Firm Performance and (Foreign) Debt Financing before and during the Crisis: Evidence from Firm-Level Data

This paper finds that foreign debt financing improved firm performance and mitigated the adverse effects of leverage for moderately leveraged firms in Slovenia before and during the recent crisis.

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Abstract

We study the effects of financial leverage and foreign financing on firm performance before and during the recent crisis, using a large panel of Slovenian companies. We find a significant negative impact of leverage on firm performance, even when we explicitly control for the reverse causality between the two variables. The negative effect, albeit weaker, persists also in the crisis period. Firms with some foreign debt performed better on average than firms relying only on domestic financing. At the same time, they suffered a stronger decrease in performance if their total leverage increased. Moreover, when we explicitly control for the amount of foreign financing, we find that it has a positive and highly significant effect on firm performance. The significant positive effect of foreign financing in the pre-crisis period seems to be entirely driven by privately owned firms, while the effects are negative for the state owned companies. During the crisis, the effects are positive but insignificant for both ownership types. Finally, when comparing domestic and foreign owned firms, we see no substantial variation in the coefficients.

Keywords: Leverage, foreign leverage, firm performance, instrumental variable, panel data, crisis

JEL codes: F34, G15, G24, H63

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1 Introduction

In the run-up to the recent financial and economic crisis, firms leveraged up in many European countries as a result of reduced global uncertainty and loose financing conditions. This surge in corporate leverage was supported by increased financial integration and thus amplified cross-border lending, both on the interbank market and directly to corporates. With the onset of the crisis, these financial flows first stopped and then reversed, leaving firms with a limited possibility for obtaining new financing and revolving loans.[1] Some firms were able to substitute domestic loans with direct foreign loans, while others suffered from a sudden stop of foreign funds.

In this paper, we investigate how leverage and access to foreign debt financing affects firm performance, and whether this relation changed over the recent business cycle. Generally, most empirical studies find a negative relation between firm performance and firm leverage, defined as debt to equity or debt to total assets.[2] Theoretical literature, however, suggests that the relation could be of any sign. High debt relative to equity may improve firms' performance as it resolves managerial incentive problems and lowers taxable income. Issuing debt is also cheaper than issuing equity in terms of transaction costs. At the same time, debt overhang can worsen firms' performance due to underinvestment, higher costs of financial distress and a tendency toward riskier projects.

In the first part, we add to the existing literature by estimating how the effects of financial leverage on firm performance changed in the recent crisis, compared to the pre-crisis period, using a large panel of Slovenian firms covering the period from 2001 to 2013. Some of the previous papers tackling this topic are Clarke, Cull, and Kisunko (2012), Medina (2012) and Wu (2012) for the recent crisis and Claessens, Djankov, and Xu (2000) for the Asian crisis in the 1990s. Compared to these studies, our dataset covers a wider range of firm types in terms of ownership, sector and size, allowing us to study the effects of financing choices on firm performance for a more general population of firms. We include in our sample all public, private domestic and foreign-controlled non-financial corporations that had all the necessary data available.[3]

In the second part, we focus on how *foreign* debt financing affects firm performance. Previous studies found the effect to be postitive, while mostly working with samples, where they could only analyse the effects of presence of foreign bank subsidiaries in the country (Giannetti and Ongena, 2009) or look at the effect of issuing bonds in the international markets (Ghosh, 2008; Harvey, Lins, and Roper, 2004). Since Slovenia is a small open economy with a significant portion of debt financing coming from abroad, and our panel of firms includes detailed financial

[1] Underlying reasons range from weakness of the banking sector to reasons related to firms, including the lack of demand and a drop in the creditworthiness of firms affected by the recession.

[2] See for instance Titman and Wessels (1988), Rajan and Zingales (1995), Majumdar and Chhibber (1999) and Pandey (2002) and Weill (2008) for an overview.

[3] We exclude only sole proprietors, some publicly owned firms with specific financing characteristics and government and financial sectors. Previous studies worked with more limited samples, for instance with a sample of listed companies (e.g. McConnell and Servaes, 1995; Rajan and Zingales, 1995; Claessens, Djankov, and Xu, 2000; Wu, 2012), a sample of large firms (e.g. Berk, 2006; Stierwald, 2010) or focusing only on the manufacturing sector (e.g. Pushner, 1995; Weill, 2008; Medina, 2012).

information, we are able to shed more light on this topic. In particular, we are able to observe *how much* firms borrowed directly from foreign banks and debt markets. The closest to our paper are Giannetti and Ongena (2012) and Ongena, Peydro, and van Horen (2015), who use firm-bank matching to look at the direct effect of foreign financing and at the international transmission of financial shocks. They study how a borrowing relationship with a foreign bank or an internationally funded bank affects a firm's performance. Our dataset instead allows us to look also at the role of *the amount of foreign borrowing*. Moreover, we are able to capture nonlinear effects, stemming from the interaction of that amount with how leveraged the firm is. As in the first part of our analysis, we also investigate how the effects of foreign financing on firm performance changed during the recent crisis. With the latter we are adding to the findings of Clarke, Cull, and Kisunko (2012) and Ongena, Peydro, and van Horen (2015), and also Kalemli-Özcan, Laeven, and Moreno (2016) who focus on firm investment rather than firm performance.

We estimate the effect of financing choices on firm performance using fixed-effects estimation, where firm performance is measured as earnings before interest and taxes and leverage as total financial liabilities, both scaled by total assets. Further, we assess the effect of foreign debt financing by adding a dummy variable for the presence of foreign financing and in a separate specification, by including the share of foreign financial liabilities in total assets as a regressor. All specifications also include additional control variables and time dummies. To assess whether the relation is different for the period before and during the crisis, we split the sample into pre-crisis and crisis subsamples. We also explore whether the results change depending on firm ownership, in particular on whether it is a domestic firm or (partially) foreign owned and on whether the state is involved as an owner.

In addition to the baseline estimates, we also control for reverse causality between the choice of financing and firm performance. Capital structure, in particular financial leverage, affects a firm's performance and market value, which in turn influences how the firm's management chooses the type of financing.[4] Similarly, we expect firm performance to depend on the amount of foreign financing, while the ability of the firm to borrow abroad could itself depend on its performance. In our empirical exercise, we therefore instrument leverage with interest expenses, which are expected to be highly correlated with leverage, but by construction unrelated with our measure of performance. Further, we instrument the share of foreign financing with foreign accounts payable. The two variables are highly correlated for firms in Slovenia, while the amount of foreign accounts payable tends to be far more related to the sector of activity than to firm performance.

Our first main finding is that leverage has a negative effect on firm performance, independently of whether we instrument the endogenous variable or not. The negative sign is consistent with the hypothesis that higher leverage potentially leads to higher agency costs stemming from the conflict between shareholders, managers and bondholders, resulting either in underinvestment (Myers, 1977; Stulz, 1990) or investment in overly risky projects (Jensen and Meckling, 1976). The negative sign is also in line with a number of previous empirical studies, including

[4]Only a few papers have explicitly pointed out this endogeneity problem, in particular Baker (1973), Berger and Bonaccorsi di Patti (2006) and Margaritis and Psillaki (2010).

Mramor and Valentinčič (2001) and Berk (2006), which explored the relation between performance and capital structure on a sample of Slovenian blue chips.[5]

Second, we find a negative coefficient both in the pre-crisis and crisis period, with the effect being significantly stronger before the crisis. How can we explain this finding? On the one hand, one could expect a stronger negative effect of debt on firm performance during the crisis, as higher debt aggravates the firm's problems with accessing financing, due to the higher risk of liquidation. High leverage also means a higher burden of debt servicing that limits available free cash flow, which is a problem especially during the crisis when cash flows deteriorate. On the other hand, high debt also shows that the firm was able to finance promising projects even during the crisis and can thus perform better than its counterparts. According to Bernanke and Gertler (1995) and Gertler and Gilchrist (1994), during a cash squeeze only the firms with good access to the credit market will be able to smooth production and employment. Other firms will instead have to cut their production, and will be thus hurt more by the squeeze. Our finding is in line with the latter explanation.

The third key finding is a positive relation between performance and foreign debt both before and during the crisis, with the coefficient significant only in the pre-crisis period. This means that firms with access to foreign debt financing on average outperformed firms with domestic debt financing only, significantly so before the crisis. Additionally, firms benefited from having a larger share of foreign funds in total liabilities. The positive effect of foreign financing on firm performance is consistent with the empirical literature on this topic (see Harvey, Lins, and Roper, 2004; Ghosh, 2008; Giannetti and Ongena, 2009). The argument goes that due to stricter monitoring by foreign lenders, the information asymmetry and agency costs decrease more in firms that borrow on international markets, which improves their performance. In order to attract foreign lenders, the firms also have to meet higher financial standards.[6]

Further exploration shows that this result is not uniform across the different ownership subsamples. While the results are quite similar for domestic and foreign owned firms, they are very different from the baseline case for state-owned firms. For this subsample, the presence of foreign loans led to a significant negative effect on performance and to a more muted negative effect of total leverage on performance in the pre-crisis period.

Our results imply that foreign debt plays a dual role in the economy; on the one hand it reduces asymmetric information and boosts performance of firms, while on the other hand it can also exacerbate the negative effect of total leverage on performance. The threshold amount, i.e. where the benefit of foreign debt outweighs the negative effects, is very much idiosyncratic to firms, their business plans and how leveraged they are. For moderately leveraged firms, the positive effects seem to prevail over the negative ones. Our results are in this respect informative primarily for firm managers. Additionally, although weaker and insignificant, the positive effect of foreign financing persists during the crisis. The reduction in the positive effect could be explained by higher volatility of foreign loans in the crisis times due to withdrawals of banks

[5]Compared to our study, the latter two articles focus on a more restricted sample of Slovenian firms during the transition period. Additionally, they look at the capital structure determinants, while we look at firm performance and control for the underlying endogeneity.

[6]Harvey, Lins, and Roper (2004) also show the importance of international debt markets, especially when domestic banks are unable to provide sufficient debt capital.

from foreign markets and related uncertainty and cash squeeze. This suggests that policies that mitigate fragmentation of financial markets in the times of the crisis could be beneficial.

The rest of the paper is structured as follows. Section 2 presents the theoretical and Section3 empirical literature studying the relation between leverage and performance. In Section 4 we describe the database used and descriptive statistics of our sample, along with a qualitative assessment of developments in Slovenia. Section 5 presents the models and estimation approach. We present our results in Section 6 and robustness checks in Section 7. Section 8 concludes.

2 On the reverse causality between leverage and performance

Various theories about what determines capital structure and how the capital structure in turn affects firm value or performance have been developed and tested in the literature. The conclusion that emerges is that there is reverse causality between capital structure and performance.

One of the main theories of capital structure, *static trade-off theory*, includes both directions of causality. According to this theory, the optimal capital structure is chosen by minimising the weighted average cost of capital, while taking into account the costs and benefits of financial leverage. Since the capital structure affects a firm's performance and market value, the management takes into account this relation when deciding about the type of financing and amount of financial leverage. For instance, as analysed by Modigliani and Miller (1963), the tax shield derived from the interest paid on debt leads to a positive effect of leverage on firm performance. At the same time higher financial leverage can induce worse performance due to the cost of financial distress and cost of agency conflict.

According to Jensen and Meckling (1976), there are two types of agency conflict which can lead to diverging results in terms of how leverage affects firm performance. On the one hand, higher financial leverage reduces the moral hazard problem of the managers through the threat of liquidation (Grossman and Hart, 1982; Williams, 1987) and by limiting the amount of free cash flow that managers could invest into projects that are in their interest but are not maximising shareholders' value (Jensen, 1986; Stulz, 1990). Higher leverage thus curbs the costs of conflict between shareholders and managers and has a positive effect on firm performance. On the other hand, higher leverage might lead to underinvestment (Myers, 1977; Stulz, 1990). In order to limit investment in projects with a negative net present value, shareholders force managers to issue debt and are less willing to provide equity in the future. Consequently, the managers have limited financial resources and cannot invest even in some projects with a positive net present value. Hence, the debt financing on one hand mitigates the overinvestment problems but aggravates the underinvestment problem.[7] In addition, higher financial leverage increases the agency costs stemming from the conflict between shareholders and bondholders (Jensen and Meckling, 1976). The shareholders support investment in riskier projects as they gain from potential profits, while the bondholders bear the losses. The resulting lower value of bonds entails a cost, that increases with the share of debt in the capital structure. In sum,

[7] McConnell and Servaes (1995) show that the negative effects prevail for the firms with high-growth opportunities, as at least in some circumstances the managers will forgo projects with a positive net present value, thus confirming the underinvestment theory. The opposite is true for firms with few growth opportunities.

within the static trade-off theory, diverse signs are expected for both directions of the causal relation depending on which effect prevails.

