

Asymmetric Effects of Firm Investment Determinants: Evidence from Post-Transformation Economies*

Klára BAKOVÁ - Department of Finance, Faculty of Business and Economics, Mendel University, Brno, Czech Republic

Svatopluk KAPOUNEK - Department of Finance, Faculty of Business and Economics, Mendel University, Brno, Czech Republic (kapounek@mendelu.cz)
corresponding author

Abstract

The paper investigates asymmetric effects of liquidity and profitability on the investment behavior of publicly traded firms in post-transformation economies. We show that firms in post-transformation economies face more restrictive access to external sources of funds stemming from underdeveloped capital markets. We confirm that management of firms uses free cash flow to increase firm investment activities. On the contrary, liquidity decreases do not affect investment decision making processes of firms. We also confirm positive effects of increasing profitability and negative effects of decreasing profitability on the firm investment behavior. However, our results are robust only for the firms with financial leverage reported between 1 % and 50 %. Investment behavior of over indebted firms and low indebted firms is affected mostly by aggregate economic activity.

1. Introduction

Firm investment behavior is traditionally affected by macroeconomic fundamentals (Vermeulen, 2002; Maçãs Nunes et al., 2012; Gilchrist et al., 2007) and firm specific conditions (Fazzari et al., 1988; Vermeulen, 2002; Aivazian et al., 2005). There are numerous determinants of firm investment behavior at a firm level but certain financial indicators prevail. The recent literature emphasizes the effects of cash flow (Fazzari et al., 1988; Lewellen and Lewellen, 2016), profitability (Martínez-Carrascal and Ferrando, 2008; Pacheco, 2017) and leverage (Lang et al., 1996; Aivazian et al., 2005; Vinh Vo, 2019).

We contribute to this stream of literature in several ways. First, we provide empirical analysis of firm investment behavior in post-transformation economies where capital markets are still not well developed and publicly traded firms are assumed to face more restrictive access to external sources of funds. We show that the financial constraints of firms stemming from the weak financial conditions on the microeconomic level, in particular use of financial leverage.

Second, we use rich microeconomic data and focus on asymmetric effects of firm investment determinants that allow us to group firms endogenously according to their financial investment constraints. We show positive effects of increasing cash flow on

* We appreciate comments from two anonymous reviewers, Jarko Fidrmuc, Jan Hanousek, Zuzana Kučerová, and Evžen Kočenda. This research was funded by the Czech Science Foundation via grant No. 19-22488S "Interactions between the financial sector and the real economy."

investment behavior due to the wedge between the cost of internal and external funds or overspending internally available funds. However, these effects are not significant when cash flow is decreased. On the contrary, firm profitability (measured by ROA) affects investment behavior in both situations (increasing and decreasing returns).

Third, our results confirm that firm investment behavior of companies is significantly affected by financial leverage. We show that both groups of low-debt firms and most indebted companies are affected mostly by macroeconomic fundamentals, especially economic activity, instead of firm specific financial constraints.

The paper is organized as follows. Section 2 contains literature review concerning on the determinants of investments. A detailed overview of methods and data is provided in the Section 3. Section 4 presents the results of empirical models. Robustness analyses are presented in the Section 5 and the Section 6 concludes.

2. Literature Review

Modigliani and Miller (1958) explain two separate and independent processes, financial and investment decisions. They assume perfect capital market with internal and external funds as substitutes but they consider also imperfections stemming from information asymmetry, transaction costs, financial constraints, agency problem or taxation. These imperfections have to be solved by financial restrictions generating financial investment constraints.

There are several streams of literature investigating financial investment constraints determining firm investment behavior. The first stream of literature focuses on the relationship between investments and cash flow (Fazzari et al., 1988; Fazzari and Petersen, 1993; Kaplan and Zingales, 1997; Vermeulen, 2002; Lewellen and Lewellen, 2016). The second stream provide detailed analyses of financial constraints represented mostly by liquidity, profitability and indebtedness (Martínez-Carrascal and Ferrando, 2008; Vermeulen, 2002; Gebauer et al., 2017). The third stream of literature analyses impact of macroeconomic fundamentals, especially economic activity (Vermeulen, 2002; Maçãs Nunes et al., 2012) and interest rate (Maçãs Nunes et al., 2012; Gilchrist et al., 2007).

