Firm Performance and (Foreign) Debt Financing Before and During the Global Financial Crisis: Evidence from Firm-Level Data*

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Abstract

We examine the impact of financial leverage and foreign financing on firm performance using a large panel of Slovenian firms, before and during the Global Financial Crisis. We find a significant negative effect of leverage on firm performance, even after explicitly controlling for reverse causality, with this effect persisting but weakening during the crisis. Before the crisis, firms that borrowed abroad performed better, although the marginal cost of additional leverage was higher when borrowing abroad. When explicitly controlling for the amount of foreign financing, we find a positive and highly significant effect on firm performance in the pre-crisis period. The positive effect of foreign borrowing is concentrated in privately owned firms (and negative for state-owned firms), and it holds for both domestically and foreign-owned firms. During the crisis, the effect of foreign financing is attenuated and largely insignificant across specifications.

Keywords: Leverage, Foreign leverage, Global Financial Crisis, Firm performance, Panel data

JEL Classification: C33, C36, G32

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1 Introduction

In the period leading up to the Global Financial Crisis (GFC), firms in many European countries significantly increased their leverage, driven by reduced global uncertainty and favourable financing conditions. This surge in corporate leverage was facilitated by greater financial integration and increased cross-border lending, both through the interbank market and directly to firms. However, with the onset of the crisis, these financial flows initially halted and subsequently reversed, significantly restricting firms' access to new financing and revolving loans.[1] While some firms managed to replace domestic loans with direct foreign borrowing, others experienced a sudden and complete halt in foreign funding. Faced with the sudden withdrawal of credit, many firms simultaneously experienced more volatile cash flows, making risk management a crucial mechanism for preserving debt capacity and avoiding distress.[2]

In this paper, we examine how leverage and access to foreign financing translate into firm performance before and during the GFC, using detailed firm-level data. Empirical studies often find a negative correlation between overall leverage and firm performance (see, e.g., Titman and Wessels, 1988; Rajan and Zingales, 1995; Majumdar and Chhibber, 1999; Kalemli-Özcan et al., 2022; Blickle and Santos, 2024). However, recent quasi-experimental evidence suggests this negative correlation need not be very persistent (Heath and Sertsios, 2022). The theoretical implications are ambiguous.[3] On the one hand, debt can mitigate managerial agency problems and reduce taxes. On the other hand, excessive debt can create overhang and distress costs that harm investment and overall performance.

Because we observe foreign and domestic financial liabilities at the firm-year level, we explore the role of foreign financing, building on previous work on foreign bank presence (Giannetti and Ongena, 2009; Shang and Xing, 2025) and international debt markets (syndicated loans and bonds) (Harvey et al., 2004; Gregorio and Jara, 2024; Huang et al., 2024). Using detailed financial data, we measure direct borrowing from abroad and examine non-linearities arising from the interaction between foreign borrowing and firm leverage (Giannetti and Ongena, 2012; Ongena et al., 2015). Because the advantages of foreign funding are time-varying (Correa et al., 2022; Bahaj and Malherbe, 2024), we estimate separate pre-crisis and crisis effects around the GFC, complementing work by Clarke et al. (2012); Kalemli-Özcan et al. (2022).

We use a large panel of Slovenian firms from 2001 to 2013, covering a broad 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. Compared to previous studies focusing on listed companies or specific sectors (e.g., Clarke et al., 2012; Medina, 2012; Wu, 2012; Claessens et al., 2000), our dataset includes all non-financial corporations with complete data, excluding only sole proprietors and certain state-owned firms.

We estimate the effect of financing choices on firm performance using fixed-effects estimation,

[1] Underlying causes include weaknesses in the banking sector and firm-specific issues such as reduced demand and deteriorating creditworthiness amid the recession.

[2] A vast finance literature shows that by smoothing cash flows, effective hedging can lower expected distress costs, expand debt capacity, reduce tax liabilities, and encourage productive investment (see, e.g., Smith and Stulz, 1985; Froot et al., 1993; Graham and Smith, 1999; Leland, 1998; Graham and Rogers, 2002; Fehle and Tsyplakov, 2005; Purnanandam, 2008).

[3] See Myers (2001) for a detailed overview on this topic.

where firm performance is measured by Earnings Before Interest and Taxes (EBIT), and leverage by total financial liabilities, both scaled by total assets. To assess the impact of foreign debt financing, we include a dummy variable indicating the presence of foreign financing, and in an alternative specification, we use the share of foreign financial liabilities in total assets as a regressor. All specifications incorporate additional control variables and time fixed effects. To explore differences over the business cycle, we split the sample into pre-crisis and crisis periods. We further investigate whether the relationship varies by firm ownership structure, particularly distinguishing between domestic and (partially) foreign-owned firms, as well as those with state ownership involvement.

In addition to our baseline estimates, we address potential reverse causality between financing choices and firm performance. Capital structure, especially financial leverage, can influence a firm's performance and market valuation, which in turn may affect managerial decisions regarding financing.[4] Similarly, while firm performance may depend on the extent of foreign financing, a firm's ability to access foreign debt may itself be influenced by its performance. To address this endogeneity, we use interest expenses as an instrument for leverage. Interest expenses are strongly correlated with leverage but, by construction, are excluded from our performance measure (EBIT), which captures operating profitability before accounting for financing costs. Moreover, we instrument the share of foreign financing with foreign accounts payable, which in the Slovenian context are highly correlated with foreign liabilities. Importantly, foreign accounts payable are generally more influenced by the firm's sector of activity than by its performance *per se*, making them a valid instrument.[5] This approach aligns with the instrumental variable strategies used in related studies (see, e.g., Berger and Bonaccorsi di Patti, 2006; Margaritis and Psillaki, 2010).

Our first finding is that leverage has a negative effect on firm performance, regardless 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 in either underinvestment (Myers, 1977; Stulz, 1990) or investment in overly risky projects (Jensen and Meckling, 1976). Recent evidence also documents the real costs of debt overhang for investment, employment, and firm growth (Blickle and Santos, 2024). The negative sign is consistent with prior evidence for Slovenian blue-chip firms, which documents a negative relation between leverage and performance (Mramor and Valentinčič, 2001; Berk, 2006).