Another major theory on determinants of capital structure, the *pecking order theory* (see Donaldson, 1961; Myers, 1977; Myers and Majluf, 1984), claims that firms follow a hierarchy of financing options, where internal funding is preferred over external financing due to costs of information asymmetry between managers and external investors. Among external funding options, debt is issued first, then hybrid securities and, finally, new stock.[8] In this, the firm's performance represents one of the decisive factors affecting the capital structure. First, as argued by Myers and Majluf (1984), the more profitable firms can finance from retained earnings to a larger extent, thus lowering the need for acquiring external debt funding and more leverage. This predicts a negative relation between performance and leverage. Second, since external investors are not able to fully monitor the performance or value of the firm, they will try to deduce it from the financing decisions of the firm. A firm's choice of capital structure thus acts as a signaling device, whereby the managers issue more debt to signal the high quality of the firm. This is a credible signal because better firms are able to get more credit, as they are less vulnerable to the costs of default risk and debt servicing, which increase after the debt issue (Leland and Pyle, 1977; Ross, 1977; Myers and Majluf, 1984).[9] We would thus expect a positive effect of firm performance on the amount of leverage. Therefore, also the pecking order theory remains inconclusive about the sign of the relation between performance and capital structure.

Another prominent capital structure theory which links leverage and performance is the *market timing theory*. The idea is that the decisions to issue equity depend on market performance. When market valuations are high, firms tend to issue more equity relative to debt, thus reducing leverage. Conversely, when market valuations are low, firms issue more debt which increases leverage. There are two main explanations for the existence of market timing behaviour. The first assumes that economic agents are rational and therefore firms issue equity directly after a positive information release which reduces the asymmetry problem and increases the stock price. Hence, firms create their own timing opportunities (Lucas and McDonald, 1990; Korajczyk, Lucas, and McDonald, 1991, 1992). The second explanation considers economic agents to be irrational (Baker and Wurgler, 2002). Due to irrational investors or managers, there is a time-varying (perception of) mispricing of firms' shares. When managers perceive the cost of equity to be irrationally low they will issue equity and vice-versa. When equity is perceived to be irrationally expensive, they will buy back their own shares. This theory therefore suggests that leverage is actually a cumulative outcome of past attempts to time the equity market. Both versions of the theory lead to a negative link between firm performance and leverage.

Berger and Bonaccorsi di Patti (2006) and Margaritis and Psillaki (2010) consider two ad-

[8] In addition to the information asymmetry between managers of the firm and external investors, Donaldson (1961) attributes such ordering to the transaction costs of issuing new external capital, which are highest for new equity issues. Myers and Majluf (1984), conversely, claim that these costs are outweighed by the net benefits of debt financing, mostly due to the tax shield, and that information asymmetry is the main reason for the pecking order.

[9] In addition, since it is easier to issue equity when firms are overvalued, a new equity issue might be a negative signal followed by downward pressures on the prices of existing stocks. If the firm is preforming well, it is therefore cheaper to issue debt (Myers and Majluf, 1984).

ditional hypotheses explaining how firm efficiency, an alternative measure of firm performance, influences the choice of capital structure. The *efficiency risk hypothesis* predicts a positive relation between efficiency and leverage, as more efficient firms choose lower equity ratios due to lower expected costs of bankruptcy and financial distress (Berger and Bonaccorsi di Patti, 2006). In contrast, the *franchise-value hypothesis* predicts a negative effect of efficiency on leverage, because the economic rents coming from higher efficiency are safer from the threat of liquidation if the debt-to-equity ratio is lower (Demsetz, 1973; Berger and Bonaccorsi di Patti, 2006).

3 Empirical literature

Empirically, the early papers have unveiled a negative relationship between leverage and profitability. Arditti (1967), for instance, finds a negative effect of debt-to-equity ratio on the expected future profitability and Hall and Weiss (1967) find that equity-to-assets affects the profits-to-equity ratio positively, when market structure conditions are held constant. Other empirical literature studying the effect of leverage on firm performance include McConnell and Servaes (1995), Pushner (1995) Majumdar and Chhibber (1999) and Stierwald (2010) among others.[10]

A larger body of empirical literature focused on how performance, assessed by several different measures, influences the capital structure of the firm. Harris and Raviv (1991) show that financial leverage is lower in more profitable firms. Rajan and Zingales (1995) find for the G7 countries that leverage is affected positively by the tangibility of the assets, the investment opportunities (proxied by the market-to-book ratio), the size of the firm and negatively by profitability. Fama and French (2002) confirm that more profitable firms and firms with more investment usually have lower financial leverage due to a higher return on investment. Grossman and Hart (1982) and Aivazian, Ge, and Qiu (2005) confirmed a negative relation between financial leverage and investment which is in line with the agency cost theory of underinvestment. Also Mramor and Valentinčič (2001) and Berk (2006), which explored the relation between performance and capital structure on a sample of Slovenian blue chips in the period of transition, find a negative relation. They link their results to the pecking order theory, according to which better performing firms tend to use more internal financial resources and less debt financing.

Only a few papers have explicitly pointed out and controlled for the reverse causality between leverage and performance. Baker (1973) estimates a simultaneous equation model of the relation between performance and leverage at the industry level, using a two-stage least squares procedure to solve the endogeneity problem. He finds a negative effect of equity-to-debt ratio on firm profitability, while a simple ordinary least squares (OLS) estimation, conversely, yields a coefficient of the opposite sign.[11] Berger and Bonaccorsi di Patti (2006) and Margaritis and

[10] See Weill (2008) for an overview.

[11] The first-stage equation models leverage as a function of profitability, cost fixity and output predictability. The second-stage equation models the industry profitability as a function of leverage, cost fixity and a number of market variables (capital requirements, firm concentration, economies of scale relative to the market size and growth in industry output).

Psillaki (2010) both study the effect of leverage on firm efficiency, while taking into account the reverse causality between efficiency and a firm's capital structure. The two studies differ in their empirical approach. Berger and Bonaccorsi di Patti (2006) run a two-stage least squares regression, whereas Margaritis and Psillaki (2010), estimate the two parts of the circular relation separately by OLS and use lagged values of the endogenous regressors to achieve exogeneity. Both studies find a positive relationship between leverage and efficiency.

Recently, a few papers looked into non-linearities in the relationship between financial leverage and firms' productivity growth. In particular, on the sample of CEE countries Coricelli, Driffield, Pal, and Roland (2011) estimate a threshold for leverage, above which leverage has adverse effects on firm productivity. The estimated threshold is then used explicitly in the analysis of the effects of leverage on firm productivity. Other studies that take into account non-linearity do so by including squared terms of leverage in their empirical models (for example, see Margaritis and Psillaki, 2010).

3.1 Empirical literature on foreign debt financing

The empirical literature on the relation between a firm's performance and foreign debt financing has gained prominence in recent years, but it is still limited. Generally, the effects of foreign lending on firm performance are estimated to be positive. Harvey, Lins, and Roper (2004) show on a sample of firms from emerging economies that the information asymmetry and agency costs decrease more in firms that issue bonds on international markets, as they are subject to stricter monitoring by foreign lenders. These firms also have to meet higher financial standards in order to attract foreign lenders, which improves their performance. For a sample of Indian firms, Ghosh (2008) finds a weaker negative effect of leverage on firm profitability for firms that participate in international debt markets. The effect of foreign bank lending on firm performance was also explored by Giannetti and Ongena (2009) on a panel of listed and unlisted companies from Eastern European economies. They find that lending by foreign bank subsidiaries stimulates growth in firm sales, assets, and use of financial debt, and decreases the firms' cost of debt.[12] In another paper (Giannetti and Ongena, 2012), where they are able to identify firms' primary bank relationships, they find a positive effect on firms that borrow directly from foreign banks and also an indirect positive effect of foreign bank presence in the country.

3.2 Effects of (foreign) leverage in crisis times

In addition to the literature on determinants of corporate performance during the 1990s Asian crisis, a handful of papers examine how financial leverage and having access to foreign financing affected firm performance, survival and recovery during the recent crisis. In particular, Claessens, Djankov, and Xu (2000) and Medina (2012) find that firms that entered a crisis with higher leverage performed worse during the crisis times, using data on listed companies during

[12]Note that in this study, Giannetti and Ongena (2009) do not observe bank-firm relationships and are thus not able to evaluate whether firms benefit directly from having borrowed from foreign banks or indirectly due to foreign bank presence in the economy that changes the lending policies of domestic lenders.

the Asian and recent global financial crisis, respectively. Medina (2012) finds also a non-linear negative effect of leverage, with the negative effects being particularly strong in firms with high pre-crisis leverage. FurtheSr, Wu (2012) find that in their sample of listed Chilean firms, the recent crisis had a larger negative impact on firms that relied more on external sources financing, i.e. firms that could not finance from their retained earnings.[13] Similarly, Clarke, Cull, and Kisunko (2012) look at the financial constraints and how access to financing affected firm survival in the first year of the recent crisis, using data from emerging markets. They find that firms with access to financing have weathered the crisis better. They also find that financial constraints were lower for older and larger firms, althought they have become more pronounced for the latter ones during the crisis times. The constraints were also less severe during the crisis in countries with foreign bank presence. Note that despite using firm-level dataset, they could not observe whether a particular firm was borrowing from a foreign owned bank, to look at the direct effect of foreign lending.

The closest to our analysis is a paper which analyses firm performance during the recent crisis using matched bank-firm level data with information on direct foreign borrowing. Analysing the propagation of financial shocks, Ongena, Peydro, and van Horen (2015) find that firms that had a borrowing relationship with an internationally-borrowing domestic or a foreign bank before the crisis suffered more in their financing and real performance during the crisis, compared to firms that relied only on a locally funded domestic bank. Adverse shock to credit had a much stronger impact on firms with a single bank relationship, as well as smaller firms, or those with less tangible assets they could pledge as collateral.[14] In contrast to this study, our dataset allows us to analyse also the role of the *amount* of foreign borrowing. Additionally, we are able to capture nonlinear effects stemming from the interaction of foreign financing and firm leverage. Finally, we perform these analyses while explicitely controlling for reverse causality between the choice of financing and firm performance.

4 Corporate capital structure and firm performance in Slovenia

4.1 Data

For the empirical analysis we use annual data from a newly constructed firm-level database which contains detailed qualitative and financial information on all Slovenian firms from 1995 onwards.[15] The database includes data from a variety of sources: (i) Business Register of Slovenia from the Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES), (ii) the Annual Reports of Corporate Entities also collected by AJPES, (iii) the Statistics of Financial Accounts and (iv) the Foreign Direct Investments Register, the latter two both coming from the Bank of Slovenia's internal database. Due to the fact that foreign loans data are available only since 2001, we adjust our sample accordingly. The sample size is

[13] They also find that firms with more foreign currency debt also had a larger declines in sales, although their investment or profits were did not differ significantly from other firms.

[14] They use data from Eastern Europe and Central Asia, that are including many SMEs.

[15] Sole proprietors were excluded from the database due to the poor quality of their reporting, resulting in a lot of missing data.

also adjusted based on the availability of the data necessary for our analysis, thus including the firms that have reported values for all the variables we use in our specifications.[16] Our sample is unbalanced, since the coverage of firms' financial information alters constantly throughout the sample period. Most of it is due to normal firm dynamics (i.e. firm creation vs. destruction) and part of it due to reporting. The coverage in terms of value added is relatively stable across the years, with firms in the sample contributing about 41% of the total value added in the economy. Table 10 in the Appendix reports the sample size for each year for the full sample and for the subsample of firms with foreign financing.

The advantage of our database is its wide coverage, which allows us to study the effects of financing choices on performance for a more general population of firms than some previous studies. Our sample includes firms of all sizes, except for the sole proprietors, while for instance McConnell and Servaes (1995) and Rajan and Zingales (1995) limit their sample to listed companies, and Berk (2006), Stierwald (2010) focus on a sample of large firms. Further, comparable studies that examine the relationship between firm performance and financial leverage mostly focus on the manufacturing sector (e.g. Pushner, 1995; Weill, 2008; Coricelli, Driffield, Pal, and Roland, 2011). We broadly follow the approach by Driffield and Pal (2008) and Rajan and Zingales (1995), that exclude the financial sector and the government sector, respectively. Our sample thus includes all public, private domestic and foreign-controlled non-financial corporations, but excludes the government and financial sectors.[17] In addition, some publicly owned firms that have very specific sectoral financing characteristics (e.g. DARS d.d., the state motorway company) are also excluded.

