explores the link between financialization and investment dynamics. Stockhammer (2004) states that: “Financialisation is a recent term, still ill-defined, which summarises a broad range of phenomena including the globalisation of financial markets, the shareholder value revolution and the rise of incomes from financial investment.” Over a decade later, Davis (2017) confirms that “the definition of financialization remains nebulous and often varies substantially across papers.” She observes that in empirical literature, the term “summarizes a broad, wide-reaching process of structural change, and there is no a priori reason to expect all aspects of this phenomenon affect investment analogously.” In this study, we limit ourselves to the following definition of financialization: Entrepreneurs determine their we adopt a specific definition of financialization: Entrepreneurs base their productive investments on maximizing shareholder value rather than solely maximizing profit. This pursuit involves managers considering the minimum returns demanded by shareholders.

Many economists argue that shareholder return constraints lead to increased selectivity in investment and depress capital accumulation (Alvarez, 2015; Boyer, 2000; Cordonnier & Van de Velde, 2008; Davis, 2017, 2018). Empirical studies on this present diverse findings. Stockhammer (2004) presents empirical tests conducted using annual data from the non-financial business sectors of Germany, France, the UK, and the US. The results test the hypothesis that financialization (as defined) causes a slowdown in accumulation. Economists in the US, France, and the UK strongly support this hypothesis. Orhangazi (2008) obtains similar results by analyzing the impact of increased dividend payouts on real capital accumulation in the United States. Using data from a sample of non-financial corporations from 1973 to 2003, he finds a

negative relationship between real investment and shareholder value. The latter dries up the source of financing for productive investments and shortens the time horizon for managers' decisions. Additionally, Barradas (2017) estimates that financialization contributed to a slowdown in real investment of 1–8% before and after the crisis.

However, Rabinivitch's empirical study (2019) challenges these conclusions. What is termed "the financial turn of accumulation hypothesis" (that non-financial corporations (NFCs) have been increasingly engaged in financial accumulation to the detriment of productive investment) is not verified in his estimates. He demonstrates that in the USA, financial income (including dividends) has not grown significantly with the process of creating shareholder value since the 1980s and that productive investment has not declined but has taken more varied forms, such as internationalizing production or refocusing activities.

Finally, there is little or no theoretical model to explain the negative or positive relationship between shareholder value creation and the investment amount. How can we explain this divergence in results depending on the period and economic sector considered? This study aims to provide a theoretical explanation for this paradox.

Therefore, we analyze how the search for Economic Value Added (EVA) modifies Tobin's Q (Bolton, Chen, & Wang, 2022; Epaulard, 1993; Lin, Wang, Wang, & Yang, 2018; Reffeirs, 1995; Tobin, 1969), which is recognized as an important determinant of investment (Hayashi, 1982). In the standard Tobin's Q model, investment is the result of a profit-maximizing program. We aim to analyze the consequences of replacing the profit-maximizing program with a shareholder value-maximizing program: Does the optimal investment increase or decrease?

In this study, we do not consider market imperfections or the consequences of noisy information aggregation on investments (Albagli, Hellwig, & Tsyvinski, 2023). A huge body of literature on agency costs and investment suggests that "financialization," the focus on shareholder value, and

the use of high-power incentives have reduced inefficient investment. Lower capital accumulation can be optimal if the capital is unproductive (Akkemik & Özen, 2014). Friction can easily explain the sometimes positive and sometimes negative relationships between investment and shareholder value creation. However, our study examines the impact of shareholder value creation independent of competitive imperfections (moral hazard and asymmetric information, for instance).

We demonstrate that the negative effects of searching for value creation are not systematic. In Section 1, we discuss the calculation of EVA and its determinants. In Section 2, we substitute an EVA maximization program with a profit maximization program to compute Tobin's Q and interpret the results.

1.1. *The calculation of the EVA and the Tobin 'Q*

The objective of creating value for the shareholder implies generating a profit (net of financial charges) that is greater than the cost of the equity contribution; the shareholder will benefit from a gain as soon as the profits they receive are greater than the cost of the capital they have contributed to the firm. This is considered an opportunity cost. This is the return required *ex ante* by shareholders whose expectations deteriorate. The return required by shareholders is given by the fundamental equation of the CAPM.