There are numerous empirical contributions considering cash flow as a robust early warning bankruptcy indicator and the main determinant of investments behavior, especially in SMEs (Gertler and Gilchrist, 1994; Petersen and Rajan, 1995; Oliveira and Fortunato, 2006). There is also robust evidence that corporate managers use free cash flow as financial source for investments (Vinh Vo, 2019). Moreover, cash flow is considered as a liquidity indicator (Fazzari et al., 1988; Lang et al., 1996; Vermeulen, 2002; Martínez-Carrascal and Ferrando, 2008; Pacheco, 2017).

Lewellen and Lewellen (2016) emphasize the wedge between the cost of internal and external funds. Their results show that the role of cash flow, as a firm investment activity determinant, is more important in time of restrictive access to external sources of funds. This study follows theoretical argumentation explaining impact of information asymmetry on external funding costs (Fazzari et al., 1988; Fazzari and Petersen, 1993 or Maçãs Nunes et al., 2012). Moreover, lagged cash flow indirectly leads to higher level of investments through growth expectation of management about future cash flow.

Compared to cash and the other indicators, there is no general agreement about the role of finance leverage in firm investment behavior. Lang et al. (1996) present negative effects of financial leverage on firm investment behavior. The similar results were confirmed also by Aivazian et al. (2005) or Vinh Vo (2019). However, Hernando and Martinez-Carrascal (2008), Goretti and Souto (2013) and Gebauer et al. (2017) point out non-linear and asymmetric effects of financial leverage on the firm investment behavior. They confirm significant negative impact of financial leverage over specific thresholds or highly indebted firms. Such firms use assets inefficiently or starve slowly to deaths and its asset is fully wasted (Firdmuc et al., 2017). On the contrary, low levels of financial leverage have no negative effects of the firm investment behavior and positive effects prevail (Modigliani and Miller, 1963; Grossman and Hart, 1982; Gebauer et al., 2017). However, there are still numerous empirical studies remaining impact of financial leverage on the firm investment behavior uncertain (Vermeulen, 2002; Firth et al., 2008). Vermeulen (2002) includes variety of balance sheet indicators (especially financial leverage, liquidity and profitability) and describes diverse effects of financial accelerator separately for small and large firms in the euro area.

There is also significant body of literature describing macroeconomic fundamentals as the main drivers of firm investment behavior. Vermeulen (2002) confirms that the financial position of firm is more important in recession periods. The economic downturn makes capital markets to be more restrictive and external capital becomes more expensive. On the other hand, Maças Nunes et al. (2012) describes decrease in cash flow resulting from sales decreases.

The traditional approach addressing financial constraints of firms and macroeconomic development was introduction as the so-called financial accelerator described by Bernanke and Gertler (1995). They emphasize the effect of interest rates on investments and generally borrowing costs over different business cycle. These effects are evident also in post-transformation economies (Firdmuc et al., 2010).

Moreover, interactions between the real and financial sector are influenced not only by bank-firm relationships but also by institutional factors (banks receive informal information and signals related to the firms' distress), especially in transition and emerging market economies where new institutions were created (Firdmuc et al., 2017; Kapounek, 2017). In short, in times of economic turmoil, the bank-firm relationship is affected particularly by legal protection of creditors (Fernández et al., 2013), increasing information asymmetries (Beltran et al., 2017), moral hazard (Antzoulatos and Tsoumas, 2014; Duran and Lozano-Vivas, 2015) and bank competition (Fungáčová et al., 2014).

3. Data and Methods

We use annual microeconomic data of publicly traded firms (569 firms and 2,909 observations) in the all Visegrad Countries (V4 Countries, namely Czech Republic, Hungary, Poland, and Slovakia) in the period 2009–2018 (provided by Bureau van Dijk, Orbis database). We follow recent literature (e.g. Martínez-Carrascal and Ferrando, 2008; Gebauer et al., 2017) and define investments as an increasing value of capital expenditure (book value of fixed assets) including depreciation. We also include cash flow, ROA and financial leverage (long-term debt

to total assets). Moreover, we control for macroeconomic fundamentals, especially aggregate demand represented by economic activity (index of GDP) and borrowing costs represented by money market interest rates (3-month interbank offer rate). Relevant time series (investments and cash flow) are stationarized by percentage changes. The detailed descriptive statistics are reported in the Table A1. We also do not find multicollinearity among the analyzed variables (see cross-correlation matrix in the Table A2).