There might be substantial differences in the effect of (foreign) leverage on firms' performance before the crisis and after the crisis, so we split our analysis in the pre-crisis period (2001-2008) and the crisis period (2009-2013). We set 2009 as the first year of the crisis, since this is the year the global financial crisis hit the Slovenian economy. Thus, this is also the first year of the crisis reflected in the balance sheets and income statements of firms. In 2010 and 2011 there was some modest recovery on the real side of the economy, but as a result of financial distress in the corporate sector, balance sheets deteriorated further.[18]

Furthermore, to consider potentially more favourable (foreign) financing conditions for foreign firms, we divide our sample into two subsamples based on ownership status. In the first subsample we include firms with no foreign equity capital, which we will refer to as "domestic firms", while firms with some share of foreign ownership, called "foreign firms" constitute the second subsample. In the latter category, we include all the firms with some foreign ownership, either FDI or portfolio investment. We also verify how involvment of the state in firm ownership changes the effects of financing choices on firm performance. For this, we divide our sample

[16] An exception to this are firms that have no data on foreign financing. If there is data on other variables included in our analysis, we include the firms in our full sample, and their respective amount of foreign financing is set equal to zero. Additionally, observations with zero sales are dropped from the sample.

[17] Sector S.11 in ESA 95 classification.

[18] Note that our sample covers also a period in which there was a change in the accounting standards. In particular, since 2006 firms' assets were no longer all valued at their book value. The firms could alternatively use the mark-to-market approach for valuation of some types of assets. Since we do not have data on the size of the resulting revaluation of firms' assets and how it affected different firm types, we can at best control for this change by estimating a fixed effects model and by including year dummies to pick up the structural break.

into two subsamples, a subsample of private firms, that includes all firms denoted as having corporate ownership, private ownership and cooperative ownership. All firms that were denoted as having a mixed and state ownership were instead put in the sample of state-owned firms.[19]

4.2 Choice of financing and firm performance in Slovenia - qualitative assessment

Bank loans are the most prevalent source of financing in small countries with less developed capital markets and Slovenia is no exception. Most of firms' investment is financed via bank loans. For example, between 2001 and 2008, the average annual growth rate of bank loans to domestic firms on average exceeded 20%, peaking just before the crisis (end of 2008) with a growth rate of over 30%. This exuberant loan growth can be attributed to Slovenia's entry into the ERM II in 2004 and in particular EMU in 2007, which eliminated exchange rate risk and facilitated access of firms, and especially banks, to foreign and often cheaper sources of financing. Firms accessed this foreign financing both directly and indirectly. The latter was through the domestic banking sector, where domestic banks obtained foreign financing and transmitted it to firms. As it would be impossible to identify the amount of these "indirect" sources of foreign financing at the firm level and since we are mostly interested in the effect of direct foreign borrowing on performance, we take into account only the information on direct foreign financing.

High loan growth resulted in higher firm indebtedness, as shown in Figures 1-2 in the Appendix. First, what we observe is that firms with some foreign financial liabilities were on average more leveraged relative to their counterparts which were not borrowing from abroad. Not surprisingly, this difference in leverage increased significantly after Slovenia joined EMU, meaning that firms with access to foreign sources used them extensively once the exchange rate risk was eliminated.[20]

With the onset of the crisis, firms found themselves in an adverse economic environment with more limited access to financing. Due to their high indebtedness, which had increased in the years before the crisis, firms were confronted with difficulties in obtaining and revolving loans. As a result, the growth rate of financial liabilities slowed. As the domestic sources became scarcer, however, firms with access to foreign financial markets partly substituted them with foreign loans. Accordingly, the average amount of foreign loans held by firms increased after the crisis.

Figures 3-4 depict average and median performance - as measured by net operating profit and by a proxy for cash flow - for firms with some foreign debt and firms without foreign debt for the period 2001 - 2013. Irrespectively of whether looking at the mean or the median performance, one can observe that firms without foreign debt on average outperformed firms with some foreign financing. Before the crisis, differences were relatively small, while in years 2009 and

[19] We were not able to determine the ownership status for a few firms, leading to a loss of 7 observations when building domestic-foreign owned subsamples and of 37 observations when looking at the private-state owned subsamples.

[20] However, it is also worth mentioning that in that period there was considerable excess liquidity on international financial markets which facilitated this exuberant loan growth.

2010 the gap in performance between the two samples of firms widened on the account of a relatively larger collapse in performance of firms with some foreign financing. Just by looking at these figures, however, it is impossible to assess the potential effect of (foreign) leverage on performance. For that reason, we introduce a formal analysis in the following section.

4.3 Descriptive statistics

To substantiate the qualitative analysis we report some basic descriptive statistics for the variables employed in our empirical analysis.[21] The statistics are presented in Table 1 for the full sample and in Table 2 for the subsample of firms with some foreign debt. The tables are further split into panels that report descriptive statistics for the pre- and crisis period, respectively. More detailed summary statistics including sample characteristics for firms without foreign loans are provided in Table 9 in the Appendix .

We use two measures of firm performance. The first measure, which we refer to as *net operating profit*, is calculated as the ratio of earnings before interest and taxes over total assets (EBIT/TA) and is also our "core" measure. The second measure, which we call *cash flow*, is calculated as the ratio of earnings before interest, taxes, depreciation and amortisation over total assets (EBITDA/TA). Not surprisingly, both measures of firm performance show that firms on average performed better in the pre-crisis period.[22] This holds in the full sample and in the subsample of firms with some foreign financing, whereby in the latter sample average net operating profits even became negative during the crisis.

TABLE 1. Descriptive statistics: Full sample

	A. Before crisis				**B. Crisis**			
	mean	p25	p50	p75	mean	p25	p50	p75
EBIT / TA (%)	3.48	0.95	4.17	8.62	1.54	0.49	2.72	5.79
EBITDA / TA (%)	8.61	4.28	8.74	14.50	6.42	3.24	6.77	11.54
Financial liabilities / TA (%)	28.99	11.33	23.89	41.11	37.52	17.80	33.13	51.14
Foreign fin. liabilities / TA (%)	19.46	3.23	10.09	26.41	26.43	3.89	15.00	37.42
Size (assets, in 1000 EUR)	5224.60	191.00	548.00	1881.00	6393.74	299.00	797.00	2461.00
Size (employment)	41.96	3.00	7.00	18.00	33.04	3.00	7.00	17.00
Firm age	11.42	8.00	12.00	14.00	14.36	8.00	17.00	20.00
Tangibility (%)	37.51	15.63	35.63	56.37	36.56	13.03	34.00	56.25
Firm openness (%)	13.32	0.00	0.08	11.92	14.79	0.00	0.54	15.20
Productivity	34.53	17.12	24.98	37.59	37.21	19.98	28.28	41.14
Sales growth (%)	10.96	-6.28	7.93	23.45	-2.70	-19.02	-2.27	12.55
Liquidity ratio (%)	93.60	46.67	75.16	109.26	100.53	42.97	76.30	118.04
Interest expenses / TA (%)	2.15	0.71	1.59	2.83	1.68	0.67	1.32	2.22
Observations	42336				23652			

Various measures of leverage exist, used depending on the subject of interest. For our analysis, we employ *leverage* calculated as the percentage of financial liabilities in total assets. On average, financial liabilities constituted 29% of total assets of firms before the crisis. This

[21] See Table 8 in Appendix for exact variable definitions.

[22] Note that average firm performance has deteriorated as a consequence of a minor increase in EBIT and EBITDA coupled with relatively large increase in total assets.

TABLE 2. Descriptive statistics: Sample of firms with some foreign debt

	A. Before crisis				B. Crisis			
	mean	p25	p50	p75	mean	p25	p50	p75
EBIT / TA (%)	2.38	0.77	3.66	7.35	-1.05	-2.08	2.06	5.34
EBITDA / TA (%)	7.15	3.90	7.77	12.70	3.21	1.17	5.52	10.35
Financial liabilities / TA (%)	36.38	19.59	33.07	48.46	46.71	25.92	41.13	56.22
Foreign fin. liabilities / TA (%)	18.12	3.11	9.45	24.60	27.35	4.38	16.19	38.18
Size (assets, in 1000 EUR)	46479.13	1287.50	4477.00	17679.50	54154.21	1808.00	5305.50	19536.50
Size (employment)	278.16	9.00	35.00	174.00	183.79	9.00	23.00	105.50
Firm age	12.05	8.00	12.00	15.00	15.50	8.00	17.00	20.00
Tangibility (%)	39.22	19.98	40.68	55.71	30.40	9.38	26.39	49.44
Firm openness (%)	35.48	1.44	18.29	71.55	36.52	3.01	20.19	72.31
Productivity	52.03	20.86	30.58	48.70	55.16	26.20	37.21	58.45
Sales growth (%)	15.21	-1.13	9.69	22.98	2.45	-14.03	0.75	14.61
Liquidity ratio (%)	83.84	46.42	70.47	100.57	99.57	45.42	76.67	117.12
Interest expenses / TA (%)	2.56	1.09	1.91	3.11	1.86	0.70	1.43	2.31
Observations	1840				956			

share increased by about 9 percentage points during the crisis. Both in the pre-crisis and the crisis period, firms with foreign financing were on average leveraged more. For these firms, the average ratio rose by 10 percentage points to 46.7% during the crisis.

Further we measure *foreign leverage* with a ratio between foreign loans, that is the value of foreign financial liabilities extended to firms by foreign banks, and total assets. Mean foreign leverage stood at 18.1% of total assets before the crisis and increased to an average of 27.4% in the crisis years.

Turning to other firm characteristics, we see that the average *firm size* increased during the crisis.[23] Not surprisingly, firms with foreign financing are on average larger. If we measure the firm size in terms of number of employees, a different picture emerges, as the average number of employees decreased during the crisis. Also the share of tangible assets in total assets (*tangibility*) declined during the crisis, more so for firms with foreign financing. Further, in the period before the crisis, the share of international net sales (*openess*) represented on average about 13% of total net sales in the full sample and about 35% in the sample of firms with foreign loans. During the crisis, the mean value of the ratio increased slightly in the full sample and stayed roughly the same in the sample of firms with foreign financing. *Productivity*, calculated as real value added over employment, rose on average during the crisis, with a higher increase in the sample of firms with some foreign financing, that were more productive also before the crisis. *Sales growth* was higher on average for firms with some share of foreign financing in the pre-crisis times. During the crisis, it became negative in the full sample, while remaining positive in the sample of firms with foreign financing. Firms' ability to meet short-term financial obligations, as measured by the *liquidity ratio*, improved during the crisis, mostly due to an increase in current assets net of inventories. Finally, *interest expenses* increased in both samples during the crisis, but by less than total assets. As a result, the percentage of assets being spent

[23] In the model we use a logarithm of total assets to allow for potential non-linearities.

to pay interest declined in both samples for more than 20% in the crisis period.

To summarise, comparing the full sample of firms with those with some foreign financing, the latter are on average bigger, more productive, more open, have a higher leverage, grew faster during the crisis and have a slightly lower liquidity ratio.

5 Empirical model

For a formal analysis of the relationship between corporate performance and financing options in Slovenia, we estimate several variants of the following fixed effects model (Model 1):

$$\begin{aligned} Performance_{i,t} = c_i &+ \alpha_1 Leverage_{i,t} \\ &+ Control\ variables_{i,t} + \nu_t + \varepsilon_{i,t} \end{aligned}$$

where we regress firm performance on different financing options, a set of control variables, an intercept and year dummies. With the latter, we control for general macroeconomic developments in the economy.

As described previously, our "core" measure of performance is net operating profit over total assets. In the robustness section we cross-check the results using cash flow as an alternative measure of performance. The dependent variable, firm performance, can be defined in various ways. One of the options commonly used in the literature are financial ratios derived from balance sheet and income statement data. Rajan and Zingales (1995), for instance, measure firm performance with profitability, defined as cash-flow over the book value of assets. Similarly, Baker (1973) uses the after-tax profit rate and Giannetti and Ongena (2009) the censored sales and assets growth rates as measures of firm performance. Corporate performance can also be measured with stock market returns and Tobin's q, which represents a mix between market and accounting values (e.g. McConnell and Servaes, 1995), or with total factor productivity (e.g. Pushner, 1995). Finally, recent papers have introduced a firm's efficiency as a measure of performance. A firm's efficiency is measured as the distance from the performance of a best-practice firm or efficiency frontier. Several versions of this measure were used in the literature, for instance the cost efficiency score (Weill, 2008), profit efficiency (Berger and Bonaccorsi di Patti, 2006) and productive or technical efficiency (Margaritis and Psillaki, 2010).