Second, we find a negative effect in both the pre-crisis and crisis periods, with the effect being significantly larger before the crisis. How can we explain this finding? On the one hand, one could expect a more negative effect of debt on firm performance during the crisis, as higher debt aggravates the firm's problems with access to financing, due to the higher risk of liquidation. High leverage also increases the burden of debt servicing, reducing available free

[4] Only a few papers have explicitly addressed this endogeneity issue, notably Baker (1973), Berger and Bonaccorsi di Patti (2006), and Margaritis and Psillaki (2010). For an overview of endogeneity concerns and potential solutions, see Roberts and Whited (2013).

[5] Fisman and Love (2003) show that reliance on trade credit is strongly related to industry characteristics and financial development, suggesting that accounts payable reflect sectoral patterns rather than contemporaneous firm performance.

cash flow—an issue that becomes particularly acute during crises, when cash flows typically deteriorate. Conversely, high debt may also reflect that a firm could finance promising projects even during a crisis and 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 can smooth production and employment. Other firms will instead have to cut their production, and will thus be hurt more by the squeeze. Our finding is in line with the latter explanation.

The third key finding is that foreign debt is positively associated with performance both before and during the crisis, although the coefficient is statistically significant only in the pre-crisis period. Consistent with this, firms with a larger share of foreign funds in total liabilities perform better in the pre-crisis period. The positive relationship between foreign financing and firm performance is consistent with evidence that foreign-bank presence and access to international debt markets relax financing frictions—through stricter monitoring, risk management, and disclosure—hence supporting investment capacity (Giannetti and Ongena, 2009; Gregorio and Jara, 2024). The mechanism is that international creditors' oversight and contracting standards reduce information asymmetry and agency problems, potentially improving operating outcomes.

Results differ by ownership. Before the crisis, foreign borrowing was positively associated with performance for both domestic and foreign-owned firms, but it increased the marginal cost of leverage. For state-owned firms, foreign borrowing reduces performance, although it slightly mitigates the adverse effect of leverage. During the crisis, the foreign borrowing effect is largely insignificant across ownership types, while leverage continues to depress performance.

Our results suggest that foreign debt plays a dual role; on the one hand, it reduces asymmetric information through tighter monitoring, enhancing performance. On the other hand, it can also exacerbate the negative impact of total leverage on performance. The threshold amount, i.e., where the benefit of foreign debt outweighs the negative effects, is highly idiosyncratic to firms, their business plans, and their level of leverage. For moderately leveraged firms, the positive effects prevail over the negative ones. This non-linear relationship echoes Purnanandam (2008), who shows that hedging adds value at moderate leverage levels, but beyond a certain threshold, heightened bankruptcy risk dominates, and performance deteriorates.

The rest of the paper is structured as follows. Section 2 presents empirical literature studying the relation between leverage and performance. In Section 3, we describe the data used and present the descriptive statistics of our sample, along with a qualitative assessment of developments in Slovenia. Section 4 presents the models and estimation approach. We present our results in Section 5. Section 6 concludes.

2 Empirical literature

Early work documented 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 studies exam-

ining the effect of leverage on firm performance include McConnell and Servaes (1995), Pushner (1995), Majumdar and Chhibber (1999), and Stierwald (2010), among others.[6]

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 that leverage in the G7 countries is positively affected by the tangibility of assets, investment opportunities (proxied by the market-to-book ratio), and firm size, and negatively affected by profitability. Fama and French (2002) confirm that more profitable firms and those with higher investment levels typically have lower financial leverage due to their higher returns on investment. Grossman and Hart (1982) and Aivazian et al. (2005) confirm a negative relation between financial leverage and investment, which is in line with the agency cost theory of underinvestment. Moreover, Mramor and Valentinčič (2001) and Berk (2006), who explore the relationship between performance and capital structure using a sample of Slovenian blue chips during the transition period, also find a negative relationship. They link their results to the pecking order theory, which states that better-performing firms use more internal financial resources and less debt financing. Some studies also emphasise the role of operating leverage in shaping the observed negative relation between profitability and financial leverage (Chen et al., 2019).

Few studies 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 the debt-to-equity ratio on firm profitability, while a simple ordinary least squares (OLS) estimation, conversely, yields a coefficient of the opposite sign.[7]

Berger and Bonaccorsi di Patti (2006) and Margaritis and 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.

Several papers have examined the non-linear relationship between financial leverage and firms' productivity growth. In particular, for the sample of CEE countries, Coricelli et al. (2012) estimate a threshold for leverage, above which leverage hurts firm productivity. The estimated threshold is then used explicitly in the analysis of the effects of leverage on firm productivity. Other studies that account for non-linearity include squared terms of leverage in their empirical models (for example, see Margaritis and Psillaki, 2010). Furthermore, quasi-natural experiments reveal complex dynamics in the profitability-leverage nexus, showing that firms may temporarily reduce leverage in response to shocks that increase profitability but

[6] See Weill (2008) for a detailed overview.

[7] 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 several market variables (capital requirements, firm concentration, economies of scale relative to the market size and growth in industry output).

gradually revert to prior leverage targets, in line with dynamic trade-off models (Heath and Sertsios, 2022).

2.1 Empirical literature on foreign debt financing

Although research on foreign debt financing and firm performance is growing, it remains limited. Most studies find positive effects. Using a sample of firms from emerging economies, Harvey et al. (2004) show that issuing syndicated loans in the international market reduces information asymmetry and agency costs through stricter external monitoring. In contrast, using Indian firms, Ghosh (2008) find that the negative leverage–profitability relation is larger for firms accessing international debt markets. More recent evidence from international bond markets suggests that external market access alleviates financing frictions and enhances investment or intra-group liquidity (Gregorio and Jara, 2024; Huang et al., 2024).

