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Explaining the Low Level of Investment in Slovenia

Jože Damijan, Jozef Konings,
Črt Kostevc and Katja Zajc Kejžar

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Jože Damijan, Jozef Konings, Črt Kostevc and Katja Zajc Kejžar

Abstract

This report analyses business investment in Slovenia and offers an explanation of why investment was hit more and longer after the global financial crisis relative to other European countries. Using macroeconomic data for all EU countries, Norway and Switzerland we find that Slovenian corporate investment was less responsive to the business cycle after the global financial crisis. In addition, the high deleveraging process in the Slovenian private sector has contributed to the lower investment in Slovenia compared to other European countries. This pattern is confirmed using a sector level approach. Furthermore, using confidential firm level data we find evidence of the granular nature of investment, where the largest Slovenian firms dominate the aggregate investment pattern. These are also the firms with a large debt overhang, which invest less, explaining the aggregate picture.

JEL Classification: E22, C23, G30, L25, O40, O52.

Keywords: investment, accelerator model, global financial crisis, granularity, Slovenia, micro data.

Contact: Jože Damijan, University of Ljubljana, School of Economics and Business, and KU Leuven, joze.damijan@ef.uni-lj.si; Jozef Konings, KU Leuven and Nazarbayev University Graduate School of Business, jozef.konings@kuleuven.be; Črt Kostevc, University of Ljubljana, School of Economics and Business, crt.kostevc@ef.uni-lj.si; Katja Zajc Kejžar, University of Ljubljana, School of Economics and Business, katja.zajc@ef.uni-lj-si.

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SUMMARY

Many international institutions and analysts have noted the sluggish performance of business investment since the global financial crisis. In a number of euro-area member countries, the investment cycle recovery followed the business cycle itself (France and Ireland). However, the picture looks considerably bleaker for some of the other member states. In this report the focus is on business investment in Slovenia as the drop in investment is mainly driven by the private sector. We find that business investment as a share of gross domestic product in Slovenia averaged at 27 per cent of GDP in the period 1999-2008, which was 4.2 percentage points above the EU-average. However, after the global financial crisis (GFC) this dropped to 19.6 per cent between 2009 and 2019, 1.2 percentage points below the EU-average. While before the financial crisis corporate investment closely followed the business cycle, from 2009 onwards there has been a disconnect between the two. Thus, while GDP growth picked up again, investment did not. In addition, we find that the deleveraging process in Slovenia played a more important role to explain the fall in investment compared to other countries. This can be contributed to the structurally weak banking sector in Slovenia, which had increased foreign liabilities rapidly in the run-up to EU accession and which accelerated further with the adaptation of the EURO. When the GFC hit, a rapid reduction of new foreign credit to Slovenian banks resulted, feeding through to the corporate sector.

Institutional factors, such as product and labor market regulation and corporate tax policy, do not seem to explain much of the variation in aggregate investment in European countries and certainly not in Slovenia. More than 70 percent of the aggregate investment growth can be explained by factors such as aggregate demand (the business cycle) and the deleveraging process after the GFC, while institutional factors do not seem to contribute much to explaining the investment dynamics. The key to understanding the sharp decline in the investment-to-GDP ratio after 2008 is the prolonged recession, which in Slovenia (in addition to the impact of the euro crisis) was a consequence of (a) the extremely high financial leverage and debt overhang of the Slovenian corporate sector and (b) policy inefficiencies as the government failed to bail out the banks until it was too late (late 2013). The combination of the above factors has resulted in a decreased potential for investment and increased uncertainty, which lasted for a long time. It is indicative of the depth of the GFC depression and of the increased uncertainty that even exporters that have a record of higher investment rates in boom years and that faced less severe sales declines due to the GFC significantly reduced their investment rates during the post-GFC period.

This study also shows the importance of analysing investment at the granular firm level as almost 90 percent of all investment is concentrated in the top 10 percent of Slovenian firms. Most of the variation in aggregate investment can be accounted for by the variation in firm level factors, rather than sector specific factors. In particular, large firms are more sensitive to demand shocks during business cycles compared to small companies. Moreover, the elasticity of the investment rate with respect to demand is growing with firm size. After the global financial crisis, deleveraging contributed to decreased investment of highly leveraged firms. Large firms' investment rates appear to fall more with increased debt to assets, while liquidity is not a significant investment factor. The Investment rate is also not responsive to changes in ROA for large firms, suggesting lower dependence of large firms on internal finance sources compared to SMEs. For micro firms, on the other hand labour productivity and profitability seem to be important drivers of investment activity. The negative impact of the debt-to-assets ratio is especially high for the top 1 % investors after the financial crisis.