The key explanatory variables in the model are variables related to the amount of leverage and foreign financing of the firm. In all our models, we include leverage measured as the share of financial liabilities in total assets. In Models 2 to 4, we then add variables related to the presence of foreign financial liabilities. First, we include a dummy variable which takes value 1 if the firm has some foreign debt financing and 0 otherwise (Model 2):

$$\begin{aligned} Performance_{i,t} = c_i &+ \alpha_1 Leverage_{i,t} \\ &+ \alpha_2 Foreign\ dummy_{i,t} \\ &+ Control\ variables_{i,t} + \nu_t + \varepsilon_{i,t} \end{aligned}$$

From this specification, one can conclude whether the presence of foreign loans affects firms'

performance. Next, by including a cross term between leverage and foreign financing dummy, we check whether the effect of leverage on firm performance differs depending on the presence of foreign debt (Model 3):

$$\begin{aligned} Performance_{i,t} = c_i &+ \alpha_1 Leverage_{i,t} + \alpha_2 Foreign\ dummy_{i,t} \\ &+ \alpha_3 (Leverage \times Foreign\ dummy)_{i,t} \\ &+ Control\ variables_{i,t} + \nu_t + \varepsilon_{i,t} \end{aligned}$$

Finally, in a subsample consisting of firms with some foreign financing, we also explicitly control for the share of foreign debt financing in total assets (foreign leverage), where foreign debt financing is represented by the value of foreign financial liabilities extended to firms by foreign banks (foreign loans). Our Model 4 is thus:

$$\begin{aligned} Performance_{i,t} = c_i &+ \alpha_1 Leverage_{i,t} \\ &+ \alpha_2 Foreign\ leverage_{i,t} \\ &+ Control\ variables_{i,t} + \nu_t + \varepsilon_{i,t} \end{aligned}$$

All specifications also include a set of control variables. We base our choice of these on the factors found relevant for firm performance in the existing literature. First, we control for the size of the firm, which is expected to affect performance, as larger firms tend to be more diversified and consequently fail less often. We use log total assets as a proxy for it in our baseline estimation and log employment for checking the robustness of our results. We also control for the share of tangible assets, and firm productivity. Further, we add squared values of log productivity, tangibility of assets and a size variable to allow for potential nonlinearities. Next, we also include log firm age expressed to grasp the decreasing informational content of this variable as the firm ages, as in Giannetti and Ongena (2009). Net sales growth, firm openness, and liquidity ratio are also included as control variables. The latter is defined as current assets net of inventories divided by current liabilities and indicates creditworthiness and the ability to pay off short-term debt. Finally, we include year dummies to account for aggregate factors that may vary over time, in particular macroeconomic developments and institutional factors. As a robustness exercise, we include also the world GDP growth and stock market volatility index (VIX) to control for the international macroeconomic environment.[24]

5.1 Estimation strategy and endogeneity

The models are estimated by the standard fixed effects approach. However, as suggested in Section 2, there exists evidence of a two-way causal relationship between firm performance and its leverage. Higher leverage can have a positive or negative effect on the performance. Yet, there is also a possible reverse causality (i.e. leverage might be affected by performance) either due to the manager's signaling efforts or because retained earnings and consequently amount

[24] VIX is the CBOE Volatility Index, a measure of market expectations of near-term volatility based on S&P 500 stock index option prices. GDP growth rates as reported by World Economic Outlook Database, October 2015.

of leverage depend on firm performance. Simple OLS fixed effects estimation of the relation between financial leverage, the presence and the amount of foreign debt financing and firm performance would thus lead to biased and inconsistent estimates.

To correct for endogeneity, we estimate an instrumental variable (IV) version of the above specified fixed-effects models, where we instrument leverage by the share of interest expenses in total assets. Interest expenses are expected to be a good instrument, since they are related to leverage and unrelated to earnings before interest and taxes (EBIT) by construction. [25] Another possible endogeneity problem might arise when analysing the relationship between foreign leverage and performance. While a firm's performance could also depend on the share of foreign leverage, one can expect that foreign borrowing itself depends on firm performance. For that reason, the instrumental variable approach is warranted also when focusing on the share of foreign leverage. We use foreign accounts payable, which represent the trade credit given to Slovenian firms from abroad. We use this instrumental variable, firstly, because it is highly correlated with foreign loans for firms in Slovenia and secondly, because the amount of foreign accounts payable is more related to the sector of activity and long term relations between companies, than to the performance itself.

We verify validity and strength of the instruments by conducting a number of tests. We look at the significance of the first stage regression coefficients and at the tests for underidentification and weak identification, using the Kleibergen–Paap rk LM and Wald F statistic (Kleibergen and Paap, 2006). Additionally, we use the Anderson-Rubin Wald test (based on Anderson and Rubin, 1949), which provides a weak-instrument-robust inference. With this test we can reject or accept the null hypotensis of coefficients of our endogeneous variables being zero without the test size distortions coming from the potential weakness of instruments.

6 Results

In this section, we show our main estimation results for the first three models described in Section 4 and estimated on the full sample, split in precrisis (Table 3) and crisis period (Table 4). In both Tables, the OLS results are presented in Panel A and IV results in Panel B.

Effect of leverage on performance (Models 1 - 3). We find a negative and statistically significant (at 1% significance level) effect of leverage on performance in both periods and for all three models. Our results strongly indicate that higher leverage is associated with lower performance, which is consistent with many previous empirical studies (e.g. Titman and Wessels 1988, Rajan and Zingales 1995, Majumdar and Chhibber 1999, Pandey 2002, Ghosh 2008). From a theoretical point of view, these results are in line with the agency costs of conflict between shareholders and managers that can manifest as "underinvestment" (see Myers, 1977; Stulz, 1990) and the cost of conflict between shareholders and debtholders that can lower the value of bonds (Jensen and Meckling, 1976). In both cases, the agency costs are increasing with

[25] Other approaches have been used in the previous literature to control for reverse causality between leverage and profitability. Pushner (1995), for instance, uses productivity instead of profitability as the dependent variable in his study of the effect of leverage on firm efficiency, since leverage is not affected by productivity, thereby avoiding the problem of reverse causality. At the same time profitability and productivity are positively correlated.

leverage, however, the latter case is less relevant for Slovenia, as not many firms have issued debt securities. Our result could instead also be explained by high financial distress costs and/or the higher transaction costs of external financing (Donaldson, 1961).

However, this negative relation could be also driven by the causality running in the opposite direction; better performance and more retained earnings are expected to lead firms to accumulate less debt (see Weill, 2008, or Rajan and Zingales, 1995, among others).[26] To overcome this endogeneity problem, we instrument leverage by the share of the interest expenses in total assets. Results (in Panel B) remain robust across all three models in both periods. This finding is in contrast with Baker's (1973) who finds that the sign of the leverage coefficient changes when the problem of endogeneity is taken into account. Looking at the instrument's validity and strength, one should note that the null hypothesis of underidentification is rejected for all three models in both periods at 5% significance level. The weak identification tests signal some difficutlies in the pre-crisis period, where the size of the Wald test of the coefficient of the instrumented variable turns out to be larger than 20 or 25%. This means that we might be rejecting too often the null hypothesis of coefficient being zero. However, the Anderson-Rubin test that corrects for the test size distortion shows that the coefficients on the endogenous regressor are indeed significantly different from zero.

In terms of magnitudes, in our sample, the negative effect of leverage on performance is stronger in the pre-crisis period.[27] The finding that during the crisis leverage has less adverse effect on firm performance than in the pre-crisis times is consistent with the explanation provided by Bernanke and Gertler (1995) and Gertler and Gilchrist (1994) on how a cash squeeze can affect firms' performance. According to these studies, during a cash squeeze, which is one of the characteristics of the recent crisis, only firms with good access to the credit market will be able to smooth production and employment. The remaining firms will instead have to cut their production, and will thus be hurt more by the squeeze. In other words, firms which have access to the credit market are likely to experience a weaker negative effect of leveraging up during the crisis.

Access to foreign financing and performance (Model 2). Next, we investigate how the presence of foreign loans affects firms' performance. The coefficient on the foreign loans dummy is insignificant when we consider a standard OLS estimation, with a positive sign before the crisis and a negative one during the crisis. When we control for the endogeneity, we get a positive effect of foreign financing in both periods, with a larger and significant coefficient in the pre-crisis period. The explanation could follow the same lines as in Harvey, Lins, and Roper (2004) or Giannetti and Ongena (2009), i.e. that stricter monitoring by foreigners reduces agency costs which has a positive effect on performance. The positive effect could be smaller in crisis times due to higher volatility of foreign loans, as banks withdraw from foreign markets, and related higher uncertainty.

[26] On the other hand, Margaritis and Psillaki (2010) found that more efficient firms choose higher leverage because their bankruptcy and financial distress costs are lower. In this case, we would expect a positive relation between leverage and performance.

[27] The Chow test showed that the difference between the coefficients for the two periods is significant in the case of IV estimation at 1% significance level. See the Appendix for details.

TABLE 3. Firm performance and (foreign) financing: Pre-crisis period

Dependent v.: EBIT/TA	**A. OLS**			**B. IV**		
Model	1	2	3	1	2	3
Leverage	-0.3092***	-0.3092***	-0.3095***	-0.7320***	-0.7325***	-0.6487***
	(0.057)	(0.057)	(0.058)	(0.179)	(0.180)	(0.153)
Foreign dummy		0.2742	-0.0321		1.7434**	33.3595***
		(0.603)	(3.574)		(0.855)	(11.311)
Leverage*Foreign dummy			0.0089			-0.9276***
			(0.106)			(0.334)
Control variables:						
Size (ln Assets)	25.219***	25.218***	25.220***	18.656***	18.642***	19.242***
	(3.549)	(3.549)	(3.554)	(3.104)	(3.105)	(2.917)
Size^2 (ln Assets)	-1.3918***	-1.3919***	-1.3919***	-0.8097***	-0.8105***	-0.8870***
	(0.236)	(0.236)	(0.236)	(0.229)	(0.229)	(0.208)
Tangibility	0.0134	0.0133	0.0133	0.0747*	0.0744*	0.0658*
	(0.032)	(0.032)	(0.032)	(0.039)	(0.039)	(0.037)
Tangibility^2	-0.0003	-0.0003	-0.0003	0.0002	0.0002	0.0002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age	-0.9606	-0.9642	-0.9625	-0.3778	-0.4000	-0.6439
	(0.799)	(0.799)	(0.801)	(0.918)	(0.919)	(0.910)
Sales growth	0.0277***	0.0277***	0.0277***	0.0205***	0.0205***	0.0216***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
Liquidity ratio	0.0038***	0.0038***	0.0038***	0.0037***	0.0037***	0.0042***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Openness	-0.0025	-0.0026	-0.0026	-0.0090	-0.0091	-0.0018
	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)	(0.012)
Productivity	0.0699***	0.0699***	0.0699***	0.0644***	0.0644***	0.0643***
	(0.013)	(0.013)	(0.013)	(0.010)	(0.010)	(0.010)
Productivity^2	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Intercept	-89.968***	-89.946***	-89.959***			
	(11.97)	(11.97)	(11.99)			
Kleibergen-Paap rk LM stat				5.20	5.19	4.47
(P-value)				0.023	0.023	0.034
Kleibergen-Paap rk Wald F stat				5.60	5.59	2.42
Size of distortion				$< 25\%$	$< 25\%$	$> 25\%$
Anderson-Rubin Wald test				14.63	14.63	32.69
(P-value)				0.000	0.000	0.000
R^2	0.261	0.261	0.261	-0.068	-0.069	-0.057
Observations	42,336	42,336	42,336	42,336	42,336	42,336

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in brackets. All specifications are estimated with firm fixed effects and include year dummies and an intercept. For the IV estimation we report Kleibergen-Paap rk LM statistic as an underidentification test and Kleibergen-Paap rk Wald F statistic as a test for weak identification. We report also the Anderson Rubin Wald test, which is a significance test for coefficients on endogeneous variables, robust to the presence of weak instruments.