Foreign bank lending shows similar patterns. Using a panel of listed and unlisted companies from Eastern European economies,Giannetti and Ongena (2009) find that lending by foreign-bank subsidiaries boosts sales, assets, and the use of financial debt, while lowering borrowing costs. In another paper (Giannetti and Ongena, 2012), where they identify firms' primary bank relationships, they document positive direct effects for borrowers from foreign banks and indirect gains from the presence of foreign banks. Relatedly, (Shang and Xing, 2025) shows that foreign bank entry promotes firm innovation. Macro evidence shows that larger inflows of international bank lending relax local credit constraints and raise investment and activity (Aldasoro et al., 2023), while a deglobalisation shock (Brexit) cut foreign bank lending and dampened real activity (Imbierowicz et al., 2025).

Foreign leverage exposes firms to exchange rate risk, which can impact firm performance and its value if left unhedged. Allayannis and Weston (2001) find higher market valuations for FX-derivative users, while Bartram et al. (2011) show reduced risk and more stable debt-servicing costs with mixed evidence on valuation. In particular, during periods of financial turbulence, financial derivatives help stabilise cash flows and reduce uncertainty related to debt servicing costs, thereby preserving firm value. In our context, this is less of a concern since Slovenia joined the European Exchange Rate Mechanism (ERM II) in 2004 and adopted the euro in 2007, which effectively eliminated exchange rate risk.

2.2 Effects of (foreign) leverage during crisis

In addition to research on determinants of corporate performance during the 1990s Asian crisis (see, e.g., Claessens et al., 2000), a handful of papers examine how financial leverage and access to foreign financing affected firm performance, survival and recovery during the GFC. For example, Medina (2012) find that firms with higher pre-crisis leverage performed worse during the crisis, using data on listed companies during the GFC. Specifically, they find a non-linear negative effect of leverage, with the negative effects particularly strong in firms with high pre-crisis leverage. Similarly, Wu (2012) find that Chilean firms dependent on external financing-—i.e., those unable to fund operations from retained earnings–experienced steeper

downturns during the GFC.[8]

Turning to emerging markets, Clarke et al. (2012) examine how financial constraints and access to financing affected firm survival in the first year of the GFC. They find that firms with access to financing have weathered the crisis better. Moreover, they find that financial constraints were lower for older and larger firms, although they became more pronounced for the latter during the crisis. The constraints were also less severe during the crisis in countries with foreign bank presence. Using European firm–bank data, Kalemli-Özcan et al. (2022) show that firms entering the crisis with higher leverage and shorter-maturity debt cut investment more.

Using Slovenian firm-level data, Herman and Krahnke (2022) show that firms with a higher share of foreign equity in total external financing were less affected by the GFC and less likely to default thereafter. The authors attribute this resilience to intra-firm loans and trade credit that provided liquidity when external markets were distressed.

Closest to our analysis is a study by Ongena et al. (2015), which analyses firm performance during the GFC using matched bank-firm level data with information on banks' international wholesale funding and foreign ownership. They find that firms, whose relationship bank (domestic or foreign) funded itself internationally before the crisis, suffered larger declines in financing and real performance during the crisis than firms borrowing from locally funded domestic banks. Adverse shocks to credit had a significantly stronger impact on firms with a single bank relationship, as well as smaller firms or those with less tangible assets that could be pledged as collateral.[9] In contrast, our dataset also allows us to analyse the role of the amount of foreign borrowing. Additionally, we can also capture non-linear effects stemming from the interaction of foreign financing and firm leverage. Finally, we perform these analyses while explicitly controlling for reverse causality between financing choice and firm performance.

3 Data

3.1 Data and sample construction

For the empirical analysis, we use annual data from a firm-level database that contains detailed qualitative and financial information on all Slovenian firms from 1995 onwards.[10] 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. Since foreign loan data have been available since 2001, we adjust our sample accordingly.[11] The sample size is also adjusted based on the data

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

[9] They use data from Eastern Europe and Central Asia, which includes many SMEs.

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

[11] We use "foreign loans" and "foreign financial liabilities" interchangeably, as non-loan components (e.g., financial leasing from the rest of the world (ROW)) are negligible in our sample.

availability necessary for our analysis, thereby including firms that have reported values for all the variables used in our specifications.[12] Our sample is unbalanced, since the coverage of firms' financial information varies constantly throughout the sample period. Most of it is due to normal firm dynamics (i.e., the creation versus destruction of firms), and some is due to reporting errors. The coverage in terms of value added is relatively stable over the years, with firms in the sample contributing approximately 41% of the total value added in the economy. Table 10 in the Appendix C reports the sample size for each year for the full sample and 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 sole proprietors, whereas McConnell and Servaes (1995) and Rajan and Zingales (1995) limit their sample to listed companies, and Berk (2006) and Stierwald (2010) focus on a sample of large firms. Furthermore, comparable studies examining the relationship between firm performance and financial leverage primarily focus on the manufacturing sector (e.g. Pushner, 1995; Weill, 2008; Coricelli et al., 2012). We broadly follow the approach of Driffield and Pal (2010) and Rajan and Zingales (1995), which exclude the financial sector and the government sector, respectively. Our sample thus includes all public, private, domestically and foreign-controlled non-financial corporations, but excludes the government and financial sectors.[13] In addition, some publicly owned firms with 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 into 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; however, due to financial distress in the corporate sector, balance sheets deteriorated further.[14]

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 firms with some foreign ownership, whether through foreign direct investment (FDI) or portfolio investment. We also examine how state ownership affects the impact of financing choices on firm performance. For this, we divide

[12] An exception applies to firms with 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 amounts of foreign financing are set to zero. Additionally, observations with zero sales are dropped from the sample.

[13] Non-financial corporations are sector S.11 in ESA 95 classification.

[14] Note that our sample also covers a period in which there was a change in the accounting standards. In particular, since 2006, firms' assets have no longer been valued at their book value. The firms could alternatively use the mark-to-market approach for the 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 including year dummies to capture the structural break.

our sample into two subsamples: (i) private firms, defined as those with corporate, private, or cooperative ownership; and (ii) state-owned firms, comprising all firms identified as having mixed or state ownership.[15]

3.2 Qualitative assessment - Choice of financing and firm performance in Slovenia

Bank loans are the most prevalent source of financing in small countries with less developed capital markets, and in Slovenia, most firm investments are financed via bank loans.[16] Between 2001 and 2008, the average annual growth rate of bank loans to domestic firms exceeded 20%, peaking just before the crisis (at the 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, its adoption of the euro in 2007, which eliminated exchange rate risk and facilitated access to foreign and often cheaper foreign (mostly euro-denominated) financing for firms, and especially banks.[17] Firms accessed this foreign financing both directly and indirectly, the latter via the domestic banking sector, where domestic banks obtained foreign financing and transmitted it to firms. As we cannot 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 consider only the information on direct foreign financing.