Now, we write the value of a firm as the firm value net of investment costs:

$$V_0 = [EVA_t - I_t P_{it}]e^{-it} \quad (1)$$

under a constraint of capital accumulation:

$$\dot{K} = I - \Delta K \quad (2)$$

where I is the investment value, K represents capital depreciation, and P_{it} is the acquisition price of the investment good. If the discounted stream of the per-period EVA is positive, this satisfies

the shareholder value constraint.

At each period, the EVA net of investment cost is equal to:

$$EVA_t = \frac{1}{V} [P_t F(K_t, N_t) - W_t N_t - \varphi(I_t, K_t) P_{it} - I_t P_{it}] - (r_t + \beta_t \emptyset)$$

(3)

where V is equity value, r_t is the rate of return on risk-free assets, β_t is the firm's beta at period t , and \emptyset is the aggregate risk premium. Furthermore, P_t is the price of the goods produced by the firm; $F(K_t, N_t)$ is the production function whose arguments are the volume of capital K_t and the level of employment N_t , $W_t N_t$ is the wage bill; $\varphi(I_t, K_t)$ is a function of the cost of maintenance generated by the investment I_t , and P_{it} is the acquisition price of the investment good.

To endogenize a firm's beta, we follow Piluso and Colletis (2012). As productive investment is an irrevocable decision, the firm's beta on which the shareholder's return constraint depends can be written as follows:

$$\beta_t = \frac{\text{cov}(\frac{1}{V}[P_t F(K_t, N_t) - W_t N_t - \varphi(I_t, K_t) P_{it} - I_t P_{it}], r_M)}{\sigma_{r_M}^2} \quad (4)$$

Hence,

$$\beta_t = \frac{1}{V} \frac{[\text{cov}(P_t F(K_t, N_t) - W_t N_t, r_M) - \varphi(I_t, K_t) \text{cov}(P_{it}, r_M) - I_t \text{cov}(P_{it}, r_M)]}{\sigma_{r_M}^2} \quad (5)$$

We consider the prices of the investment good, P_{it} , and goods sold by the firm, P_t , as random variables and endogenize β concerning productive investment. Generally, an increase in investment lowers β and thus lowers the minimum return required by shareholders. This assumption aligns with the hypothesis proposed by Piluso and Colletis (2012), where φ increases with investment amount while covariance remains constant. For simplicity, we express this as:

$$\beta_t = \frac{1}{V} \frac{A - \varphi(I_t, K_t) B_t - I_t B_t}{\sigma_{r_M}^2} \quad (6)$$

The Hamiltonian that translates the firm's EVA maximization program is written as:

$$H(N_t, I_t, K_t, \rho_t) = [P_t F(K_t, N_t) - W_t N_t - \varphi(I_t, K_t) P_{it} - V_t \left(r_t + \frac{1}{V} \frac{A - \varphi(I_t, K_t) B_t - I_t B_t}{\sigma_{r_M}^2} \varphi \right) + \rho_t (I - \Delta K)] e^{it} \quad (7)$$

The first-order conditions give the following results:

$$\frac{\partial H}{\partial N} = P_t F'(K_t, N_t) - W_t N_t = 0 \quad (8)$$

$$\frac{\partial H}{\partial K} = \frac{\partial \rho e^{-it}}{\partial t} \quad (9)$$

$$\frac{\partial H}{\partial I} = 0 - \varphi'(I_t, K_t) P_{it} - P_{it} - \left(\frac{-\varphi'(I_t, K_t) B_t - B_t}{\sigma_{r_M}^2} \varphi \right) + \rho_t = 0 \quad (10)$$

Let us assume that $\varphi(I_t, K_t) = \frac{1}{2} \frac{C}{K} (I - \Delta K)^2$ with C as a constant (Hayashi, 1982).