Notwithstanding the negative impact of the GFC on the Slovenian investment rate, Slovenia faces a secular decline in investment dynamics, which highlights the importance of structural factors contributing to the decline in business investment. These may originate in the traditional production and trade structure and underline the need for structural reforms. The report concludes with five policy recommendations.

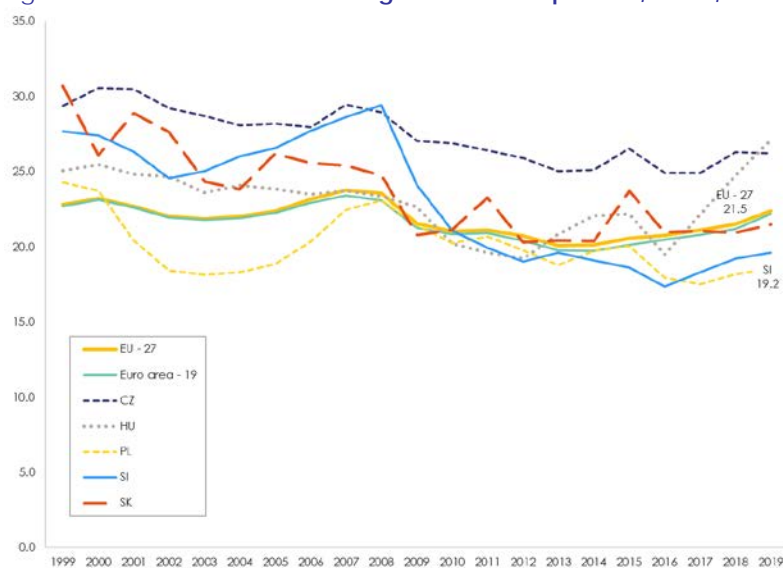
1. INTRODUCTION

Capital formation and productivity growth are key determinants of macroeconomic performance. One of its key drivers is business investment. Falling investment activity can have detrimental medium and long-term knock-on effects on productivity, employee skill structure and capacity to produce. Furthermore, such investment shortfalls cause long-term arrears relative to competing economies in terms of productivity, innovation, technological level, capacity, etc. further eroding a country's competitiveness.

Many international institutions and analysts have noted the sluggish performance of business investment since the global financial crisis (ECB, 2017; EIB, 2017; IMF, 2015, etc). EU countries' prolonged investment slump compared to China or the U.S. further deepened the investment divide and potentially laid the foundation for further divergence in productivity performance between the U.S. and Europe in the foreseeable future. While the aggregate investment in the euro area took almost 10 years to recover to pre-crisis levels (2007-2016), there is also considerable heterogeneity in the response rates of individual member countries. In a number of euro-area member countries, the investment cycle recovery followed the business cycle itself (France and Ireland). However, the picture looks considerably bleaker for some of the other member states, such as Slovenia. In this report the focus is on *investment in Slovenia*.

The global financial crisis (GFC, 2008-2009) appears to represent a major turning point for Slovenia's investment levels (see Figure 1). Investment as a share of gross domestic product in Slovenia averaged at 27 per cent of GDP in the period 1999-2008, surpassing the average investment ratios of EU-27 and CEE-4 countries¹ by 4.2 and 1.8 percentage points, respectively. However, after the GFC, investment ratios in Slovenia fell dramatically, averaging to 19.6 per cent only in the period 2009-2019.

Figure 1. Investment as a share of gross domestic product, EU-27, EA-19, CEE-4 and Slovenia, 1999-2019 (in %)