High loan growth resulted in higher firm indebtedness, as shown in Figures 1–2 in the Appendix B. First, we observe that firms with some foreign financial liabilities were, on average, more leveraged than their counterparts that did not borrow 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. 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 preceding the crisis, firms faced difficulties in obtaining and revolving loans. As a result, the growth rate of financial liabilities slowed.

Figure 3 in the Appendix B shows the average performance of firms with foreign debt compared to those without it. From the data, it is evident that firms without foreign debt, on average, performed better than those with some foreign financing. Before the crisis, differences were relatively small, whereas in the years 2009 and 2010, the gap in performance between the two samples of firms widened due to a relatively larger decline in performance among 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 Section 4.

[15] 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.

[16] Throughout the sample, debt securities accounted for less than 2% of total Slovenian corporate debt and were concentrated among a handful of the largest firms Bank of Slovenia (2013).

[17] Before Slovenia joined ERM II, much of the exchange rate exposure was naturally hedged. Firms in manufacturing and transportation, which primarily used foreign bank loans, earned approximately 60% of their revenues abroad, mainly from euro area countries, effectively offsetting exchange rate risk Bank of Slovenia (2005).

3.3 Descriptive statistics

The descriptive statistics are presented in Table 1 for the full sample and in Table 2 for the subsample of firms with some foreign debt.[18] The tables are further split into panels that report descriptive statistics for the pre- and crisis periods, respectively.[19]

Our measure of firm performance, which we refer to as *operating profit*, is calculated as the ratio of Earnings Before Interest and Taxes over Total Assets (EBIT/TA) and is also our main measure. Not surprisingly, firms performed better in the pre-crisis period than during the crisis.

TABLE 1. Descriptive Statistics: Full Sample

	A. Before Crisis				**B. Crisis**			
Variable	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
Financial liabilities / TA	28.99	11.33	23.89	41.11	37.52	17.80	33.13	51.14
Foreign financial liabilities / TA	19.46	3.23	10.09	26.41	26.43	3.89	15.00	37.42
Size (assets)	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	42,336				23,652			

Foreign leverage statistics are computed conditional on positive foreign debt.

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 accounted for 29% of the total assets of firms before the crisis. This share increased by about 9 percentage points during the crisis. Both during the pre-crisis period and the crisis period, firms with foreign financing were on average more leveraged. For these firms, the average ratio rose by almost 10 percentage points to 46.9% during the crisis.

Furthermore, we measure *foreign leverage* as the ratio of foreign financial liabilities to total assets. Mean foreign leverage stood at 19.5% of total assets before the crisis and increased to an average of 26.4% in the crisis years.

Turning to other firm characteristics, we see that the average *firm size* increased during the crisis.[20] Not surprisingly, firms with foreign financing are on average larger. If we measure the firm size in terms of the 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. Furthermore,

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

[19] More detailed summary statistics, including sample characteristics for firms without foreign loans, are provided in Table 9 in the Appendix C.

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

TABLE 2. Descriptive Statistics: Firms with Some Foreign Debt

	A. Before Crisis				B. Crisis			
Variable	Mean	P25	P50	P75	Mean	P25	P50	P75
EBIT / TA	2.41	0.64	3.70	7.40	-0.72	-1.80	2.08	5.28
Financial liabilities / TA	37.72	20.08	33.98	50.89	46.89	25.93	41.59	57.51
Foreign financial liabilities / TA	19.46	3.23	10.09	26.41	26.43	3.89	15.00	37.42
Size (assets)	37249.93	880.00	3359.00	13521.00	47988.75	1518.00	4836.00	17988.00
Size (employment)	223.53	7.00	23.00	129.00	166.17	7.00	20.00	88.00
Firm age	11.67	8.00	12.00	14.00	15.13	7.00	17.00	20.00
Tangibility	39.50	19.39	40.30	56.91	30.49	8.79	25.89	49.17
Firm openness	30.46	0.12	10.68	64.23	34.14	0.96	16.73	69.50
Productivity	54.11	20.22	30.07	47.69	57.87	25.55	37.00	58.91
Sales growth	14.47	-2.13	9.65	24.05	0.27	-17.09	0.00	14.34
Liquidity ratio	83.38	44.06	68.55	99.97	98.74	43.62	76.02	115.97
Interest expenses / TA	2.66	1.09	2.00	3.24	1.86	0.71	1.43	2.41
Observations	2,381				1,165			

before the crisis, the share of international net sales (*openness*) accounted for approximately 13% of total net sales in the full sample and around 30% in the sample of firms with foreign loans. During the crisis, the mean value of the ratio increased slightly in the full sample and increased substantially in the sample of firms with foreign financing. *Productivity*, calculated as real value added over employment, rose on average during the crisis for both subsamples. *Sales growth* was higher on average for firms with some share of foreign financing in the pre-crisis times. During the crisis, *sales growth* turned negative in the full sample but was approximately zero (slightly positive) among firms with foreign financing. Finally, although *interest expenses* increased in both samples during the crisis, they rose by less than total assets. As a result, the ratio of interest expenses to total assets declined.

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

4 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):

$$\begin{aligned} \text{Performance}_{i,t} = c_i + \alpha_1 \cdot \text{Leverage}_{i,t} \\ + \text{Controls}_{i,t} + \nu_t + \varepsilon_{i,t} \ , \end{aligned} \tag{1}$$

where we regress firm performance on leverage, a set of control variables, firm fixed-effects c_i, and year dummies ν_t. Firm fixed-effects capture unobserved heterogeneity across firms, while year dummies account for macroeconomic shocks and trends common to all firms. The main explanatory variables capture the level and structure of leverage, with a focus on foreign

financing. In all model specifications, leverage is measured as the ratio of financial liabilities to total assets.