We employ OLS fixed effects estimator and identify determinants of investment behavior ($INV_{i,t}$) in the firm i and at time t :

$$INV_{i,t} = c + \beta_1 CF_{i,t} + \beta_2 ROA_{i,t} + \beta_3 IR_{c,t} + \beta_4 GDP_{c,t} + \theta_t + \gamma_i + \varepsilon_{i,t} \quad (1)$$

where $CF_{i,t}$ represents cash flow as a liquidity proxy, ROA is ratio of profit/loss to total assets, borrowing costs ($IR_{c,t}$) and aggregate demand represented by GDP ($GDP_{c,t}$) in country c . We also include fixed effects (γ_i), time effects (θ_t) and heteroscedastic residual ($\varepsilon_{i,t}$). In the next step we analyze asymmetric effects of cash flow and ROA changes. We follow Allison (2018) and decompose effects of positive and negative changes of cash flow

$$\begin{aligned} CF_{i,t}^{positive} &= CF_{i,t} \text{ if } CF_{i,t} > 0 \\ CF_{i,t}^{negative} &= -CF_{i,t} \text{ if } CF_{i,t} < 0 \end{aligned} \quad (2)$$

and ROA:

$$\begin{aligned} ROA_{i,t}^{positive} &= ROA_{i,t} \text{ if } ROA_{i,t} > 0 \\ ROA_{i,t}^{negative} &= -ROA_{i,t} \text{ if } ROA_{i,t} < 0. \end{aligned} \quad (3)$$

Finally, we investigate asymmetric impact of financial leverage in our robustness check. Financial leverage is measured as a ratio of long-term debt to total assets. Robustness of our results is also supported by additional analysis of lagged cash flow and ROA (Martínez-Carrascal and Ferrando, 2008; Gebauer et al., 2017; Ferrando et al., 2017; Pacheco, 2017). Moreover, we check for robustness of our results within different country groups.

4. Results

Our analysis is divided into three steps. First, we show baseline regressions of the firm investment behavior (Table 1) including firm specific factors (liquidity represented by cash flow and profitability) and macroeconomic environment (aggregate demand and borrowing costs). Second, we provide extended models and identify asymmetric effects of liquidity and profitability (Table 2). Third, we analyze the asymmetric effects separately in relation to different level of financial leverage (Table 3).

Our first results confirm recent empirical studies, especially positive effects of liquidity represented by cash flow on firm investment behavior (Table 1). We show that firm managers in post-transformation economies use free cash to increase investments, similarly to firm management in countries where capital markets are developed. Our results also confirm positive and significant impact of profitability on investments. The positive effects of liquidity and profitability are stable even when we include macroeconomic fundamentals (aggregate demand and borrowing costs). As the first robustness check we include lagged cash flow and ROA (see Appendix, Table A3). In comparison with our baseline regressions (Table 1), we do not identify significant impact of lagged profitability (by one year) on firm investment behavior. On the contrary, stable liquidity creation (lagged cash flow) forms positive expectations of firm management and increase investment activity regardless of borrowing costs. However, effects of aggregate demand remain positive and significant (Table A3).

Table 1 Baseline Regression Models of Firm Investment Behavior

Variables	(1)	(2)	(3)	(4)	(5)
	<i>dependent variable: firm investments (annual changes in %)</i>				
ΔCF	0.024** (0.004)				0.017* (0.006)
ROA		0.045*** (0.006)			0.042*** (0.005)
ΔIR			-0.106*** (0.013)		-0.085** (0.022)
GDP (index)				0.700** (0.195)	1.525*** (0.239)
Constant	3.120*** (0.039)	3.227*** (0.038)	3.587*** (0.016)	-4.402 (2.159)	-13.690** (2.644)
Fixed effects	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes
Observations	1754	2897	2909	2909	1750
R ²	0.067	0.061	0.067	0.061	0.111
Number of firms	571	804	807	807	569

Notes: The reported coefficients are obtained from regression of the firm investment annual percentage changes estimated with OLS fixed effects estimator. Robust standard errors are reported in parentheses. *** indicates significance at the 1 % level, ** at the 5 % level, and * at the 10 % level.