TABLE 4. Firm performance and (foreign) financing: Crisis period

Dependent v.: EBIT/TA	**A. OLS**			**B. IV**		
Model	1	2	3	1	2	3
Leverage	-0.2606***	-0.2604***	-0.2508***	-0.4206***	-0.4207***	-0.4059***
	(0.058)	(0.058)	(0.061)	(0.106)	(0.106)	(0.112)
Foreign dummy		-0.7021	3.7098*		0.2620	7.7445
		(1.250)	(2.226)		(1.289)	(5.676)
Leverage*Foreign dummy			-0.1116			-0.1890
			(0.070)			(0.164)
Control variables:						
Size (ln Assets)	36.208***	36.192***	36.386***	33.031***	33.037***	33.3353***
	(6.676)	(6.676)	(6.645)	(6.474)	(6.471)	(6.451)
Size^2 (ln Assets)	-2.0797***	-2.0781***	-2.0949***	-1.9598***	-1.9604***	-1.9879***
	(0.438)	(0.439)	(0.435)	(0.435)	(0.435)	(0.432)
Tangibility	-0.0832	-0.0831	-0.0839	-0.0568	-0.0568	-0.0580
	(0.054)	(0.054)	(0.054)	(0.050)	(0.050)	(0.050)
Tangibility^2	-0.0001	-0.0001	-0.0001	0.0001	0.0001	0.0001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age	-0.6428	-0.6393	-0.6601	-0.0213	-0.0226	-0.0522
	(1.217)	(1.215)	(1.216)	(1.139)	(1.138)	(1.142)
Sales growth	0.0249***	0.0249***	0.0250***	0.0217***	0.0217***	0.0219***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Liquidity ratio	0.0032***	0.0032***	0.0033***	0.0029***	0.0029***	0.0031***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Openness	-0.0052	-0.0050	-0.0062	-0.0037	-0.0037	-0.0058
	(0.027)	(0.027)	(0.027)	(0.023)	(0.023)	(0.023)
Productivity	0.0834**	0.0834**	0.0834**	0.0788**	0.0788**	0.0788**
	(0.035)	(0.035)	(0.035)	(0.031)	(0.031)	(0.031)
Productivity^2	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Intercept	-132.98***	-132.94***	-133.66***			
	(23.34)	(23.34)	(23.28)			
Kleibergen-Paap rk LM stat				28.86	28.74	26.59
(P-value)				0.000	0.000	0.000
Kleibergen-Paap rk Wald F stat				35.09	34.97	16.30
Size of distortion				$< 10\%$	$< 10\%$	$< 10\%$
Anderson-Rubin Wald test				17.13	17.07	11.78
(P-value)				0.000	0.000	0.000
R^2	0.235	0.235	0.237	0.200	0.200	0.200
Observations	23,652	23,652	23,652	23,652	23,652	23,652

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in brackets. All specifications are estimated with firm fixed effects and include year dummies and an intercept. For the IV estimation we report Kleibergen-Paap rk LM statistic as an underidentification test and Kleibergen-Paap rk Wald F statistic as a test for weak identification. We report also the Anderson Rubin Wald test, which is a significance test for coefficients on endogeneous variables, robust to the presence of weak instruments.

Access to foreign financing, leverage and performance (Model 3). Furthermore, we also include a cross term between leverage and foreign loans dummy. Recall that the presence of foreign financing had a positive and highly significant effect on performance for the IV estimation in the pre-crisis period (Model 2). However, increasing leverage while using some foreign financing results in an even more negative effect of leverage on firms' performance (Model 3). Yet this does not necessarily imply that the increase in foreign loans *per se* hinders performance. This only suggests that firms with some foreign financing pay a higher price - in terms of performance - when they increase overall leverage relative to the firms without this source of financing. Results are also very similar in the crisis period. The only difference is that the negative effect of leverage is now less pronounced and that the coefficients on foreign dummy and cross term are insignificant.

Next, we look at how the positive effect of foreign financing and the enhanced negative effect of leverage due to foreign financing interact depending on the leverage of the firm. In Table 5, we calculate the difference between the impact of the dummy, coefficient on leverage and cross term for various levels of leverage. The values are taken from the distribution of leverage for the full sample of firms. For values of leverage equal to sample mean or lower, the effect of having foreign financing is positive, which is in line with positive coefficient on dummy for foreign financing. The threshold level of leverage beyond which the negative effects prevail is calculated to be at 36.6% of total assets for the pre-crisis period, and higher, at 40.6% for the crisis times. Note that this calculation looks at average effects.

TABLE 5. Difference in firm performance depending on presence of foreign financing for various values of leverage

Leverage		**No foreign fin.**		**Foreign fin.**		**Difference***	
Distribution		P-C	C	P-C	C	P-C	C
p10	5.42	-3.51	-2.20	24.82	4.52	28.33	6.72
p25	13.23	-8.58	-5.37	12.51	-0.12	21.09	5.24
p50	27.03	-17.53	-10.97	-9.24	-8.33	8.29	2.64
mean	32.05	-20.79	-13.01	-17.15	-11.32	3.63	1.69
p75	44.98	-29.18	-18.26	-37.55	-19.02	-8.37	-0.76
p90	63.40	-41.13	-25.74	-66.58	-29.97	-25.45	-4.24

* Difference in firm performance due to having foreign financing, for different values of firm leverage. Calculated based on coefficients on foreign financing dummy variable, coefficient on Leverage and a cross term between the two. Coefficients used are IV coefficients from Model 3 from Tables 3-4. P-C denotes pre-crisis period and C the crisis period.

Finally, to identify whether *an increase* in foreign loans is actually dampening firms' performance, one has to explicitly control for the amount of foreign loans. We do this in the next subsection where we estimate Model 4 on a subsample of firms with some foreign financing.

Other determinants of firm performance. Next, we turn to the relation between control variables and firm performance. The size of the firm (proxied by the logarithm of total assets) is positively and significantly related to firm performance in both periods. A positive size effect was found in numerous empirical works that used net sales or firm assets as a measure of firm size, for instance Rajan and Zingales (1995) and Harvey, Lins, and Roper (2004). This is in line with Margaritis and Psillaki (2010), who argue that larger firms are expected to

perform better as they usually possess more advanced technology, are more diversified and better managed. Additionally, Stierwald (2010) argues that firm size has a positive impact on profitability, stemming from economies of scale and scope or larger firms accessing to capital at lower costs than their smaller counterparts. In addition, we also allow for nonlinearities in the relation between size and firm-level performance. We find statistically significant negative coefficients, suggesting that larger firms perform better but at a decreasing rate.

Further, our results point to a positive relationship between tangibility and performance in the pre-crisis sample, which is, however, significant only in the IV estimation. In the crisis, the effect of tangibility is insignificant, but of a negative sign. Firm age, which could be seen as an approximation for intangible capital and experience, has insignificant effect in both periods. As regards sales growth, we find a positive and significant effect in the pre-crisis and crisis period. This result can be interpreted along the lines of McConnell and Servaes (1995) who use a five-year past sales growth as a proxy for the future growth opportunities. As expected, firms with a higher liquidity ratio performed better on average according to our estimates. From an economic perspective, the higher the short-term assets, the more able the firm is to pay off its short-term liabilities, thus exhibiting higher financial strength. Interestingly, openness does not affect performance significantly in either period.

Productivity is positively and significantly related to performance in both periods, with the positive effect decreasing in productivity; more productive firms are performing better on average, but at a decreasing rate. This finding is consistent with the superior firm hypothesis by Demsetz (1973), where in the world of heterogeneous firms, the more productive firms have a competitive advantage over less productive ones, either in lower average costs of production, higher quantity produced with fewer inputs or higher product quality, which in turn leads to higher profitability. Similarly, Stierwald (2010) finds that higher productivity leads to higher profitability due to the competitive advantage that these firms have over their rivals.

Finally, the coefficients do not change if we control explicitly for external macroeconomic factors. When included, the world GDP growth and the volatility index VIX have an insignificant effect on firm performance, therefore we proceed by estimating our models without these two external macroeconomic variables.[28]

6.1 Amount of foreign financing

In this section, we discuss the effect of the relative amount of foreign financing (foreign leverage) on firm performance, by estimating Model 4 on a subsample of firms that have some foreign financing. This could introduce a sample selection bias in our estimates, since firms' ability to obtain foreign financing could depend on factors related to performance. To verify if the sample selection bias is indeed present in our subsample, we first estimate Model 4 with a two-stage Heckman approach using OLS, before going on with the analysis.

We perform the Heckman procedure as follows. In the first stage, we estimate a selection equation that relates the probability of a firm being in the foreign-financing subsample to a number of explanatory variables. In addition to the explanatory variables of the original

[28] The results with VIX and world GDP growth are available upon request.

model, we add the share of foreign accounts receivable in total assets as an overidentifying variable. Foreign accounts receivable represent trade credit given by Slovenian firms to their partners abroad, which is a good proxy for the firm being an exporter and thus present in the international markets. This in turn increases probability of being able to get financing from foreign sources. From the first stage estimates, we calculate the inverse Mills ratio, which is then included as an explanatory variable in the second stage of the estimation to correct for the sample selection bias. If the coefficient on the inverse Mills ratio turns out to be significant, this indicates that the sample selection bias is indeed present in the smaller sample. We report the second step results in Table 6, with pre-crisis results in the first column of Panel A and crisis period resutls in the first column of Panel B. Since the inverse Mills ratio turns out to be insignificant in both periods, we proceed with regular OLS and IV estimation on the smaller subsample. The results are reported in the remaining columns in Table 6.

The effect of leverage on firm performance remains negative and significant when constraining the sample to firms that were able to obtain foreign financing. This result holds for both periods, except in the crisis period when estimating with IV, where the effect is negative but insignificant. Our variable of interest, the share of foreign debt financing in total assets, has a positive effect on performance in most cases. An exception is the OLS estimation before the crisis, where this effect is negative but statistically insignificant. When we explicitly control for endogeneity in the pre-crisis period, the coefficient on foreign leverage turns positive and becomes significant at 1% singificance level. Turning to the crisis period, our estimates show a positive and significant effect of foreign leverage on performance for the OLS estimation and positive but insignificant coefficient on foreign leverage in the IV estimation. The size of the leverage and foreign leverage coefficients is smaller in the crisis period, aligned with the results from full sample. We can also notice some differences in the effects of control variables, when estimating our models on the smaller sample. The effect of sales growth on firm performance becomes insignificant in both periods and the effect of size also becomes insignificant when using the IV approach. The loss of significance could be due to a relatively small sample size.

TABLE 6. Firm performance and amount of foreign financing

Dependent v.: EBIT/TA	A. Pre-crisis			B. Crisis		
Model	4 (OLS)	4 (OLS)	4 (IV)	4 (OLS)	4 (OLS)	4 (IV)
Leverage	-0.3695**	-0.370**	-5.1178***	-0.6003***	-0.6001***	-0.6323
	(0.152)	(0.149)	(1.357)	(0.117)	(0.092)	(0.400)
Foreign fin. liabilities/TA	-0.0830	-0.0834	4.8144***	0.2991**	0.2991**	0.0852
	(0.162)	(0.156)	(1.529)	(0.130)	(0.118)	(0.524)
Control variables:						
Size (ln Assets)	19.145**	18.850***	17.361	76.513	76.723*	43.957
	(7.777)	(7.289)	(41.88)	(48.98)	(45.28)	(52.73)
Size^2 (ln Assets)	-0.4840	-0.4664	0.6468	-3.9918	-4.0026*	-2.2993
	(0.440)	(0.415)	(2.219)	(2.588)	(2.344)	(2.931)
Tangibility	-0.1595	-0.1696	0.4409	-0.6281	-0.6243	-0.5342
	(0.188)	(0.176)	(0.630)	(0.605)	(0.601)	(0.510)
Tangibility^2	0.0019	0.0020	0.0022	0.0042	0.0042	0.0038
	(0.002)	(0.002)	(0.007)	(0.005)	(0.005)	(0.005)
Age	-0.2991	-0.1579	-0.4266	-4.4053	-4.2731	-1.7521
	(5.451)	(5.372)	(14.40)	(7.057)	(6.927)	(5.906)
Sales growth	-0.0144	-0.0125	-0.0483	0.0052	0.0053	0.0001
	(0.016)	(0.014)	(0.039)	(0.012)	(0.010)	(0.009)
Liquidity ratio	0.0299**	0.0300***	0.0446	-0.0005	-0.0006	0.0017
	(0.012)	(0.011)	(0.039)	(0.010)	(0.007)	(0.007)
Openness	-0.0146	-0.0170	-0.0870	-0.0273	-0.0267	-0.0352
	(0.039)	(0.034)	(0.246)	(0.083)	(0.072)	(0.081)
Productivity	0.1057	0.0997***	-0.0130	0.0324	0.0324***	0.0302***
	(0.064)	(0.030)	(0.081)	(0.061)	(0.009)	(0.009)
Productivity^2	-0.0000	-0.0000***	0.0000	0.0000***	0.0000*	0.0000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Inverse Mills ratio	1182.83			-104.06		
	(3267.1)			(1800.8)		
Intercept	-117.01***	-105.37***		-308.46	-309.88*	
	(34.34)	(29.84)		(200.0)	(186.7)	
Kleibergen-Paap rk LM stat			3.58			3.62
(P-value)			0.059			0.057
Kleibergen-Paap rk Wald F stat			5.35			3.05
Size of distortion			<15%			<25%
Anderson-Rubin Wald test			100.12			206.94
(P-value)			0.000			0.000
R^2	0.302	0.306	-9.724	0.440	0.440	0.353
Observations	1,840	1,840	1,840	956	956	956

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in brackets. All specifications are estimated with firm fixed effects and include year dummies and an intercept. First columns in Panel A and Panel B present results of a FE OLS estimation including the inverse Mills ratio. For the IV estimation we report Kleibergen-Paap rk LM statistic as an underidentification test and Kleibergen-Paap rk Wald F statistic as a test for weak identification. We report also the Anderson Rubin Wald test, which is a significance test for coefficients on endogeneous variables, robust to the presence of weak instruments.