In Models 2 to 4, we extend the baseline specification by incorporating variables related to foreign financial liabilities. First, we include a dummy variable that takes the value 1 if the firm has some foreign debt financing and 0 otherwise (Model 2):

$$\begin{aligned} \text{Performance}_{i,t} = c_i &+ \alpha_1 \cdot \text{Leverage}_{i,t} \\ &+ \alpha_2 \cdot \text{Foreign Financing Dummy}_{i,t} \\ &+ \text{Controls}_{i,t} + \nu_t + \varepsilon_{i,t} \ . \end{aligned} \tag{2}$$

This specification allows us to examine the relationship between the presence of foreign debt and firm performance. Next, we include an interaction term between leverage and the foreign financing dummy to examine whether the impact of leverage on firm performance depends on the presence of foreign debt (Model 3):

$$\begin{aligned} \text{Performance}_{i,t} = c_i &+ \alpha_1 \cdot \text{Leverage}_{i,t} + \alpha_2 \cdot \text{Foreign Financing Dummy}_{i,t} \\ &+ \alpha_3 \cdot (\text{Leverage} \times \text{Foreign Financing Dummy})_{i,t} \\ &+ \text{Controls}_{i,t} + \nu_t + \varepsilon_{i,t} \ . \end{aligned} \tag{3}$$

In the last model, we focus on the subsample of firms with some foreign financing and explicitly control for the extent of foreign debt exposure. We introduce foreign leverage, defined as the ratio of foreign financial liabilities, specifically, loans and financial leases extended by foreigners, to total assets (Model 4):

$$\begin{aligned} \text{Performance}_{i,t} = c_i &+ \alpha_1 \cdot \text{Leverage}_{i,t} \\ &+ \alpha_2 \cdot \text{Foreign Leverage}_{i,t} \\ &+ \text{Controls}_{i,t} + \nu_t + \varepsilon_{i,t} \ , \end{aligned} \tag{4}$$

allowing us to assess whether the intensity of foreign debt exposure, rather than just its presence, has a differential effect on firm performance.[21]

All specifications also include a set of control variables. We base our choice on the factors identified as relevant to firm performance in the existing literature. First, we control for the size of the firm, which is expected to affect performance because larger firms tend to be more diversified and consequently fail less often. We also control for the share of tangible assets and firm productivity. Furthermore, we include the squared values of log productivity, tangibility of assets, and a size variable to account for potential non-linearities. Next, we also include the log of firm age to capture 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, indicating creditworthiness and the ability to pay off short-term

[21] With total and foreign leverage included, the coefficient α_2 captures a (within-firm) swap from domestic to foreign debt, holding total leverage fixed.

debt. Finally, we include year dummies to account for aggregate factors that may vary over time, in particular macroeconomic developments and changing institutional factors.

4.1 Estimation strategy and endogeneity

The models are estimated using the firm-level fixed-effects approach. However, as suggested in the previous section, 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. However, there is also a possible reverse causality (i.e., leverage might be affected by performance) due to the manager's signalling efforts or retained earnings, and consequently, the amount of leverage depends on firm performance. Simple OLS fixed-effects estimation of the relationship between financial leverage, the presence and 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 EBIT by construction.[22] Another possible endogeneity problem might arise when analysing the relationship between foreign leverage and performance. While a firm's performance may also depend on the share of foreign leverage, one can expect that foreign borrowing itself is likely to depend on the firm's performance. Therefore, the instrumental variable approach is also warranted when focusing on the share of foreign leverage. We use foreign accounts payable, which represent the trade credit extended to Slovenian firms by foreign entities. 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 closely related to the sector of activity and long-term relations between companies, rather than to the performance itself.

We verify the validity and strength of the instruments by conducting several 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 statistics (Kleibergen and Paap, 2006). Additionally, we use the Anderson-Rubin Wald test (based on Anderson and Rubin, 1949), which provides robust inference against weak instruments. With this test, we can reject or accept the null hypothesis that the coefficients of our endogenous variables are zero, without the test size distortions arising from the potential weakness of the instruments.

5 Results

In this section, we present our main estimation results for the first three models described in Section 4, estimated on the full sample and split into pre-crisis (Table 3) and crisis periods

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

(Table 4). In both tables, the OLS results are presented in Panel A, and the IV results are presented in Panel B.[23]

Effect of leverage on performance (Models 1 - 3). We find a negative and statistically significant (at a 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" (Myers, 1977; Stulz, 1990), and the cost of conflict between shareholders and debt holders that can lower the value of bonds (Jensen and Meckling, 1976). In both cases, the agency costs increase with leverage. However, the latter case is less relevant for Slovenia, as few firms have issued debt securities. Our result could also be explained by high financial distress costs and/or higher transaction costs associated with external financing (Donaldson, 1961).

However, reverse causality may also drive this negative relation; better performance and more retained earnings are expected to lead firms to accumulate less debt (see, e.g., Weill, 2008; Rajan and Zingales, 1995).[24] To overcome this endogeneity problem, we instrument for leverage by the share of interest expenses in total assets. Results (in Panel B) remain robust across all three models in both periods. This finding contrasts with Baker (1973), who finds that the sign of the leverage coefficient changes when the problem of endogeneity is taken into account.

[23] We test the robustness of our results by (i) using a crisis dummy instead of splitting the sample, (ii) replacing operating profit with cash flow (EBITDA) as the performance measure, and (iii) using log employment as an alternative size proxy, following Giannetti and Ongena (2009). Results remain robust and are available upon request.

[24] On the other hand, Margaritis and Psillaki (2010) find 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.

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 financing dummy		0.2742	-0.0321		1.7434**	33.3595***
		(0.603)	(3.574)		(0.855)	(11.311)
Leverage*Foreign financing 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 the Kleibergen-Paap rk LM statistic as an under-identification test and the Kleibergen-Paap rk Wald F statistic as a test for weak identification. We also report the Anderson-Rubin-Wald test, a significance test for coefficients on endogenous variables that is robust to the presence of weak instruments.