Source: Own computation.

In the next step we provide detailed analysis of asymmetric effects of liquidity and profitability on the firm investment behavior (Table 2). Our results confirm significant positive effects of increasing cash flow. These results are in line with the Free Cash Flow theory and confirm tendency of firm management using free cash flow for their investment activities. On the contrary, liquidity decreases do not affect investment decision making processes of the firms in post transition economies. We

also confirm positive effects of increasing profitability and negative effects of decreasing profitability on the firm investment behavior. All the presented models show robust negative effects of borrowing costs and positive effects of aggregate demand represented by short-term interest rates and economic activity.

Table 2 Asymmetric Effects of Cash Flow and ROA

Variables	(1)	(2)	(3)	(4)	(5)
	<i>dependent variable: firm investments (annual changes in %)</i>				
$\Delta CF^{positive}$	0.021*** (0.001)				0.018** (0.005)
$\Delta CF^{negative}$	-0.031 (0.015)				-0.015 (0.026)
$ROA^{positive}$		0.057** (0.017)			0.033* (0.013)
$ROA^{negative}$		-0.039** (0.009)			-0.047** (0.014)
ΔIR			-0.106*** (0.013)		-0.086** (0.023)
GDP				0.700** (0.195)	1.535*** (0.230)
<i>Constant</i>	3.127*** (0.045)	3.149*** (0.071)	3.587*** (0.016)	-4.402 (2.159)	-13.746** (2.593)
<i>Fixed effects</i>	Yes	Yes	Yes	Yes	Yes
<i>Time effects</i>	Yes	Yes	Yes	Yes	Yes
<i>Observations</i>	1754	2897	2909	2909	1750
R^2	0.067	0.061	0.067	0.061	0.111
<i>Number of firms</i>	571	804	807	807	569

Notes: The reported coefficients are obtained from regression of the firm investment annual percentage changes estimated with OLS fixed effects estimator. Robust standard errors are reported in parentheses. *** indicates significance at the 1 % level, ** at the 5 % level, and * at the 10 % level.

Source: Own computation.

Finally, we focus on differences between low and highly indebted firms. Therefore, we split our data sample into three subsamples according to the financial leverage level (Table 3). The first model includes debt-free or low indebted firms (financial leverage below 1 %), the second model covers firms with optimal leverage (it is generally agreed by thresholds between 1 % to 50 %) and the third model presents regression coefficients of highly or over indebted firms (more than 50 % of financial leverage). We show that liquidity and profitability affect firm investment behavior only in case of firms with optimal financial leverage. However, our results are robust only for the firms which report financial leverage between 1 % and 50 %. Investment behavior of over indebted firms and low indebted firms is affected only by aggregate economic activity. The results indicate that low leveraged firms rely more on their own funds and favorable economic conditions.

Table 3 Impact of Financial Leverage

	(1)	(2)	(3)
	<i>dependent variable: firm investments (annual changes in %)</i>		
<i>Variables</i>	<i>Fin lev < 1 %</i>	<i>1 % ≤ Fin lev < 50 %</i>	<i>Fin lev ≥ 50 %</i>
$\Delta CF^{positive}$	0.028 (0.089)	0.027*** (0.002)	0.449 (0.477)
$\Delta CF^{negative}$	-0.024 (0.155)	-0.006 (0.003)	-0.041 (0.027)
$ROA^{positive}$	0.007* (0.002)	0.052* (0.019)	-0.162 (0.118)
$ROA^{negative}$	-0.051 (0.040)	-0.042* (0.016)	-0.061 (0.034)
ΔIR	-0.079* (0.029)	-0.087*** (0.013)	0.003 (0.168)
GDP	1.933** (0.517)	1.306*** (0.172)	2.527* (0.896)
<i>Constant</i>	-18.771** (5.712)	-10.831** (1.977)	-25.903* (9.951)
<i>Fixed effects</i>	Yes	Yes	Yes
<i>Time effects</i>	Yes	Yes	Yes
<i>Observations</i>	574	1104	72
R^2	0.131	0.105	0.087
<i>Number of firms</i>	257	405	39