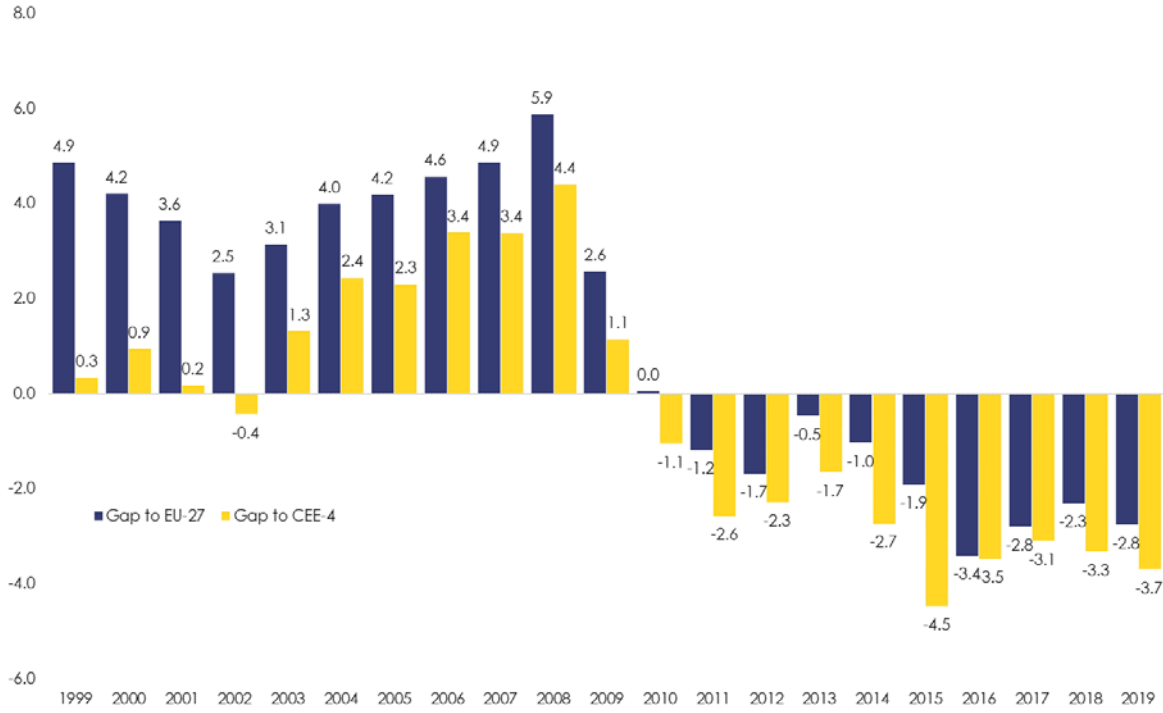


Source: Eurostat.

¹ Central and Eastern European countries (CEE-4): Czechia, Hungary, Slovakia and Poland.

Being one of the top investors before the GFC, after 2009 Slovenia’s investment ratios began to lag behind the EU-27 and CEE-4 levels on average by 1.2 and 2.4 percentage points, respectively (Figure 2). Moreover, the gap relative to both EU-27 and CEE-4 seems to persist despite relatively high GDP growth rates since 2014. After Romania, Slovenia suffered the largest drop in investment intensity among EU countries (Eurostat, 2020).

Figure 2. Total investment to GDP ratio gap in Slovenia versus EU-27 and CEE-4, 1999-2019 (percentage points)



Note: CEE-4: Czechia, Hungary, Poland, Slovakia.

Source: Eurostat.

As shown in Figure 3, the main reason for the large gap in Slovenia's investment ratio compared to the average of EU-27 countries is the dramatic decline in business investment after the GFC. While before 2008, Slovenia's business investment as a share of GDP exceeded the average EU-27 investment shares by 4 to 5 percentage points, after 2012 Slovenia's business investment ratios lag behind the EU-27 ratios by about 2 percentage points.

Figure 3. Decomposition of total investment to GDP ratio gap in Slovenia relative to EU-27 by investment type, 1999-2019 (percentage points)



Source: Eurostat.

The aim of the analysis will be to explore the underlying causes of the drop in Slovenia’s non-financial corporate investment rate. By exploring contributing factors at the macro-, industry- and firm-level, we aim to provide targeted policy guidance on tackling the issue of sluggish investment activity in Slovenia. We start in the section 2. with a review of the relevant literature and the key policies relevant to the Slovenian investment context. In section 3 we provide a cross-country macroeconomic analysis, section 4 focuses on a sector level approach. In section 5 we use a unique firm level data set to analyse investment at the firm level and to document the importance of a granular approach.