Considering the instrument's validity and strength, one should note that the null hypothesis of under-identification is rejected for all three models in both periods at a 5% significance level. The weak identification tests signal some difficulties in the pre-crisis period, where the size of the Wald test of the coefficient of the instrumented variable exceeds 20% or 25%. This means that we might be rejecting the null hypothesis of the coefficient being zero too often. However, the Anderson-Rubin test, which corrects for test size distortion, shows that the coefficients on

the endogenous regressors are indeed significantly different from zero.

In terms of magnitude, the negative effect of leverage on performance is larger during the pre-crisis period.[25] The finding that during the crisis leverage has a 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 GFC, only firms with 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 with 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 sign during the crisis. When we control for endogeneity, we find a positive effect of foreign financing in both periods, with a larger and more significant coefficient in the pre-crisis period. The explanation could follow the same lines as in Harvey et al. (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 during crisis times due to higher volatility of foreign loans, as banks withdraw from foreign markets and related increased uncertainty.

Access to foreign financing, leverage and performance (Model 3). Furthermore, we also include an interaction term between leverage and the 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 firms without this source of financing. Results are very similar in the crisis period. The only difference is that the negative effect of leverage is now less pronounced, and the coefficients on the foreign financing dummy and the interaction term are insignificant.

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

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 financing dummy		-0.7021	3.7098*		0.2620	7.7445
		(1.250)	(2.226)		(1.289)	(5.676)
Leverage*Foreign financing 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 the Kleibergen-Paap rk LM statistic as an under-identification test and the Kleibergen-Paap rk Wald F statistic as a test for weak identification. We also report the Anderson-Rubin-Wald test, a significance test for coefficients on endogenous variables that is robust to the presence of weak instruments.

Next, we examine how the positive effect of foreign financing and the additional negative effect operating through its interaction term with leverage vary across leverage levels. In Table 5, we report the *net effect* of foreign financing on performance, evaluated at selected leverage levels. The leverage values correspond to quantiles and the mean of the full sample leverage distribution. For leverage at or below the sample mean, the effect of having foreign financing is positive, which is consistent with a positive coefficient on the foreign financing dummy. The leverage threshold beyond which the net effect turns negative is 36% of total assets in the pre-crisis period and 41% during the crisis.[26]

TABLE 5. Net effect of foreign financing on performance at selected leverage levels

Leverage		**No foreign fin.**		**Foreign fin.**		**Net effect***	
Distribution		P-C	C	P-C	C	P-C	C
p10	5.42	-3.52	-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	-20.80	-13.01	-17.15	-11.32	3.65	1.69
p75	44.98	-29.18	-18.16	-37.55	-19.02	-8.37	-0.86
p90	63.40	-41.13	-25.73	-66.58	-29.97	-25.45	-4.24

* Net effect is computed as $\Delta\text{Performance} = \alpha_2 + \alpha_3 \times \text{Leverage}$, where α_2 is the coefficient on the foreign financing dummy and α_3 is the coefficient on its interaction term with leverage. Coefficients are IV estimates from Model 3 (Tables 3–4). P-C denotes the pre-crisis period, and C the crisis period.

Other determinants of firm performance. Next, we examine the relationship 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 has been found in numerous empirical works that used net sales or firm assets as measures of firm size, for instance, Rajan and Zingales (1995) and Harvey et al. (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 are better managed. Additionally, Stierwald (2010) argues that firm size has a positive impact on profitability, stemming from economies of scale and scope, as well as larger firms' access to capital at lower costs than their smaller counterparts. Additionally, we allow for non-linearities in the relationship between size and firm-level performance. We find statistically significant negative coefficients, suggesting that larger firms perform better but at a decreasing rate.

Furthermore, our results indicate 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 a proxy for intangible capital and experience, has an insignificant effect in both periods.

Regarding sales growth, we find a positive and significant effect during both the pre-crisis and crisis periods. This result can be interpreted in line with McConnell and Servaes (1995), who use a five-year past sales growth as a proxy for future growth opportunities. As expected, firms with a higher liquidity ratio performed better on average according to our estimates. From

[26] Note that these are average partial effects.

an economic perspective, the higher the firm's short-term assets, the more able it is to pay off its short-term liabilities, thereby 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 as productivity increases; more productive firms perform 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.

5.1 Amount of foreign financing

In this section, we explicitly control for the amount of foreign financing on firm performance by estimating Model 4 on the subsample of firms with non-zero foreign financing. This could introduce a sample selection bias in our estimates, as firms' ability to obtain foreign financing may depend on factors related to their performance. To verify whether sample selection bias is indeed present in our subsample, we first estimate Model 4 using a two-stage Heckman approach with OLS, before proceeding 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 model, we add the share of foreign accounts receivable in total assets as an over-identifying variable. Foreign accounts receivable represent trade credit extended by Slovenian firms to their partners abroad, serving as a good proxy for the firm being an exporter and thus being present in international markets. This, in turn, increases the probability of getting 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 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 results 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.

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. The first columns in Panels A and B present the results of an FE-OLS estimation that includes the inverse Mills ratio. For the IV estimation, we report the Kleibergen-Paap rk LM statistic as an under-identification test and the Kleibergen-Paap rk Wald F statistic as a test for weak identification. We also report the Anderson-Rubin-Wald test, which is a significance test for coefficients on endogenous variables that is robust to the presence of weak instruments.

The effect of leverage on firm performance remains negative and significant when the sample is restricted to firms that can 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. This result supports the idea that stricter monitoring and enforced risk management practices by foreign creditors help firms mitigate the negative effects of leverage and enhance overall performance.

When we explicitly control for endogeneity in the pre-crisis period, the coefficient on foreign leverage becomes positive and significant at a 1% significance level. Turning to the crisis period, our estimates show a positive and significant effect of foreign leverage on performance for the OLS estimation and a positive but insignificant coefficient in the IV estimation. The size of the leverage and foreign leverage coefficients is smaller during the crisis period, aligning with the results from the 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.