Notes: The reported coefficients are obtained from regression of the firm investment annual percentage changes estimated with OLS fixed effects estimator. The regressions were estimated for a subsample of firms according to the financial leverage in the reported year. Robust standard errors are reported in parentheses. *** indicates significance at the 1 % level, ** at the 5 % level, and * at the 10 % level.

Source: Own computation.

5. Robustness Analysis

We provide robustness analysis with respect to different macroeconomic and institutional environment, especially capital markets development. Thus, we split our sample into 4 subsamples covering specific Visegrad countries: (1) Hungary, Poland and Slovakia, (2) Czech Republic, Hungary and Poland, (3) Czech Republic, Poland and Slovakia, and (4) Czech Republic, Hungary and Slovakia (Table 4). We confirm positive effects of liquidity and negative effects of profitability in three subgroups. The results of our robustness analysis approved the previous conclusions mostly for publicly traded firms in Poland. We consider that the fourth subgroup covering firms from Czech Republic, Slovakia and Hungary is relatively small and heterogeneous.

Table 4 Regressions by Country Groups

	(1)	(2)	(3)	(4)
<i>Variables</i>	<i>PL, SK, HU</i>	<i>PL, CZ, HU</i>	<i>CZ, PL, SK</i>	<i>CZ, SK, HU</i>
ΔCF <i>positive</i>	0.020** (0.003)	0.019* (0.005)	0.019** (0.004)	-0.043 (0.051)
ΔCF <i>negative</i>	-0.016 (0.028)	0.001 (0.005)	-0.013 (0.027)	-0.190* (0.064)
ROA <i>positive</i>	0.027* (0.008)	0.037 (0.016)	0.028 (0.010)	0.081 (0.047)
ROA <i>negative</i>	-0.052** (0.010)	-0.053** (0.009)	-0.048* (0.014)	0.030 (0.042)
ΔIR	-0.085* (0.025)	-0.087* (0.026)	-0.099*** (0.005)	-0.005 (0.088)
GDP	1.379** (0.234)	1.675** (0.242)	1.533** (0.253)	1.470 (1.779)
<i>Constant</i>	-11.967** (2.585)	-15.168** (2.779)	-13.614** (2.846)	-14.523 (20.148)
<i>Fixed effects</i>	Yes	Yes	Yes	Yes
<i>Time effects</i>	Yes	Yes	Yes	Yes
<i>Observations</i>	1700	1588	1663	299
R^2	0.107	0.122	0.114	0.077
<i>Number of firms</i>	558	513	547	89

Notes: The reported coefficients are obtained from regression of the firm investment annual percentage changes estimated with OLS fixed effects estimator. Robust standard errors are reported in parentheses. *** indicates significance at the 1 % level, ** at the 5 % level, and * at the 10 % level.

Source: Own computation.

6. Conclusions

The paper investigates determinants of firm investment behavior in the selected post-transformation economies (Czech Republic, Hungary, Poland and Slovakia). We show that post-transformation economies are negatively affected certain financial constraints of publicly traded companies stemming from underdeveloped capital markets. Thus, these firms face more restrictive access to external sources of funds and firm management uses free cash flow to increase firm investment activities.

We provide empirical evidence of significant positive impact of cash flow increasing on the firm investment activity. However, we show that decreasing cash flow do not affect firm investment behavior. On the contrary, liquidity decreases do not affect investment decision making processes of the firms. We also confirm positive effects of increasing profitability and negative effects of decreasing profitability on the firm investment behavior. All the presented models show robust negative effects of borrowing costs and positive effects of aggregate demand represented by short-term interest rates and economic activity.