$\varphi'(I_t, K_t)$ is the derivative of the function φ . Therefore, condition (14) can be rewritten as

$$(\Delta C - C \frac{I}{K}) P_{it} - P_{it} - \frac{\theta_t \varphi}{\sigma_{r_M}^2} \left((\Delta C - C \frac{I}{K}) B_t - B_t \right) + \rho_t = 0 \quad (11)$$

Thus:

$$\frac{I}{K} \left(-C P_{it} - \frac{\theta_t \varphi}{\sigma_{r_M}^2} C B_t \right) = P_{it} (1 - \Delta C) - \rho_t + \frac{\theta_t \varphi}{\sigma_{r_M}^2} (\Delta C B_t + B_t) \quad (12)$$

Thus, by simplifying C , we obtain the following:

$$\frac{I}{K} = \frac{P_{it} (\frac{1}{C} - \Delta) - \frac{\rho_t}{C} + \frac{\theta_t \varphi}{\sigma_{r_M}^2} (\Delta B_t + \frac{B_t}{C})}{\frac{\theta_t \varphi}{\sigma_{r_M}^2} B_t - P_{it}} \quad (13)$$

2. Discussion

In contrast to the original Tobin's Q model, it is evident that the numerator incorporates the term $\frac{\theta_t \phi}{\sigma_{r_M}^2} \left(\partial B_t + \frac{B_t}{C} \right)$, whereas the denominator introduces $\frac{\theta_t \phi}{\sigma_{r_M}^2} B_t$. The resultant value of Tobin's Q may fluctuate depending on the specific values of these parameters. From a theoretical perspective, we cannot assert *a priori* that shareholder value creation constraints uniformly reduce the optimal investment rate. If the double-restriction condition:

$$\frac{\theta_t \phi}{\sigma_{r_M}^2} \left(\partial B_t + \frac{B_t}{C} \right) B \geq \frac{\theta_t \phi}{\sigma_{r_M}^2} B_t > P_{it} \quad (14)$$

is satisfied, Tobin's Q increases relative to that derived from simple profit maximization. This scenario tends to stimulate productive investments by firms. Conversely, failure to meet this mathematical condition implies that the pursuit of shareholder value penalizes optimal investment, potentially elucidating the empirical findings of heterodox economists.

The key to the reasoning of this study is that considering the firm's beta in its investment decisions introduces an additional constraint that modulates optimal investment. Higher fixed costs in firm decisions increase operational and market risks. Consequently, shareholders increase their risk premiums, and the profitability constraint increases, thereby decreasing optimal investment. When investments involve high fixed maintenance costs, the firm's beta may increase, particularly when productive capital is high. In such scenarios, shareholder value creation tends to reduce optimal investment—a common outcome. Conversely, with short asset lifespans or negligible maintenance costs, the risk increase is minimal compared with productivity gains. Here, shareholder value creation might even encourage investment. Finally, this study suggests that the model explains why shareholder constraints occasionally do not

hinder investment.

3. Conclusion

Many empirical studies have demonstrated a negative correlation between “shareholder returns” and firm investment. This relationship is theoretically supported. This result can be explained by the relatively restrictive conditions required for a positive link between shareholder value and investment.

More precisely, our modeling of Tobin’s Q within the context of an EVA search demonstrates that the constraint of seeking to create shareholder value has uncertain effects on Tobin’s Q, which can increase or decrease owing to shareholder pressure. To achieve this result, we endogenize the firm’s beta, which influences the shareholder return constraint. Productive investment can increase under shareholder pressure if theoretical conditions are verified. Empirical work has shown that these conditions may or may not be fulfilled, depending on the periods and sectors considered.

A limitation of this study is that Tobin's Q is not the sole determinant of investments. We do not investigate the impact of shareholder value on other types of explanatory investment models. This issue could be explored in future studies. Furthermore, the perspectives offered in this study aim to determine the context in which our theoretical conditions for increased productive investment are realized.