2. LITERATURE AND POLICY REVIEW

2.1 LITERATURE REVIEW

The determinants of private investment can be categorised as domestic or internal and global or external determinants. Within domestic determinants, the main drivers of private investment described in the literature can be summarised as follows:

- **Output growth.** In a literature survey, Chirinko (1993) concludes that business investment is most sensitive to output growth. In a cross country study, Greene & Villanueva (1990; 1991) empirically show that private investment is positively related to real GDP growth and level of per capita GDP. Barkbu et al. (2015) show that part of the weak investment in the Euro area can be explained by output dynamics. Moreover, Bussiire, Ferrara, & Milovich (2015) show that systematically over-optimistic GDP growth forecasts since 2008 in advanced economies have supported business investment. Dasgupta, Lall, & Lozano-Gracia (2014) show that housing investment follows an S-shaped trajectory taking off around per capita GDP of about \$3,000 and tapering down at per capita GDP around \$36,000. Output growth can be seen as a proxy for demand which triggers investment, also referred to as accelerator models of investment. Winberry (2021) suggest that the aggregate investment is procyclical as more firms make lumpy investment decisions in expansions.
- **User cost of capital.** Jorgenson (1963) proposes a capital theory where investment behavior is determined by the user cost of capital and the rate of replacement. Bernanke (1983) highlights the importance of capital costs as the driver of aggregate investment and high real interest rates are a major source of slow capital expenditure in the US during the 1970s. Across countries, it has been empirically shown that private investment is negatively related to real interest rates (Greene & Villanueva, 1990; 1991). In developing and emerging economies low investment rates are driven by the high price of investment relative to output (Hsieh & Klenow, 2007). In the euro area, a high cost of capital and corporate leverage is among the main drivers of weak investment, especially in countries with financial constraints (Barkbu et al., 2015). Fazzari, Hubbard and Petersen (1988) were the first to point out that using a representative firm model in which all firms have equal access to finance does not seem to fit the facts as some firms find it easier to get access to finance than others. This has an impact on private investment in firms which are financially constrained, often small and young firms.
- **Financial development.** Several studies highlight a relationship between a financial development of a country and private investment. In particular, Lim (2014) shows that financial development is a robust determinant of investment. Moreover, the studies emphasize the role of financial development in improving capital allocation and growth by easing external financing constraints facing firms (Levine, 2005; Love & Zicchino, 2006). Ndikumana (2005) posits that bank-based or stock-market based financial system has no effect on the responsiveness of investment to changes in output, but financial development makes investment more responsive to output growth. Alfaro, Chanda, Kalemli-Ozcan, & Sayek (2004) argue that FDI in countries with well-developed financial markets benefit significantly from FDI. This suggests that countries with well-developed financial markets attract more FDI.

- **Public sector investment.** Munnell (1992) summarises that public investment such as infrastructure spending stimulates private production by reducing their costs and increasing employment, which in turn leads to more private investment. As private investment activity enhances future growth of real income, the second-round effects generate additional demand and output growth. Abiad, Furceri, & Topalova (2016) show that public investment attracts more private investment in advanced economies. Ang (2009) studies the private investment slowdown in Malaysia and suggests that slowing down FDI and public investment could be the drivers of the secular trend. Bahal, Raissi, & Tulin (2018) show that before 1980 public investment in India used to crowd out private investment, after 1980 the opposite is true, which can be attributed to the policy reforms in the 1980s. Erden & Holcombe (2005) show that private investment in developing economies is positively related to public investment, while in developed economies it is negatively related.
- **Public debt.** Kose, Ohnsorge, Ye, & Islamaj (2018) suggest that mounting public debt is one of the main drivers of investment growth slowdown among commodity exporters following 2010. Hennessy (2004) suggests that the debt overhang effect is significant and it leads to underinvestment.
- **Quality of institutions.** Morrissey & Udomkermongkol (2012) show that private investment is higher in countries with good governance. The governance indicators include measures of corruption and political stability, which are shown to have a significant impact on investment. Bartelsman, Haltiwanger, & Scarpetta (2010) show that there are significant differences across countries in a business environment and that these differences explain the behavior of incumbent firms and the selection of entrants. Also, Janada & Teodoru (2020) show that business confidence in Central America is significantly affected by political decisions and therefore affects private investment. Besides, income inequality is shown to be inversely related to investment (Alesina & Perotti, 1996). Therefore, weak institutions that fail to tackle income inequality further slowdown private investment. Field (2005) shows that improving property rights in Peru leads to increased residential investment.
- **Economic policy.** Calcagnini, Ferrando, & Giombini (2015) product and labor market regulation negatively affect firm investment by lowering firm profitability. Hall & Jorgenson (1967) show that tax policy is highly effective in changing the level and timing of investment expenditures. In the US, the liberalisation of depreciation rules in 1954 resulted in a substantial shift from equipment to structures. The investment tax credit and depreciation guidelines of 1962 caused a shift toward equipment. More recently, Zwick & Mahon (2017) show that small firms are more responsive to investment stimulus only when the policy immediately generates cash flows.
- **Uncertainty.** Structural weaknesses or idiosyncratic shocks in an economy may increase the uncertainty of doing business, and firms may become cautious about investment decisions if they lack confidence in the economic conditions they operate in. Gennaioli, Ma and Schleifer (2015) show that an important driver in addition to such demand factors is the uncertainty about future earnings. Bloom (2009) shows that higher uncertainty causes firms to pause their investment and hiring decisions, which leads to a sharp recession. If the uncertainty is short-lived, the recession is followed by recovery with an overshoot in output. Moreover, Carrière-Swallow & Céspedes (2013) show that the effect of uncertainty in emerging economies is more severe with much longer recovery periods. Anand & Tulin (2014) suggest that heightened uncertainty and deteriorating business confidence have played a key role in explaining the investment slowdown in India. Baker, Bloom, & Davis (2016) show that economic policy uncertainty is associated with reduced investment and employment in policy-sensitive sectors