5.2 Does the 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 at whether the effect of (foreign) leverage on the 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.[27]

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 interaction term between leverage and the 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. Similar to the full sample, the presence of foreign financing enhances firm performance while exacerbating the negative impact of leverage, regardless of ownership status.

The strength of these effects, however, is different depending on the ownership. Comparing the size of the coefficients on leverage and the interaction term between leverage and the foreign loans dummy, we observe that the penalty of higher leverage in terms of poorer performance is larger for domestic firms (-0.94) than for foreign-owned firms (-0.44), and among firms tapping foreign financing, domestic firms incur a larger marginal penalty from additional leverage (-

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

1.86 vs -1.45). 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 incremental amplification (the interaction) of the negative effect of leverage is more pronounced for foreign firms. During the crisis period, the coefficient on leverage remains robust only for domestic firms. For both ownership types, the positive effect of foreign borrowing becomes insignificant.

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 financing 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 financing 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 the Kleibergen-Paap rk LM statistic as an under-identification test and the Kleibergen-Paap rk Wald F statistic as a test for weak identification. We also report the Anderson-Rubin-Wald test, a significance test for coefficients on endogenous variables that is robust to the presence of weak instruments.
† P-C denotes the 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 observed in the full sample before the crisis is entirely driven by private firms. For state-owned firms, foreign borrowing is associated with lower performance. During the crisis period, the positive effect of foreign financing becomes insignificant for both ownership samples.

The interaction term also behaves differently across ownership types. Prior to the crisis, taking on foreign debt mitigates the negative impact of overall leverage for state-owned firms, but exacerbates it for private firms. Given that the baseline leverage coefficients are of similar magnitude across the two subsamples, state-owned firms experience lower performance loss from high leverage when they also borrow abroad compared to private firms. During the crisis period, the interaction flips sign for state firms (from positive to negative) and remains negative for private firms. In both cases, the coefficients are statistically insignificant.[28]

6 Conclusion

This paper examines the impact of leverage and foreign debt financing on firm performance, both before and during the Global Financial Crisis. Specifically, we aim to answer the following three questions: (i) Have the effects of financial leverage on firm performance changed in crisis times? (ii) How did access to foreign debt financing affect firm performance, in particular, were firms that obtained foreign debt financing relatively more successful in weathering the crisis? (iii) Was the effect of (foreign) debt financing on firm performance different depending on the firm's ownership?

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 employ a firm-level database, which is crucial for identifying the direct effects of foreign financing on firm performance, as it includes data on the amount of lending from the rest of the world. This also enables us to cover a range 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 reverse causality. This remains unchanged during the crisis. We find that pre-crisis foreign financing is associated with higher performance, while during the crisis, the effect attenuates and is largely insignificant. When we include an interaction term between leverage and the foreign loans dummy, we 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 controlled for the amount of foreign financing and found that relatively more foreign debt significantly improves firm performance. This could be explained by stricter monitoring by foreigners, which reduces

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

agency costs and has a positive impact on performance.

Additionally, we investigate whether the effect of (foreign) debt varies with ownership. First, comparing domestic and foreign-owned firms, we find that firms which borrowed abroad were more adversely affected by total leverage if they were domestically owned. Second, comparing state-owned and private firms, we find that private firms drive the pre-crisis performance gain from foreign financing (it is negative for state-owned firms). During the crisis, foreign-borrowing effects are largely insignificant across all ownership groups.

Our results are informative for firm managers when deciding on the structure of financing sources; we find that foreign leverage can enhance performance when overall leverage is moderate, but it has a detrimental effect when overall debt is already high. Moreover, during crisis periods, foreign financing has smaller positive effects. These results highlight the importance of robust (ex-ante) risk governance frameworks at the firm level and policies aimed at reducing financial market fragmentation. Although our study focuses on Slovenia, our insights can be relevant for other small, open economies facing similar financial environments, particularly in Central, Eastern, and Southeastern Europe. Future research could extend this analysis to other countries and more recent crisis episodes, such as the COVID-19 pandemic, to examine how (foreign) leverage and interaction with enterprise risk management practices affect firms' resilience.

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A Definition of variables

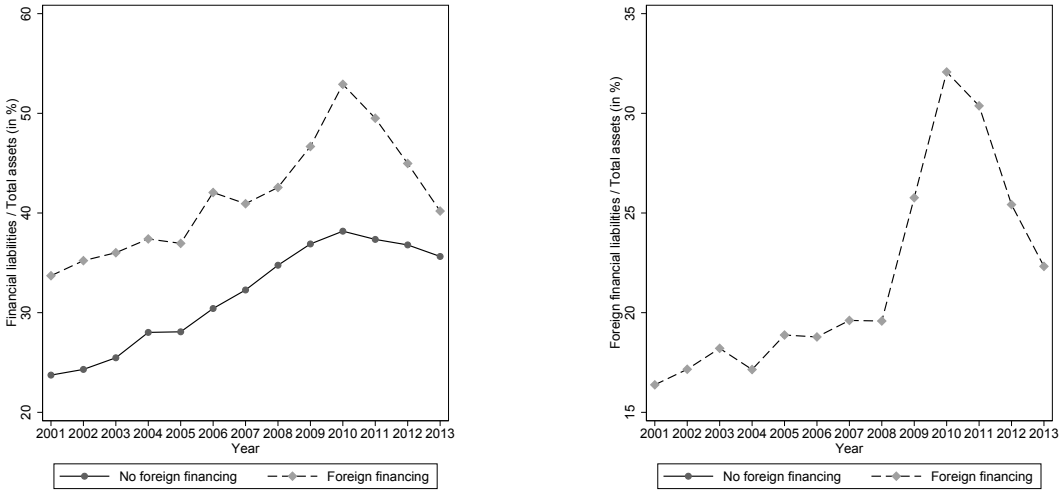
TABLE 8. Definition of variables

Variable	**Constructed as**
EBIT	Operating profit adjusted for operating loss (definition of Agency of the Republic of Slovenia for Public Legal Records and Related Services)
Total assets	Total assets
Leverage	Short plus long-term financial liabilities divided by total assets
Foreign financial liabilities	Long and short-term loans + financial leasing from ROW
Size	Logarithm of total assets
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 trade credits liabilities 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 Additional figures