Moreover, we provide detailed analysis of financial leverage. We show robustness of the previous results only in case of firms with financial leverage between 1 % and 50 %, which is generally considered as an optimal level of the financial leverage. On the contrary, investment behavior of highly or over indebted firms is affected only by aggregate demand represented by aggregate economic activity. Investment behavior of zero-debt firms and low indebted firms is affected by aggregate demand, borrowing costs and profitability. Our results confirm that low leveraged firms rely more on their own funds and favorable economic conditions.

APPENDIX

Table A1 Descriptive Statistics

Variable	n	Mean	S.D.	Min	0.25	Median	0.75	Max
Δ Investments	2909	3.55	5.18	0	0	0	6.17	19.97
Δ Cash flow	1754	-0.18	5.59	-142.84	-0.43	-0.03	0.24	86.19
ROA	2897	2.02	12.18	-88.16	-0.76	2.95	7.19	85.09
Δ IR	2909	2.16	4.55	-1.11	-0.88	0.48	1.29	11.55
GDP (index)	2909	10.79	0.76	8.94	10.08	11.17	11.18	12.96

Notes: All regressors are reported after transformations.

Source: Own computation.

Table A2 Cross-Correlation Matrix

Variable	Δ Investments	Δ Cash flow	ROA	Δ IR	GDP (index)
Δ Investments	1.000				
Δ Cash flow	0.055	1.000			
ROA	0.128	0.065	1.000		
Δ IR	-0.093	0.005	-0.036	1.000	
GDP (index)	-0.022	-0.047	-0.054	0.250	1.000

Notes: All regressors are reported after transformations.

Source: Own computation.

Table A3 Impact of Lagged Variables

Variables	(1)	(2)	(3)	(4)	(5)
ΔCF_{t-1}	0.107*** (0.007)				0.089*** (0.006)
ROA_{t-1}		0.046** (0.009)			0.012 (0.011)
ΔIR			-0.102*** (0.013)		-0.066 (0.033)
GDP				0.666** (0.195)	1.523** (0.302)
Constant	3.053*** (0.037)	2.994*** (0.035)	3.580*** (0.017)	-4.029 (2.154)	-13.733** (3.392)
Fixed effects	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes
Observations	1103	1769	2864	2864	1102
R^2	0.054	0.073	0.067	0.062	0.095
Number of firms	421	568	787	787	421

Notes: The reported coefficients are obtained from regression of the firm investment annual percentage changes estimated with OLS fixed effects estimator. Robust standard errors are reported in parentheses. *** indicates significance at the 1 % level, ** at the 5 % level, and * at the 10 % level.

Source: Own computation.