like defense, health care, finance, and infrastructure. Bloom, Bond, & Van Reenen (2007) also show that higher uncertainty reduces the responsiveness of investment to demand shocks. This implies that any given policy stimulus may be weaker in periods of high uncertainty such as the COVID-19 pandemic or Brexit.

- **Industry.** Gutierrez & Philippon (2017) show that declining competition is responsible for declining investment in the US. Evans (1967) shows that investment decisions in the US manufacturing sector highly dependent on the cash flow in addition to interest rates. Therefore, investment decisions of manufacturing firms depend on the volatility of sales. Caballero & Engel (1999) highlight the prevalence of lumpy investments in US manufacturing, which is explained by the presence of adjustment costs.

Within global determinants, we identify the following main determinants:

- **Real exchange rate.** Servén (2003) finds that real exchange rate uncertainty has a strong negative effect on investment in developing countries. The negative effect is present only when the uncertainty exceeds some critical level, and the effect is significantly larger in highly open economies with underdeveloped financial systems.
- **Capital inflows.** Wai & Wong (1982) highlight the important role of capital inflows to the private sector in determining private investment. Kose, Ohnsorge, Ye, & Islamaj (2018) show that among commodity importers, slowing FDI inflows account for much of the slowdown in investment growth following 2010. Horst (1972) shows that industries, in which the economies of size are important, tend to have fewer foreign investors controlling a larger share of the foreign market. Agosin & Machado (2005) show that the effect of FDI is not always favorable for private investment. In particular, in developing economies, FDI leaves private investment unchanged. Arndt, Buch, & Schnitzer (2010) suggest that the relationship between FDI and private investment is best captured at the industry level and that FDI increases the long-run investment growth in Germany. Bosworth & Collins (1999) argues that while FDI positively affects private investment, portfolio capital flows have no effect on the impact on investment, and the effect of loans is somewhere in between. Desai, Foley, & Hines (2009) show that an increased investment activity of multinational firms abroad is associated with increased domestic investment.
- **Trade.** Kose, Ohnsorge, Ye, & Islamaj (2018) suggest a sharp deterioration of terms of trade is one of the main drivers of investment growth slowdown among commodity exporters following 2010.
- **Global shocks and uncertainty.** Unexpected shocks abroad such as Brexit or worldwide events such as the Covid-19 pandemic could elevate the uncertainty, which forces firms to suspend investment decisions temporarily (Bloom, 2009). Ahuja & Myrvoda (2012) show that a collapse in real estate investment in China would have significant negative spillovers to many of China's trading partners, such as Germany, Japan, Korea. Moreover, a one percentage point slowdown in investment in China is associated with a reduction of the global growth of one-tenth of a percentage point (Ahuja & Nabar, 2012).

2.2 INVESTMENT POLICY IN SLOVENIA

The environment for investment in Slovenia is largely determined by two historical events: the privatisation process of state-owned enterprises in the mid-to-late 1990s and the association agreement with the EU that ultimately led to Slovenia's EU membership in 2004. On the one hand, the early process of privatising large state-owned companies was very gradual and for the most part closed to foreign investors in particular in comparison to other transition economies of Central Europe (Czechia, Hungary, Slovakia). On the other hand, the choice of joining the EU and ultimately adopting the euro (2007) ensured both the opening of the Slovene services markets and improved access to external finance.