6.2 Does ownership matter?

In the previous section we have documented the effect of (foreign) leverage and other explanatory variables on performance for the full sample. We now look whether the effect of (foreign) leverage on performance of firms varies with the ownership type. In other words, does ownership matter? We explore the effect of ownership along two dimensions: 1) domestic and foreign ownership and 2) state and private ownership. Results are presented in Table 7. For brevity, we focus on comparing the results of the IV estimations before and during the crisis for Model 3.[29]

Domestic and foreign ownership. For domestic and foreign ownership, we observe that differences in the signs and size of coefficients are not substantial in the pre-crisis period. The significant negative impact of leverage is larger for domestic firms, while the cross-term between leverage and foreign loans dummy is larger for foreign firms. The positive effect of foreign borrowing on performance remains similar for both ownership types, with slightly higher values for foreign firms. Like in the full sample, the presence of foreign financing increases firm performance, while amplifying the negative effect of leverage, regardless of the ownership status. The strength of these effects is however different depending on the ownership. Comparing the size of the coefficients on leverage and on the interaction term between leverage and foreign loans dummy, we observe that the "cost" of higher leverage in terms of poorer performance is higher for domestic firms in general. Additionally, it is also higher for those accessing some foreign financing compared to foreign owned firms who have done the same. In other words, firms which took foreign loans were more adversely affected by total leverage if they were domestically owned. This is despite the fact that the amplification of the negative effect of leverage is more pronounced for foreign firms. Turning to the crisis period, the coefficient on leverage remains robust only for domestic firms. For both ownerhip types, the positive effect of foreign borrowing becomes insignificant.[30]

Turning to control variables, there are at least four further differences between the results in the foreign firms subsample and the domestic one. First, the asset size has a significant positive effect on performance for both ownerhip types before crisis, and only for the domestic type during the crisis. For foreign firms the effect of firm size turns negative and insignificant, suggesting that for foreign owned firms, being a large firm was not helping firm's performance in the crisis times. Second, tangibility is positive before the crisis, significant for domestic firms, while it becomes negative and insignificant during the crisis for both subsamples. Third, in contrast to the domestic subsample, where we find that younger firms perform better on average, age has a positive effect on performance in case of firms with some foreign ownership. In both cases, results are significant in the pre-crisis period and insignificant during the crisis. Finally, sales growth and liquidity ratio had a positive and significant effect on performance in both periods for the domestic subsample, while in the foreign subsample, the respective coefficients become insignificant.

[29] Results on remaining models and OLS estimation are available upon request.

[30] We are working with a relatively small subsample, only 630 observations, so this might partly explain these insignificant results.

TABLE 7. Firm performance and (foreign) financing: Ownership

Dependent v.: EBIT/TA	**Domestic ownership**		**Foreign ownership**		**State ownership**		**Private ownership**	
Period†	**P-C**	**C**	**P-C**	**C**	**P-C**	**C**	**P-C**	**C**
Model	3	3	3	3	3	3	3	3
Leverage	-0.94***	-0.39***	-0.44***	-0.41	-0.695***	-0.21**	-0.65***	-0.41***
	(0.28)	(0.10)	(0.04)	(0.36)	(0.26)	(0.10)	(0.15)	(0.11)
Foreign dummy	33.38*	9.00	35.26***	2.24	-16.61***	5.78	35.40***	7.97
	(17.94)	(7.24)	(11.77)	(9.77)	(6.08)	(7.83)	(11.41)	(5.88)
Leverage*Foreign dummy	-0.92*	-0.26	-1.01***	-0.00	0.49**	-0.27	-0.96***	0.20
	(0.52)	(0.21)	(0.36)	(0.31)	(0.20)	(0.35)	(0.33)	(0.17)
Control variables:								
Size (ln Assets)	18.81***	37.89***	14.50**	-8.57	22.97	42.46***	19.68***	33.92***
	(3.36)	(6.71)	(6.51)	(20.22)	(14.06)	(10.83)	(2.96)	(6.86)
Size^2 (ln Assets)	-0.72***	-2.26***	-0.90**	0.49	-0.63	-1.95***	-0.94***	-2.05***
	(0.27)	(0.46)	(0.41)	(1.20)	(0.88)	(0.63)	(0.21)	(0.47)
Tangibility	0.09*	-0.05	0.071	-0.07	-0.23	0.13	0.08**	-0.06
	(0.05)	(0.05)	(0.10)	(0.28)	(0.24)	(0.17)	(0.04)	(0.05)
Tangibility^2	0.00	-0.00	-0.00	-0.00	0.00	-0.00*	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age	-2.11**	-0.91	5.53*	3.71	-1.43	-8.77	-0.78	0.10
	(1.07)	(1.18)	(3.06)	(3.15)	(4.55)	(5.55)	(0.93)	(1.15)
Sales growth	0.02***	0.03***	0.01	0.01	0.01	0.01	0.02***	0.02***
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.02)	(0.00)	(0.00)
Liquidity ratio	0.01***	0.00***	0.00	0.00	0.00	0.01	0.01***	0.00***
	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)	(0.00)
Openness	-0.01	-0.01	0.05	-0.01	0.05	0.03	-0.00	-0.01
	(0.01)	(0.03)	(0.04)	(0.05)	(0.05)	(0.05)	(0.01)	(0.02)
Productivity	0.08***	0.06**	0.04***	0.31***	0.09***	0.09***	0.08***	0.08**
	(0.02)	(0.03)	(0.02)	(0.08)	(0.02)	(0.02)	(0.02)	(0.03)
Productivity^2	-0.00**	-0.00	-0.00*	-0.00	-0.00***	-0.00	-0.00**	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Kleibergen-Paap rk LM stat	28.71	21.39	4.49	7.89	20.77	11.39	4.35	25.91
(P-value)	0.000	0.000	0.034	0.005	0.000	0.001	0.037	0.000
Kleibergen-Paap rk Wald F stat	9.70	16.06	11.36	4.35	2.09	4.35	2.35	15.89
Size of distortion	$< 10\%$	$< 10\%$	$< 10\%$	$< 20\%$	$> 25\%$	$< 20\%$	$> 25\%$	$< 10\%$
Anderson-Rubin Wald test	23.18	11.38	439.01	3.87	5.18	2.42	33.42	11.76
(P-value)	0.000	0.000	0.000	0.020	0.006	0.090	0.000	0.000
R^2	-0.57	0.21	0.53	0.37	-0.34	0.23	-0.04	0.20
Observations	38,646	21,431	3,685	2,221	1,779	656	40,529	22,987

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in brackets. All specifications are estimated with firm fixed effects and include year dummies and an intercept. We report Kleibergen-Paap rk LM statistic as an underidentification test and Kleibergen-Paap rk Wald F statistic as a test for weak identification. We report also the Anderson Rubin Wald test, which is a significance test for coefficients on endogeneous variables, robust to the presence of weak instruments.
† P-C denotes pre-crisis period and C the crisis period.

State and private ownership. The most striking difference between the results for private firms and those for state-owned firms is the effect of using foreign financing on firm performance. The significant positive effect before the crisis that we saw in the full sample is entirely driven by private firms. Firms with state ownership instead had a significantly lower performance if they used some foreign debt financing. In the crisis period, the presence of foreign financing had a positive but insignificant effect on performance in both ownership samples.

Similarly interesting is the switch in the sign of the cross term coefficient in the two ownership types. Taking up some foreign debt financing in the pre-crisis period has improved the (significant) negative effect of overall leverage on performance in the case of state ownership, and worsened it in the case of private firms. Given that the coefficients on overall leverage are of similar magnitudes across the two subsamples, this means that the state-owned firms were losing less in terms of performace due to high leverage if they took up some foreign financing, than privately owned firms, that did the same. For the crisis period, the signs are turned but the coefficients remain insignificant.[31]

In terms of control variables, there are two further points worth noting. First is the lack of significance on the otherwise positive effect of firm size on performance for the state-owned companies in the pre-crisis period. Second, the positive effect of tangibility on firm performance in the pre-crisis period seems to be driven by the privately owned companies only.

7 Robustness

To start with, we verify the robustness of our baseline results by introducing a crisis dummy and estimating the model using data on the whole panel, rather than splitting the sample into a pre-crisis and crisis period. We introduce the cross terms with a crisis dummy only for our main variables of interest and by doing so, restrict the effects of control variables to be the same across the two periods. Further, we estimate the model with two alternative measures for performance and firm size. First, we employ cash flow as a measure of performance as an alternative to the net operating profit used in our baseline models. Second, we verify whether our baseline results are robust to a different measure of firm size. We follow Giannetti and Ongena (2009) and use a logarithm of employment as a proxy for firm size. As in the previous subsection, we focus only on the IV results, that we report in Tables 12 to 14 in the Appendix.

Crisis dummy. Introducing a crisis dummy and limiting the control variables to have the same effect across the two periods confirms our baseline results and gives additional information on the differences in the effects of financing options in the two periods. In particular, the negative effect of leverage on firm performance is signifiantly weaker during the crisis. Similarly, the positive effect of the presence of foreign financing becomes significantly smaller in the crisis times. Also the effect of the cross term is significantly reduced in the crisis period. As expected, the coefficient on the crisis dummy is negative and significant, meaning that firms have on

[31] Note that in both periods, the weak instrument test points to a rather large distortion of test size for pre-crisis period and in state ownership subsample also for the crisis times. According to the Anderson-Rubin test, however, we can reject the null hypothesis of coefficients on endogeneous variables being zero. The only exeption is the state ownership sample in the pre-crisis period, where the null can only be rejected at 10% significance rate.

average performed worse during the crisis.[32]

Among the control variables, the only difference lies in the negative effect of firm age on performance that becomes significant, when the model is estimated using the data on the whole period. This suggests that overall, younger firms outperformed the older ones.

Cash flow as measure of performance. Results are very similar to the baseline case and confirm that leverage affects firm performance in a negative way, with coefficients remaining highly significant in both periods.[33] Results regarding the effect of foreign financing have not changed markedly either, with positive effects of foreign financing on firm performance, and amplification of the negative coefficient on leverage. Like in the baseline version, the related coefficients are significant in the pre-crisis period and insignificant in the crisis.[34]

Some differences arise when we compare the effects of control variables. For example, the positive effect of tangibility before the crisis became stronger and even more significant (at 1%), and the effect for the crisis period turned positive from negative, while remaining insignificant. This is no surprise, since tangibility is highly associated with the depreciation that is a part of EBITDA. In other words, firms which have a lot of tangible assets will on average also have higher depreciation, which will - *ceteris paribus* - translate into higher EBITDA. When working with the EBIT as a measure of performance, this direct effect was not present. Additionally, the effect of firm age turns positive in both periods, with coefficients being significant in the pre-crisis period. One possible explanation for this could be that older firms accumulate on average more assets, which implies also more depreciation that is included in the performance measure that we use in this case, i.e. EBITDA. Again, this channel was absent in our baseline specification, where depreciation was excluded from the performance measure.

Employment as measure of firm size. Results are mainly in line with our baseline results and confirm our previous findings, i.e. leverage negatively affects performance, more so if firms have accessed foreign financing.[35] It is interesting that the effect of firm size becomes insignificant, while it was highly significant in the baseline case. This suggests that it is rather the firm's size in terms of total assets than in terms of number of employees that matters for firm performance. Moreover, the coefficient on firm age turns positive and highly significant in both periods. We could explain the two changes together along the following lines: since we excluded the relevant size proxy from our estimation and number of employees could not substitute it properly in terms of explaining the variations in firm performance, firm age became a proxy for the size of firm in terms of total assets.[36]

Since the firm size is usually determined looking at more than one variable, e.g. in EU legislation, the SME definition is based on turnover, total assets and the number of employees, we have checked how our results change if we take into account such broader definition of

[32]The weak instrument test points to a relatively large distortion of test size when estimating with crisis dummy. The significance of the endogeneous variables is however confirmed by the Anderson-Rubin Wald test.

