

FEATURES

MONETARY POLICY, CORPORATE FINANCE AND INVESTMENT

SUMMARY OF BANCO DE ESPAÑA WORKING PAPER N° 1911

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Using almost 30 years of detailed firm-level data for the U.S. and U.K., we provide novel evidence on how monetary policy affects firm investment and finance. We find that relatively young firms paying no dividends are the most sensitive in terms of capital expenditures, and their response to interest rate changes drives the movement in aggregate investment. On the other hand, older firms (that pay dividends) don't respond at all. The main mechanism behind these results works through the heterogeneous exposure to asset price movements. Standard theories of firm dynamics allow for only a marginal role of age as a predictor of the response to shocks. We present an extension which can reconcile model and data.

Revisiting the transmission mechanism of monetary policy

The global financial crisis, and the years that followed, have seen a surge in the need to re-evaluate how monetary policy transmits to the real economy. The standard view within policy circles and macroeconomic research before the crisis assigned a key role to the inter-temporal transmission channel; i.e. the willingness of both households and firms to modify the path of consumption / savings / investment when the path of real interest rates changes. During the last 10 years, however, both empirical and theoretical studies have challenged this view. It is now understood that, among other aspects, the role of developments in credit markets, the heterogeneity in balance sheet positions, the type of debt instruments as well as the liquidity of assets are key elements in the transmission mechanism. While several empirical studies have looked at the household sector [for example, Cloyne *et al.* (2019), Wong (2019)], considerably less is known for firms.

In this paper, we use detailed, easily accessible balance sheet data for publicly traded firms from Compustat for the U.S. and WorldScope (Thomson Reuters) for the U.K. together with state of the art identification and estimation strategies, in order to uncover the

response of different groups of firms to monetary policy surprises. Importantly, although we only focus on public firms, these represent 50%-60% of aggregate business investment, and account for most of aggregate growth rates. We then argue, that a firm's age (or corporate history), coupled with information about the dividend payment status, is a more robust predictor of the dynamic response to a shock than standard proxies of "financial constraints", such as leverage, liquidity and size. The main channel of transmission operates through the heterogeneity in the type of debt contracts used by firms, and how assets (collateral) valuations affect firms differently.

Identifying monetary policy surprises

The first challenge we face is identifying and measuring unexpected and exogenous changes in monetary policy. Building on recent developments [Gurkaynak *et al.* (2005) and Gertler & Karadi (2015)], we first isolate a time series of monetary policy surprises by exploiting high-frequency variation in interest rate futures contracts within a 30 minute window around policy announcements. We then use this series of surprises as instrument for the reference rate when estimating the dynamic effect of monetary policy shocks on firms with different characteristics (age, leverage, size, liquidity, dividend payment status) using a local-projection, instrumental variable approach [see Jorda *et al.* (2017)].

The heterogeneous response of investment

Our estimations uncover a strong heterogeneity across firms. Younger firms exhibit the largest adjustment in investment, while older firms present a response which is small and not statistically different from zero. Delving deeper, we show that such heterogeneity is mainly driven by younger firms that have not paid dividends in the recent past (1-3 years), and we associate this with the "life-cycle" component of the dividend payment decision for a firm. Crucially, these findings survive after

	Younger		Older	
	No dividends	Paid dividends	No dividends	Paid dividends
U.S.	75.5%	6.7%	13.0%	4.8%
	[66.1 , 84.8]	[1.8 , 11.6]	[5.1 , 20.9]	[1.7 , 7.6]
U.K.	83.6%	13.1%	2.9%	0.4%
	[70.4 , 96.8]	[2.9 , 23.2]	[-2.2 , 8.1]	[-5.9 , 6.9]

NOTE: “younger” firms are those that, at the time in which the monetary surprise hits the economy, have less than 15 years of corporate experience since incorporation; “older” firms are those with more than 15 years of experience. The variable “paid dividends” refers to those firms that distributed positive dividends in the year previous to the period in which the monetary surprise arrives; “no dividends” is the complement of that group. The first row in each country represents the weighted share of the average IRF explained by the corresponding group; the second row presents 95% CI in square brackets, computed from 500 bootstrap repetitions accounting for clustering at the firm level.

accounting for traditional measures of balance sheet position and financial constraints, such as asset size, liquidity, leverage or growth potential.

The above results on the average and heterogeneous investment responses, together with the response estimated from national accounts information, allow us to infer the contribution by each group of firms to the dynamic effect of a monetary policy shock on aggregate investment. These calculations are presented in Table 1: younger firms paying no dividends account for around 75% of the overall response of the economy; interestingly, this finding is very similar for both the U.S and the U.K.

Exploring the mechanism: exposure to asset value fluctuations

In order to understand the mechanisms that can explain the heterogeneity results we have uncovered, we explore several other components of the firm’s balance sheet, as well as the structure and sources of finance and how these might differ by group of firms.

We first analyze cash-flows, and find that interest rate expenses, earnings and sales all respond significantly. However, they do so homogeneously for all firms. This implies that, although the availability of disposable liquidity after the shock could affect investment decisions, it cannot *by itself* account for the observed heterogeneity in investment.

We then show that the net worth / equity valuation of *all* firms is also significantly affected by monetary policy shocks, consistent with a general equilibrium effect

of monetary policy. Interestingly, though, borrowing *only* responds significantly for younger firms (paying no dividends). We argue, and provide evidence for, that this combination of dynamic responses can be explained by the different types of debt contracts that young and old firms have access to. As shown by Lian & Ma (2019), a significant share of the debt contracts are written against the earnings history of the firm, rather than against physical collateral. We find that this is particularly so for older firms (that pay dividends), while younger firms are usually required to provide some type of collateral. This is in line with the traditional view in policy and academic circles regarding the role of collateral and learning in addressing credit market frictions and information asymmetries. As a final step in this project, we provide a quantitative theory that can rationalize our results along the lines described here.

Final remarks

The main contribution of this project is to provide novel evidence on the behavior of different firms following a monetary policy surprise. This is part of a broader and recent trend to reassess the monetary policy transmission mechanism. The fact that a significant share of aggregate fluctuations is accounted for by movements in business investment, implies it has become even more pressing to exploit granular data to inform both models and policy decisions. Standard theories of firm and industry dynamics, in a context with credit frictions, have difficulties in assigning an important role to a firm’s age (or corporate history) in understanding the response to shocks. We contribute on this front too, by providing an intuitive model mechanism that can reconcile theory with data.

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