In the early 1990s the political compromise regarding the privatisation method resulted in decentralised, gradual, free distribution type of state assets (Mencinger, 2006). The privatisation process was run centrally through a government agency, companies were gradually converted into joint stock companies and privatisation certificates were freely distributed to citizens. In the first stage, shares of the companies were to be transferred to financial intermediaries, while in the second stage, shares of these institutional owners were to be distributed free of charge to all citizens of Slovenia. It was believed that institutional owners would monitor and restructure the companies and assure that they are efficient and profitable (Mencinger, 2006). The other key feature of the privatisation process in Slovenia was that both the method of privatisation and carefully cultivated distrust of foreign ownership meant that the process was entrusted almost exclusively to domestic investors. The primary reason for the lack of foreign investor participation was in the privatisation model itself, as it gave preference to internal buyouts or domestic institutional investors (Mencinger, 2006). The latter also benefited from small shareholders selling off their stakes after the imposed two-year moratorium. The privatisation therefore affected newly emerging capital markets by creating predominance of the secondary over primary market, and by converting savings into consumption rather than investments. In addition to being handicapped by the privatisation method, foreign investors also faced a public backlash driven by negative media coverage, views of politicians and prominent experts. This resulted in Slovenia being the only former socialist European country with the majority of the banking sector in domestic ownership in 2003, with considerable role played by state-owned banks (UNCTAD 2004, World Investment Report 2004, UN New York).

The turn of the millennium saw the gradual privatisation of the Slovene banking sector. Given the very weak capital market and virtual non-existence of the venture capital market in Slovenia, the banking sector (both local and international) remains key in ensuring financing for investment projects. The two largest banks deemed central to the stability of the banking system in Slovenia, NLB and NKBM, were both foreseen to be privatised in 1999, but the process ended up taking until 2015 (NKBM) and 2019 (NLB). Both banks ultimately ended up being either fully (NKBM) or majority foreign owned with the state maintaining a 25% share in NLB. At the end of 2019 the banking sector comprised of 19 banks and savings banks with foreign-owned banks representing 89% of total assets in the sector (own calculation based on data of the Slovenian Bank Association). The banking market has consolidated from 27 banks and savings banks in year 2000 to 19 in 2019, while, at the same time, increasing the share of foreign-owned banks (in terms of assets) from roughly 20% to almost 90% in the same time span. Both the opening up of the Slovene market to foreign providers as well as improved access to credit abroad made banking services more widely available and arguably cheaper for local service users.

The weaknesses of the Slovenian banking sector were exposed by the global financial crisis and its aftermath. In the run-up, credit growth was rapidly boosted by low interest rates and the introduction of the euro. Loans to the non-banking sector surged by almost two-thirds between 2006 and 2008. Banks financed the expansion mostly by securing financing from foreign banks as documented in Figure 4.

Figure 4. Foreign assets/liabilities of deposit-taking corporations except the central bank (in mn EUR)



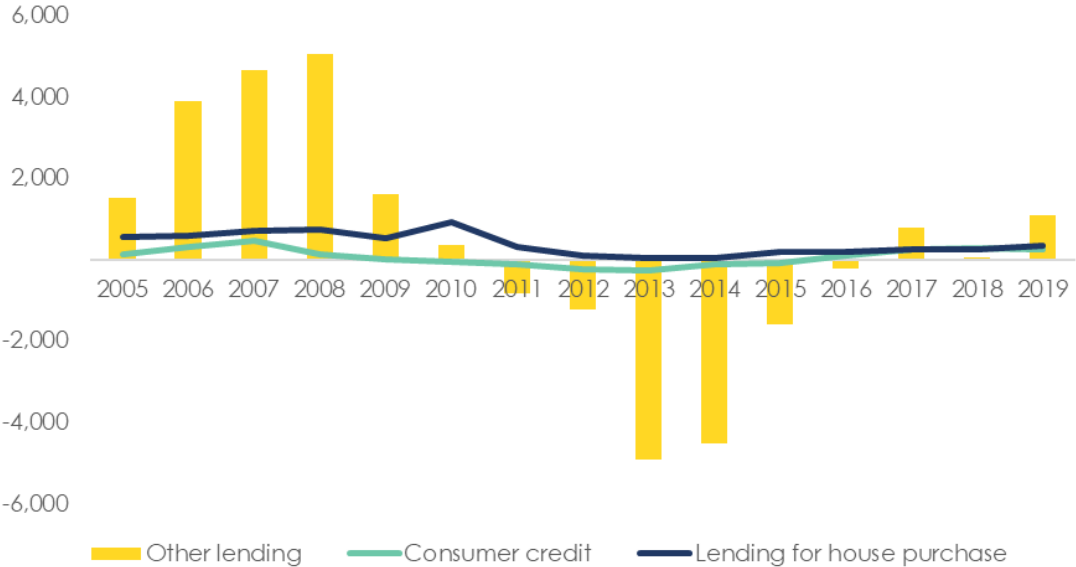
Source: Bank of Slovenia, 2020.