REFERENCES

- Aivazian VA, Ge Y, Qiu J (2005): The Impact of Leverage on Firm Investment: Canadian Evidence. *Journal of Corporate Finance*, 11(1–2): 277–291.
- Antzoulatos AA, Tsoumas C (2014): Institutions, Moral Hazard and Expected Government Support of Banks. *Journal of Financial Stability*, 15: 161–171.
- Beltran DO, Cordell L, Thomas CP (2017): Asymmetric Information and the Death of ABS CDOs. *Journal of Banking & Finance*, 76: 1–14.
- Bernanke BS, Gertler M (1995): Inside the Black Box: The Credit Channel of Monetary Policy Transmission. *The Journal of Economic Perspectives*, 9(4): 27–48
- Duran MA, Lozano-Vivas A (2015): Moral Hazard and the Financial Structure of Banks. *Journal of International Financial Markets, Institutions and Money*, 34: 28–40.
- Fazzari S, Hubbard RG, Petersen B (1998): Financing Constraints and Corporate Investment. *Brookings Papers on Economic Activity*, 1: 141–195
- Fazzari S, Petersen B (1993): Working Capital and Fixed Investment: New Evidence on Financing Constraints. *The RAND Journal of Economics*, 24(3): 328–342.
- Fernández AI, González F, Suárez N (2013): How Do Bank Competition, Regulation, and Institutions Shape the Real Effect of Banking Crises? International evidence. *Journal of International Money and Finance*, 33: 19–40.
- Fidrmuc J, Horváth R, Horváthová E (2010): Corporate Interest Rates and the Financial Accelerator in the Czech Republic. *Emerging Markets Finance & Trade*, 46(4): 41–54.
- Fidrmuc J, Kapounek S, Siddiqui M (2017): Which Institutions Are Important for Firms Performance? Evidence from Bayesian Model Averaging Analysis. *Panoeconomicus*, 64(4): 383–400.
- Firth M, Lin Ch, Wong SML (2008): Leverage and Investment under a State-Owned Bank Lending Environment: Evidence from China. *Journal of Corporate Finance*, 14(5): 642–653.
- Fungáčová Z, Solanko L, Weill L (2014): Does Competition Influence the Bank Lending Channel in the Euro Area? *Journal of Banking & Finance*, 49: 356–366.
- Gebauer S, Setzer R, Westphal A (2017): Corporate Debt and Investment: a Firm Level Analysis for Stressed Euro Area Countries. *European Central Bank Working paper series*, WP/ 2101.
- Gertler M, Gilchrist S (1994): Monetary Policy, Business Cycles, and the Behavior of Small Manufacturing Firms. *The Quarterly Journal of Economics*, 109(2): 309–340.
- Gilchrist S, Zakrajsek E (2007): Investment and the Cost of Capital: New Evidence from the Corporate Bond Market. *NBER Working Paper*, WP/ 13174
- Goretti M, Souto M (2013): Macro-Financial Implications of Corporate (De)Leveraging in the Euro Area Periphery. *IMF Working Paper*, WP 13/154.
- Grossman SJ, Hart OD (1982): Corporate Financial Structure and Managerial Incentives. *NBER Chapters*, in: *The Economics of Information and Uncertainty*, 107–140
- Hernando I, Martínez-Carrascal C (2008): The Impact of Financial Variables on Firm's Real Decisions: Evidence from Spanish Firm-Level Data. *Journal of Macroeconomics*, 30(1): 543–561.
- Kaplan SN, Zingales L (1997): Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financial Constraints? *Quarterly Journal of Economics*, 112: 159–216.
- Kapounek S (2017): The Impact of Institutional Quality on Bank Lending Activity: Evidence from Bayesian Model Averaging. *Czech Journal of Economics and Finance (Finance a uver)*, 67(5): 372–395.
- Lang L, Ofek E, Stulz R (1996): Leverage, Investment, and Firm Growth. *Journal of Financial Economics*, 40: 3–29.
- Lewellen J, Lewellen K (2016): Investment and Cash Flow: New Evidence. *Journal of Financial and Quantitative Analysis*, 51: 1135–1164.

- Maças Nunes P, Mendes S, Serrasqueiro Z (2012): SMEs' Investment Determinants: Empirical Evidence Using Quantile Approach. *Journal of Business Economics and Management*, 13: 866–894.
- Martínez-Carrascal C, Ferrando A (2008): The Impact of Financial Position on Investment: An Analysis for Non-Financial Corporations in the Euro Area. *European Central Bank Working paper series*, WP/ 943.
- Modigliani F, Miller MH (1958): The Cost of Capital, Corporation Finance, and the Theory of Investment. *The American Economic Review*, 48(3): 261–297.
- Modigliani F, Miller MH (1963): Corporate Income Taxes and the Cost of Capital: A Correction. *American Economic Review*, 53: 433–443.
- Oliveira B, Fortunato A (2006): Firm Growth and Liquidity Constraints: A Dynamic Analysis. *Small Business Economics*, 27(2/3): 139–156.
- Pacheco L (2017): Investment Determinants at the Firm-Level: the Case of Portuguese Industrial SMEs. *International Journal of Business Science and Applied Management*, 12(1): 1–17
- Petersen MA, Rajan RG (1995): The Effect of Credit Market Competition on Lending Relationships. *The Quarterly Journal of Economics*, 110(2): 407–443
- Vermeulen P (2002): Business Fixed Investment: Evidence of a Financial Accelerator in Europe. *Oxford Bulletin of Economics and Statistics*, 64: 213–231.
- Vinh Vo X (2019): Leverage and Corporate Investment – Evidence from Vietnam. *Finance Research Letters*, 28: 1–5.