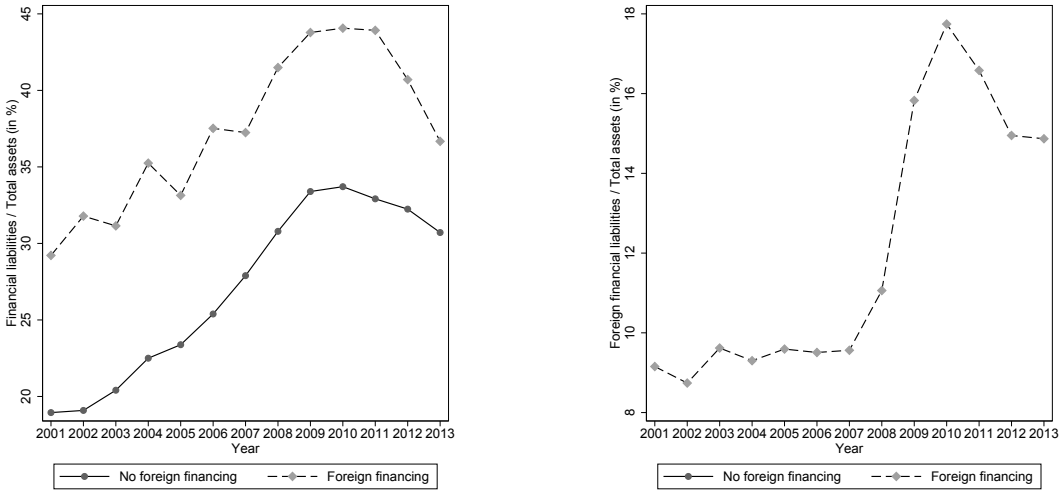
B.1 Leverage

FIGURE 1. Mean leverage



(A) Leverage (B) Foreign leverage

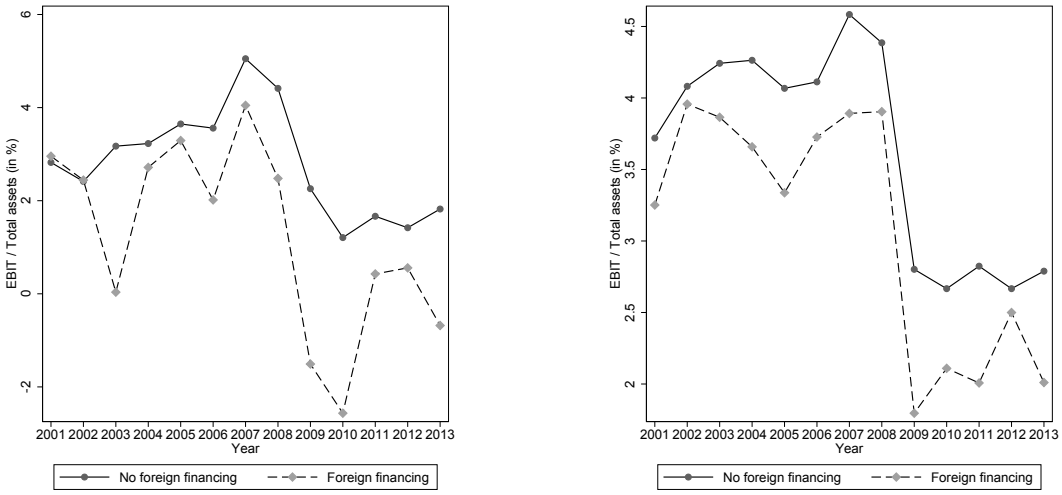
FIGURE 2. Median leverage



(A) Leverage (B) Foreign leverage

B.2 Performance

FIGURE 3. EBIT / TA



(A) Mean

(B) Median

C Additional tables

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	3.55	0.97	4.21	8.70	1.66	0.56	2.75	5.83
Financial liabilities / TA	28.47	10.97	23.32	40.44	37.03	17.50	32.70	50.78
Foreign financial liabilities / TA	–	–	–	–	–	–	–	–
Size (assets)	3,316.15	182.00	508.00	1,652.00	4,238.80	287.00	741.00	2,182.00
Size (employment)	31.14	3.00	6.00	17.00	26.14	3.00	6.00	16.00
Firm age	11.41	8.00	12.00	14.00	14.32	8.00	17.00	20.00
Tangibility	37.40	15.44	35.33	56.34	36.87	13.30	34.52	56.61
Firm openness	12.30	0.00	0.00	10.17	13.78	0.00	0.39	13.09
Productivity	33.36	17.00	24.73	37.09	36.14	19.83	27.93	40.39
Sales growth	10.75	-6.51	7.81	23.42	-2.86	-19.14	-2.41	12.49
Liquidity ratio	94.21	46.85	75.63	109.73	100.62	42.93	76.32	118.13
Interest expenses / TA	2.12	0.69	1.56	2.80	1.67	0.67	1.32	2.22
Observations	**39,955**				**22,487**			

TABLE 10. Coverage of firms in the sample

	All firms (N)	**Firms with foreign financing (N)**
2001	4,150	211
2002	5,039	272
2003	5,519	267
2004	5,913	267
2005	6,118	252
2006	5,741	201
2007	5,012	195
2008	4,844	175
2009	4,620	167
2010	5,100	203
2011	5,063	199
2012	4,757	208
2013	4,112	179
Total Observations	**65,988**	**2,796**

D Chow test

We test whether the leverage coefficient differs between the pre-crisis and crisis subsamples using a Chow test (Table 11). Under OLS, equality cannot be rejected at the 5% level for Models 1 and 2, but it is rejected for Model 3. Under IV, equality is rejected for all three models at the 1% level.

TABLE 11. Chow test for equality of leverage coefficients: pre- vs. during-crisis

	Model 1		**Model 2**		**Model 3**	
Estimator	F	p	F	p	F	p
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

Notes: Chow test of equality of the leverage coefficient across pre-crisis and crisis subsamples. Null-hypothesis: coefficients are equal across periods.