Foreign liabilities of Slovenian banks increased rapidly in the run-up to EU accession and accelerated further before the adoption of the euro. The rapid reduction of new foreign credit to Slovenian banks followed in 2008-2009 whereby the rate of new foreign credit did not recover to the pre-crisis levels.

Similarly, lending contracted by more than a third between 2010 and 2016 (Figure 5), as banks deleveraged to pay back their foreign loans rather than extend new loans to Slovenian businesses.

As can be seen from Figure 5, the change from peak to trough of credit activity by banks in Slovenia was extraordinarily large. From roughly 5-billion-euro additional loans to firms in 2008 credit activity completely reversed by 2013 with outstanding credit contracting by approximately 5 billion euro. The credit collapse was a combination of a very weak demand for loans by firms and of a limited supply by the banks.

Figure 5. Annual changes in bank lending by loan type 2005-2019



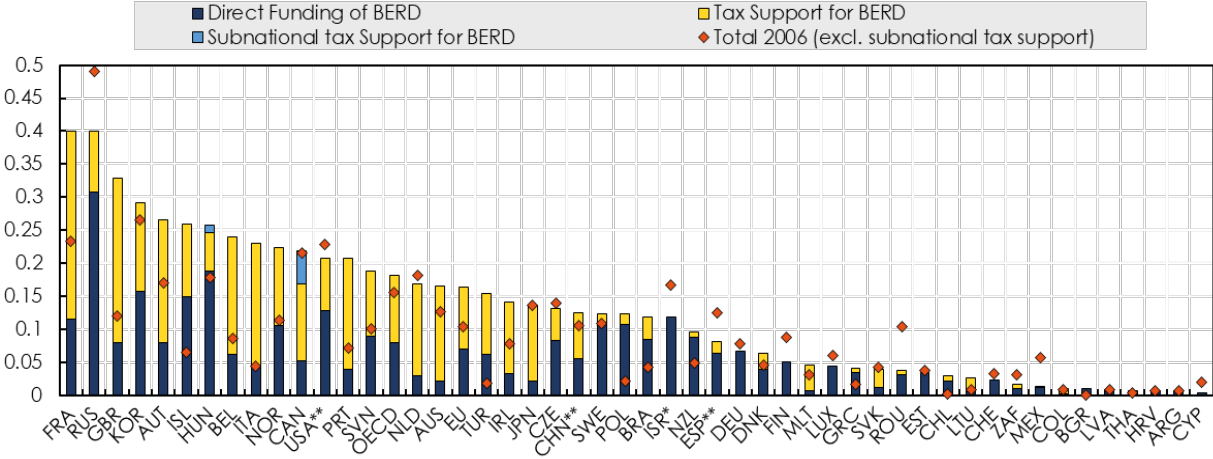
Source: Bank of Slovenia, 2020.

2.3 GOVERNMENT INVESTMENT INCENTIVES

Investment incentives offered by the government include using the value of investment in research and development to reduce the tax base of firm profit tax. From 2005 10% of the gross value of investment in R&D was eligible for reducing the base of the profit tax, with the share going up to 20% in 2010. Since 2012 100% of investment in R&D is tax deductible. Up to 2006 investments in equipment and intangible assets could be used to reduce the tax base up to 20%. While there were no reductions possible in 2006, the possibility was reintroduced in 2007 when firms could reduce the tax base up to 20% of the investment value and not exceeding 20,000 euro. Later on, the share was increased to 30% (with a 30.000-euro cap) in 2008 and ultimately to 40% in 2010.

In terms of business enterprise R&D expenditure (BERD) support Slovenia ranks relatively highly amongst OECD countries (Figure 6). The combined tax support and direct funding for R&D in Slovenia (as a share of GDP) exceed both the OECD and EU averages at 0.02% of GDP. Amongst smaller EU countries Slovenia’s government support for BERD ranks fifth behind Austria, Hungary, Belgium, and Portugal.

Figure 6. Direct government funding and tax support for R&D in 2006 and 2018 as % of GDP (%)



Note: Data on tax support and data on subnational tax support not available.

Source: OECD, 2020.