[33]Results are presented in Table 13 in the Appendix.

[34]There is a rather large distortion of test size in the pre-crisis period, according to the Kleibergen-Paap weak instrument test, however, the Anderson-Rubin test confirms the significance of endogeneous variable(s) included in the second stage of IV estimation.

[35]Results are presented in Table 14 in the Appendix.

[36]The Anderson-Rubin Wald test confirms that coefficients on the endogeneous variable(s) included in our regression are significant despite a rather large distortion of the test size in the pre-crisis period.

SMEs.[37] We have thus estimated our baseline models for the subsamples of SMEs and large firms. The results for the SMEs are very similar to those for the full sample. For large firms, the coefficients on foreign debt financing (dummy or cross term) are insignificant. The sign, however is in line with the results for state-owned firms, with foreign loan presence having positive influence on performance before crisis and negative during the crisis. Given the similarity of the results for big and state owned firms and insignificant coefficients in estimation with big firms, we deem the ownership angle as more relevant in explaining heterogeneity among firms in terms of effects of financing choices on performance.[38]

8 Conclusion

This paper examines the impact of leverage and foreign debt financing on firm performance before and during the recent crisis. In particular we aim to answer the following questions: Have the effects of financial leverage on firm performance changed in crisis times? How did access to foreign debt financing affect firm performance, in particular, were firms that were able to get debt financing abroad relatively more successful in weathering the crisis? And was the effect of (foreign) debt financing on firm performance different depending on the ownership of the firm?

To answer these questions, we analyse non-financial firms in Slovenia, among which many rely on foreign financing and have experienced a boom-bust cycle over the last decade. We use a newly-constructed firm-level database, which is crucial for identifying the direct effects of foreign financing on firm performance, as it includes data on amount of lending from the rest of the world. This database also allows us to cover various types of firms in terms of size and ownership. We estimate several variants of our firm-level fixed-effects model for the period between 2001 and 2013.

Our results support the theoretical predictions of a negative relationship between leverage and performance, even when we explicitly control for the endogeneity. This does not change during the crisis. We find that firms with access to foreign financing performed better on average. When we include a cross term between leverage and foreign loans dummy and show that firms with some foreign financing pay a higher price - in terms of performance - when they increase total leverage relative to the firms without this source. In our last model, we explicitly control for the amount of foreign financing and we find that relatively more foreign debt improves firm performance in a significant way. This could be explained by stricter monitoring by foreigners, which reduces agency costs and positively affects performance. All the findings are supported by a number of robustness checks.

Additionally, we investigated whether the effect of (foreign) debt varies with different ownership types. We find that overall the signs and size of coefficients are not substantially different when comparing domestic firms with foreign ones, except for the negative impact of leverage that is larger for domestic firms. When we further inspect our results by separating state-owned and private companies, we find the significant positive effect of foreign financing on firm perfor-

[37] We follow the definition of the SMEs in EU Recommendation 2003/361.

[38] The results with subsamples of SMEs and large firms are available upon request.

mance in pre-crisis period to be entirely driven by private firms. During the crisis, the positive effect becomes insignificant for both ownership types.

Our results are informative for firm managers when deciding on the structure of financing sources. Depending on the amount of leverage, foreign debt financing could either have positive or negative effects on firm performance, since either the positive effect of borrowing abroad or the amplified negative effect of higher leverage could prevail. At the same time, our results indicate that in crisis times, foreign financing has smaller positive effects, which could be attributed to the tendency of banks to decrease their exposure to foreign markets in turbulent times. This would suggest that the government should support policies that limit the fragmentation of financial markets in crisis times.

However, there is still room for further research. For example, it would be interesting to improve the identification of lending channels by studying the bank-firm relationship by matching bank and firm balance sheets. This would give more detailed answers regarding the credit supply side factors of obtaining (foreign) financing and the potential pass-through to firm performance. In addition, a more detailed analysis looking at different sectors could give additional insight.

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A Definition of variables

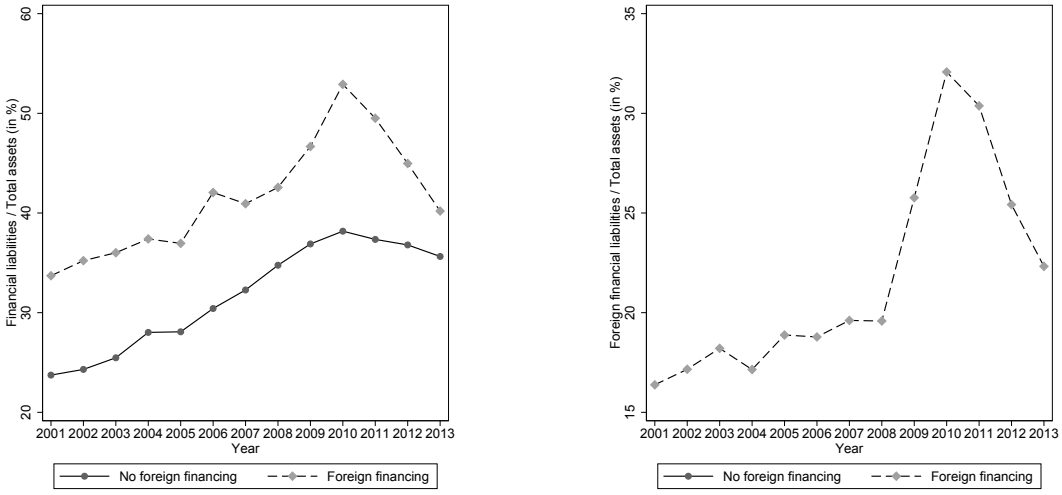
TABLE 8. Definition of variables

Variable	Constructed:
EBIT	Operating profit adjusted for operating loss (definition of Agency of the Republic of Slovenia for Public Legal Records and Related Services)
EBITDA	EBIT plus depreciation
Total assets	Total assets
Leverage	Short plus long term financial liabilities divided by total assets
Foreign loans	Long and short term loans plus financial leasing from ROW
Size	Logarithm of total assets. In the robustness section size measured as employment (average number of employees based on the number of work hours in the period).
Age	Number of years since foundation
Tangibility	Tangible assets (plant, property and equipment) divided by total assets
Value added	Gross operating returns minus the costs of merchandise, material and services and other operating expenses
Productivity	Real value added per full time equivalent (FTE) employee
Openness	Net sales outside domestic market divided by total net sales
Sales growth	Growth of net sales (calculated as difference in logs)
Liquidity ratio	Current assets minus inventories divided by short term liabilities
Interest expenses	Interest expenses divided by total assets
Share of foreign accounts payable	Trade and consumption loans from ROW and short term liabilities (trade credits) divided by total assets
Share of foreign accounts receivable	Trade and consumption loans given to foreigners and short term trade credits claims to ROW divided by total assets

B Graphs

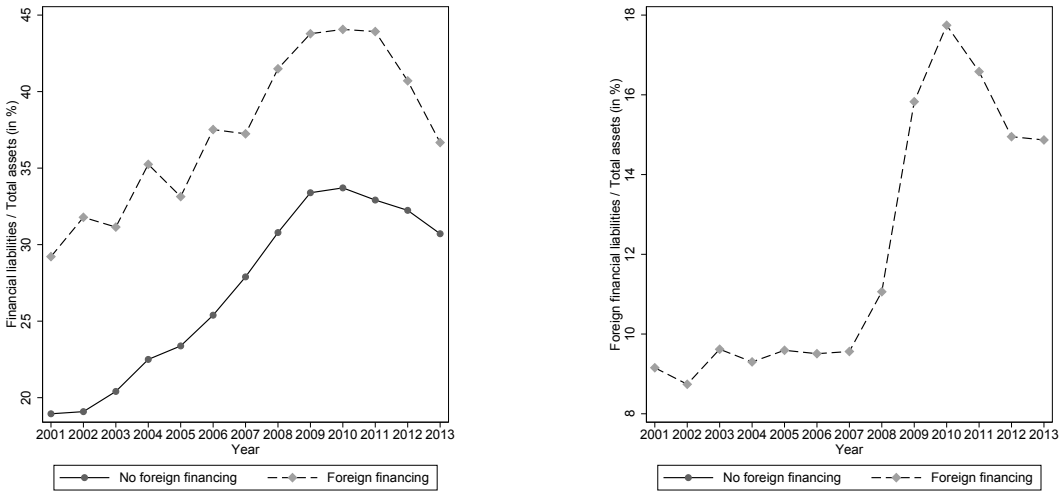
B.1 Leverage

FIGURE 1. Mean leverage



(A) Leverage (B) Foreign leverage

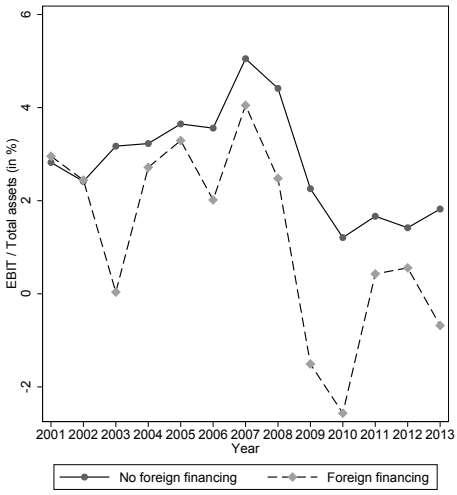
FIGURE 2. Median leverage



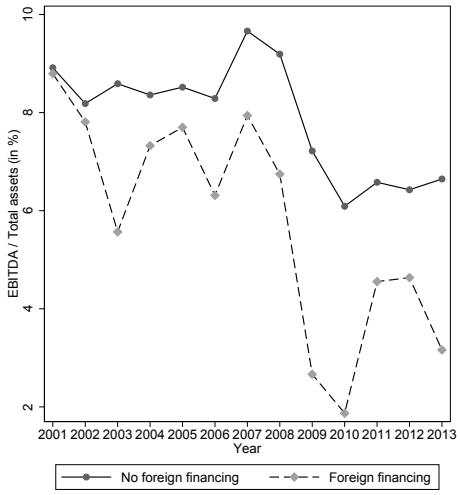
(A) Leverage (B) Foreign leverage

B.2 Performance

FIGURE 3. Mean performance

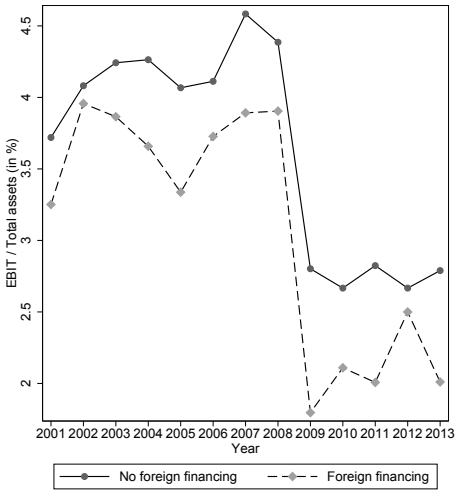


(A) Net operating profit

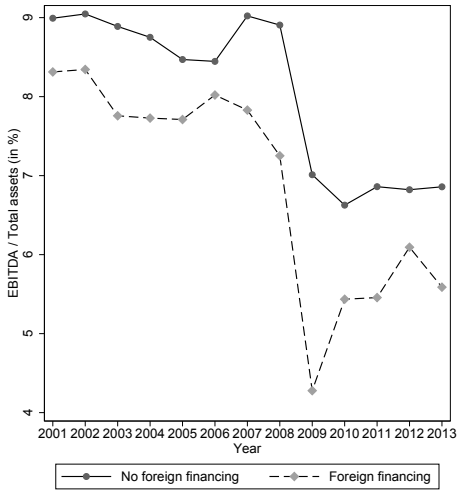


(B) Cash flow

FIGURE 4. Median performance



(A) Net operating profit



(B) Cash flow

C Descriptive statistic

TABLE 9. Descriptive statistics: Sample of firms without foreign debt

	A. Before crisis				B. Crisis			
	mean	p25	p50	p75	mean	p25	p50	p75
EBIT / TA (%)	3.53	0.96	4.21	8.70	1.65	0.55	2.75	5.82
EBITDA / TA (%)	8.67	4.30	8.79	14.59	6.56	3.32	6.82	11.60
Financial liabilities / TA (%)	28.65	11.07	23.47	40.69	37.13	17.57	32.78	50.90
Foreign fin. liabilities / TA (%)	24.02	4.07	13.41	33.79	22.22	2.78	12.52	31.59
Size (assets, in 1000 EUR)	3350.14	183.00	512.00	1667.50	4381.98	289.00	748.00	2223.00
Size (employment)	31.23	3.00	6.00	17.00	26.69	3.00	6.00	16.00
Firm age	11.39	8.00	12.00	14.00	14.31	8.00	17.00	20.00
Tangibility (%)	37.44	15.45	35.38	56.43	36.82	13.21	34.40	56.55
Firm openness (%)	12.31	0.00	0.00	10.19	13.87	0.00	0.39	13.23
Productivity	33.73	17.00	24.75	37.17	36.46	19.83	27.98	40.54
Sales growth (%)	10.77	-6.52	7.83	23.48	-2.92	-19.20	-2.45	12.49
Liquidity ratio (%)	94.05	46.69	75.46	109.62	100.57	42.86	76.29	118.10
Interest expenses / TA (%)	2.13	0.69	1.56	2.81	1.67	0.67	1.32	2.22
Observations	40496				22696			