Abbreviations

EVA – economic value added; NFCs – Non-Financial Corporations; CAPM – Capital Asset Pricing Model; ROE – Return on Equity

4. References

- Akkemik, K. A., & Özen, Ş. (2014). Macroeconomic and institutional determinants of financialisation of non-financial firms: Case study of Turkey. *Socio-Economic Review*, 12(1), 71–98. doi:[10.1093/ser/mwt006](https://doi.org/10.1093/ser/mwt006).
- Albagli, E., Hellwig, C., & Tsyvinski, A. (2023). Imperfect financial market and shareholder incentives in partial and general equilibrium. *Working Paper of Cowles Foundation for Research in Economics, Yale University*.
- Alvarez, I. (2015). Financialization, non-financial corporations and income inequality: The case of France. *Socio-Economic Review*, 13(3), 449–475. doi:[10.1093/ser/mwv007](https://doi.org/10.1093/ser/mwv007).
- Barradas, R. (2017). Financialisation and real investment in the European Union: Beneficial or prejudicial effects? *Review of Political Economy*, 29(3), 376–413. doi:[10.1080/09538259.2017.1348574](https://doi.org/10.1080/09538259.2017.1348574).
- Bolton, P., Chen, H., & Wang, N. (2022). A unified theory of Tobin' Q, corporate investment, Financing, and Risk Management. *Journal of Finance*, 66(5), 1545–1578.
- Boyer, R. (2000). Is a finance-led growth regime a viable alternative to Fordism? A preliminary analysis. *Economy and Society*, 29(1), 111–145. doi:[10.1080/030851400360587](https://doi.org/10.1080/030851400360587).
- Davis, L. (2018). Financialization, shareholder orientation and the cash holdings of US corporations. *Review of Political Economy*, 30(1), 1–27. doi:[10.1080/09538259.2018.1429147](https://doi.org/10.1080/09538259.2018.1429147).

- Davis, L. E. (2017). Financialization and investment: A survey of the empirical literature. *Journal of Economic Surveys*, 31(5), 1332–1358. doi:[10.1111/joes.12242](https://doi.org/10.1111/joes.12242).
- Epaulard, A. (1993). ‘L’apport du Q de Tobin à la modélisation de l’investissement en France. *Économie & Prévision*, 109(3), 1–12. doi:[10.3406/ecop.1993.5616](https://doi.org/10.3406/ecop.1993.5616).
- Hayashi, F. (1982). Tobin’s marginal q and average q: A neoclassical interpretation. *Econometrica*. The Econometric Society, 50(1), 213–224. doi:[10.2307/1912538](https://doi.org/10.2307/1912538).
- Lin, X., Wang, C., Wang, N., & Yang, J. (2018). Investment, Tobin’s Q, and interest rates. *Journal of Financial Economics*, 130(3), 620–640. doi:[10.1016/j.jfineco.2017.05.013](https://doi.org/10.1016/j.jfineco.2017.05.013).
- Orhangazi, O. (2008). Financialisation and capital accumulation in the non-financial corporate sector: A theoretical and empirical investigation on the US economy: 1973–2003. *Cambridge Journal of Economics*, 32(6), 863–886. doi:[10.1093/cje/ben009](https://doi.org/10.1093/cje/ben009).
- Piluso, N., & Colletis, G. (2012). Shareholder value and equilibrium rate of unemployment. *Economics Bulletin*, 32(4), 3233–3242.
- Rabinovich, J. (2019). The financialization of the non-financial corporation. A critique to the financial turn of accumulation hypothesis. *Metroeconomica*, 70(4), 738–775. doi:[10.1111/meca.12251](https://doi.org/10.1111/meca.12251).
- Reffeirs, V. (1995). Une mise en perspective des déterminants de l’investissement: Rôle du Q de Tobin sur la période 1972–1991. *Revue Economique*, 46(4), 1167–1187. doi:[10.3406/reco.1995.409727](https://doi.org/10.3406/reco.1995.409727).
- Stockhammer, E. (2004). Financialisation and the slowdown of accumulation. *Cambridge Journal of Economics*, 28(5), 719–741. doi:[10.1093/cje/beh032](https://doi.org/10.1093/cje/beh032).
- Tobin, J. (1969). A general equilibrium approach to monetary theory. *Journal of Money, Credit and Banking*, 1(1), 15–29. doi:[10.2307/1991374](https://doi.org/10.2307/1991374).

Tori, D., & Onaran, Ö. (2018). The effects of financialization on investment: Evidence from firm-level data for the UK. *Cambridge Journal of Economics*, 42(5), 1393–1416. doi:[10.1093/cje/bex085](https://doi.org/10.1093/cje/bex085).