TABLE 10. Coverage of firms in the sample

	Nr. of all firms	Nr. of firms with foreign debt
	N	N
2001	4150	211
2002	5039	272
2003	5519	267
2004	5913	267
2005	6118	252
2006	5741	201
2007	5012	195
2008	4844	175
2009	4620	167
2010	5100	203
2011	5063	199
2012	4757	208
2013	4112	179
Observations	65988	2796

D Chow test

We test whether the difference in coefficients in relationship between leverage and firm performance is statistically significant before and during the crisis. When estimating with OLS we cannot reject the null hypothesis that the coefficients are equal for leverage in both periods at 5% significance level, in models M1-M2 On the other hand, in the case of IV estimates, the

hypothesis that the coefficients are equal across the two subperiods is rejected even at 1% level of significance.

TABLE 11. Chow test for equality of coefficients on leverage pre- and during crisis

Model	1		2		3	
	$F-test$	$Prob.$	$F-test$	$Prob.$	$F-test$	$Prob.$
OLS	2.91	0.088	3.16	0.075	4.16	0.041
IV	7.22	0.007	7.03	0.008	6.81	0.009

E Robustness

E.1 Crisis as dummy

TABLE 12. Firm performance and (foreign) financing: Crisis as dummy

Dependent v.: EBIT/TA	A. IV		B. IV with crisis dummy		
Model†	3(P-C)	3(C)	1	2	3
Crisis Dummy (CD)			-13.762***	-13.741***	-12.376***
			[3.690]	[3.667]	[3.214]
Leverage	-0.6487***	-0.4059***	-0.6753***	-0.6763***	-0.6019***
	[0.153]	[0.112]	[0.134]	[0.135]	[0.115]
Leverage*CD			0.2969***	0.2975***	0.2569***
			[0.110]	[0.111]	[0.097]
Foreign dummy (FD)	33.360***	7.7445		1.9153**	31.377***
	[11.311]	[5.676]		[0.871]	[11.23]
FD*CD				-0.7797	-20.565*
				[1.029]	[11.35]
Leverage*FD	-0.9276***	-0.1890			-0.8471***
	[0.334]	[0.164]			[0.323]
Leverage*FD*CD					0.5813*
					[0.308]
Controls:					
Size	19.242***	33.335***	18.559***	18.481***	18.519***
	[2.917]	[6.451]	[2.129]	[2.131]	[2.063]
$Size^2$	-0.8870***	-1.9879***	-0.8946***	-0.8906***	-0.9178***
	[0.208]	[0.432]	[0.145]	[0.146]	[0.138]
Tangibility	0.0658*	-0.0580	0.0294	0.0294	0.0256
	[0.037]	[0.050]	[0.024]	[0.024]	[0.023]
$Tangibility^2$	0.0002	0.0001	0.0002	0.0002	0.0002
	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]
Age	-0.6439	-0.0522	-1.5153**	-1.5285**	-1.7726***
	[0.910]	[1.142]	[0.684]	[0.689]	[0.643]
Sales growth	0.0216***	0.0219***	0.0247***	0.0247***	0.0253***
	[0.004]	[0.004]	[0.003]	[0.003]	[0.003]
Liquidity ratio	0.0042***	0.0031***	0.0026***	0.0026***	0.0030***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Openness	-0.0018	-0.0058	-0.0040	-0.0042	-0.0007
	[0.012]	[0.023]	[0.009]	[0.009]	[0.009]
Productivity	0.0643***	0.0788**	0.0511***	0.0510***	0.0511***
	[0.010]	[0.031]	[0.012]	[0.012]	[0.012]
$Productivity^2$	-0.0001***	-0.0002	-0.0000**	-0.0000**	-0.0000**
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Kleibergen-Paap rk LM stat	4.47	26.59	7.81	7.77	6.92
(P-value)	0.0344	0.000	0.005	0.005	0.009
Kleibergen-Paap rk Wald F stat	2.42	16.30	4.26	4.24	1.90
Size of distortion	>25%	< 10%	< 20%	< 20%	–
Anderson-Rubin Wald test	32.69	11.78	19.54	19.54	24.72
(P-value)	0.000	0.000	0.000	0.000	0.000
R^2	-0.057	0.20	0.048	0.047	0.045
Observations	42,336	23,652	65,988	65,988	65,988

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in brackets. All specifications are estimated with firm fixed effects and include year dummies and an intercept. For the IV estimation we report Kleibergen-Paap rk LM statistic as an underidentification test and Kleibergen-Paap rk Wald F statistic as a test for weak identification. We report also the Anderson Rubin Wald test, which is a significance test for coefficients on endogeneous variables, robust to the presence of weak instruments.

† P-C denotes pre-crisis period and C the crisis period

E.2 Results using EBITDA/TA measure of performance

TABLE 13. Firm performance and (foreign) financing: using EBITDA/TA

Dependent v.: EBITDA/TA	A. Pre-crisis			B. Crisis		
Model (IV)	1	2	3	1	2	3
Leverage	-0.6427***	-0.6431***	-0.5811***	-0.4037***	-0.4038***	-0.3902***
	(0.145)	(0.145)	(0.128)	(0.107)	(0.107)	(0.113)
Foreign dummy		1.7560**	25.182**		0.1859	7.0477
		(0.763)	(11.36)		(1.313)	(5.737)
Leverage*Foreign dummy			-0.6873**			-0.1734
			(0.334)			(0.166)
Control variables:						
Size (ln Assets)	13.363***	13.349***	13.794***	26.319***	26.323***	26.597***
	(2.918)	(2.919)	(2.818)	(6.465)	(6.461)	(6.452)
$Size^2$ (ln Assets)	-0.6124***	-0.6132***	-0.6699***	-1.6452***	-1.6456***	-1.6707***
	(0.208)	(0.208)	(0.198)	(0.431)	(0.431)	(0.429)
Tangibility	0.1494***	0.1490***	0.1427***	0.0123	0.0122	0.0111
	(0.035)	(0.035)	(0.034)	(0.051)	(0.051)	(0.051)
$Tangibility^2$	-0.0006*	-0.0006*	-0.0006*	-0.0005	-0.0005	-0.0005
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Age	1.8867**	1.8642**	1.6835**	1.7996	1.7987	1.7716
	(0.862)	(0.863)	(0.857)	(1.156)	(1.155)	(1.160)
Sales growth	0.0190***	0.0190***	0.0198***	0.0206***	0.0206***	0.0208***
	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)
Liquidity ratio	0.0038***	0.0038***	0.0042***	0.0030***	0.0030***	0.0031***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Openness	-0.0008	-0.0010	0.0045	-0.0011	-0.0012	-0.0030
	(0.010)	(0.010)	(0.010)	(0.023)	(0.023)	(0.024)
Productivity	0.0685***	0.0685***	0.0684***	0.0824**	0.0824**	0.0824**
	(0.011)	(0.011)	(0.011	(0.032)	(0.032)	(0.033)
$Productivity^2$	-0.0000***	-0.0000***	-0.0000***	-0.0000	-0.0000	-0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Kleibergen-Paap rk LM stat	5.20	5.19	4.47	28.86	28.74	26.59
(P-value)	0.023	0.023	0.034	0.000	0.000	0.000
Kleibergen-Paap rk Wald F stat	5.601	5.591	2.422	35.09	34.966	16.297
Size of distortion	<25%	< 25%	>25%	< 10%	< 10%	< 10%
Anderson-Rubin Wald test	11.26	11.26	60.95	15.17	15.11	10.68
(P-value)	0.001	0.001	0.000	0.000	0.000	0.000
R^2	0.036	0.035	0.040	0.184	0.184	0.184
Observations	42,336	42,336	42,336	23,652	23,652	23,652

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in brackets. All specifications are estimated with firm fixed effects and include year dummies and an intercept. For the IV estimation we report Kleibergen-Paap rk LM statistic as an underidentification test and Kleibergen-Paap rk Wald F statistic as a test for weak identification. We report also the Anderson Rubin Wald test, which is a significance test for coefficients on endogeneous variables, robust to the presence of weak instruments.

E.3 Results using employment as size measure

TABLE 14. Firm performance and (foreign) financing: using employment as size measure

Dependent v.: EBIT/TA	A. Pre-crisis			B. Crisis		
Model (IV)	1	2	3	1	2	3
Leverage	-0.8015***	-0.8019***	-0.7161***	-0.4853***	-0.4855***	-0.4735***
	(0.208)	(0.208)	(0.181)	(0.109)	(0.109)	(0.115)
Foreign dummy		2.6077***	34.2409***		0.5850	6.4204
		(1.007)	(11.499)		(1.310)	(5.796)
Leverage*Foreign dummy			-0.9293***			-0.1477
			(0.342)			(0.168)
Control variables:						
Size (ln Employment)	0.1159	0.1308	0.3762	-0.1173	-0.1232	-0.0164
	(0.855)	(0.853)	(0.812)	(1.054)	(1.056)	(1.080)
Size^2 (ln Employment)	0.0414	0.0336	-0.0109	-0.1762	-0.1748	-0.2001
	(0.144)	(0.143)	(0.141)	(0.187)	(0.187)	(0.192)
Tangibility	0.1105**	0.1020**	0.1003**	-0.0463	-0.0464	-0.0472
	(0.045)	(0.044)	(0.042)	(0.052)	(0.052)	(0.052)
Tangibility^2	0.0005	0.0005	0.0005	0.0003	0.0003	0.0003
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Age	3.4646***	3.4218***	3.0655***	2.6094**	2.6053**	2.5640**
	(0.868)	(0.867)	(0.888)	(1.084)	(1.083)	(1.089)
Sales growth	0.0268***	0.0268***	0.0276***	0.0245***	0.0245***	0.0246***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Liquidity ratio	0.0040***	0.0040***	0.0045***	0.0029***	0.0029***	0.0030***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Openness	0.0069	0.0066	0.0129	0.0035	0.0033	0.0016
	(0.011)	(0.011)	(0.012)	(0.023)	(0.023)	(0.024)
Productivity	0.0704***	0.0703***	0.0701***	0.0774**	0.0774**	0.0774**
	(0.011)	(0.011)	(0.011)	(0.031)	(0.031)	(0.031)
Productivity^2	-0.0000***	-0.0000***	-0.0000***	-0.0000	-0.0000	-0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Kleibergen-Paap rk LM stat	4.90	4.89	4.25	28.65	28.55	26.50
(P-value)	0.027	0.027	0.039	0.000	0.000	0.000
Kleibergen-Paap rk Wald F stat	5.30	5.30	2.32	36.61	36.5	16.98
Size of distortion	>25%	>25%	>25%	< 10%	< 10%	< 10%
Anderson-Rubin Wald test	12.00	12.00	60.01	19.17	19.13	12.08
(P-value)	0.001	0.001	0.000	0.000	0.000	0.000
R^2	-0.219	-0.219	-0.188	0.143	0.143	0.144
Observations	42,336	42,336	42,336	23,652	23,652	23,652

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in brackets. All specifications are estimated with firm fixed effects and include year dummies and an intercept. For the IV estimation we report Kleibergen-Paap rk LM statistic as an underidentification test and Kleibergen-Paap rk Wald F statistic as a test for weak identification. We report also the Anderson-Rubin Wald test, which is a significance test for coefficients on endogeneous variables, robust to the presence of weak instruments.

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