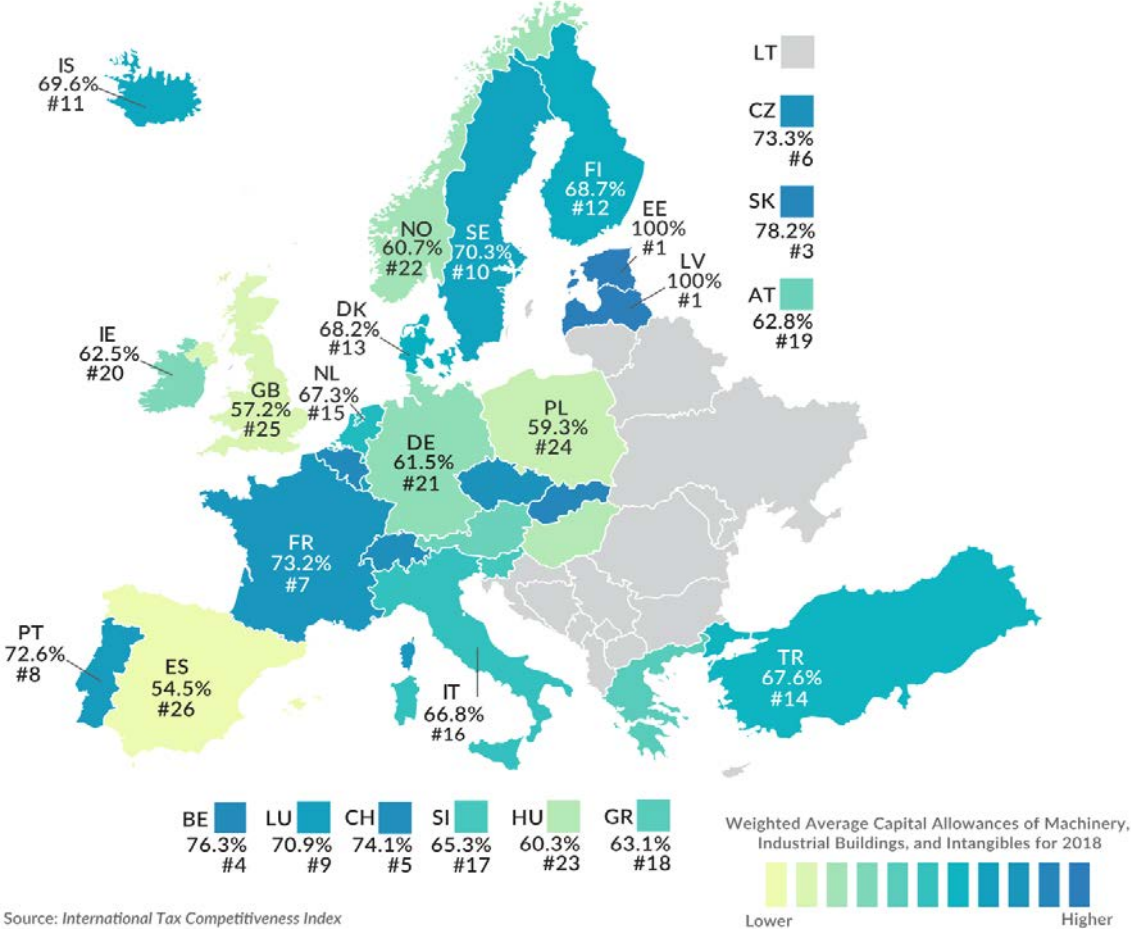
As is the case with most countries, the total (tax support and direct funding combined) increased from 2006 to 2018 with the Slovenia’s increase being one of the largest amongst the countries analysed.

In terms of the tax allowance for capital expenditures (machinery, industrial buildings and intangibles) Slovenia ranks below the EU average with the weighted average allowance in 2008 of 65.3% being the 17th highest in the EU at the time. Latvia and Estonia with 100% allowance for all types of capital expenditures rank highest, while Slovakia and Czechia with 78.2% and 73.3% are other former socialist countries to also exceed the average allowance of Slovenia. On the other hand, Spain (54.4%), Great Britain (57.2%) and Poland (59.3%) allow a considerably lower tax allowance across different types of investment than Slovenia. In more recent data Slovenia is likely to perform slightly better as the maximum allowance on equipment and intangible assets in Slovenia has increased considerably since 2008.

Figure 7. Weighted average capital allowances of machinery, buildings, and intangibles in 2008

Capital Allowances in Europe

Weighted Average Capital Allowances of Machinery, Industrial Buildings, and Intangibles for 2018



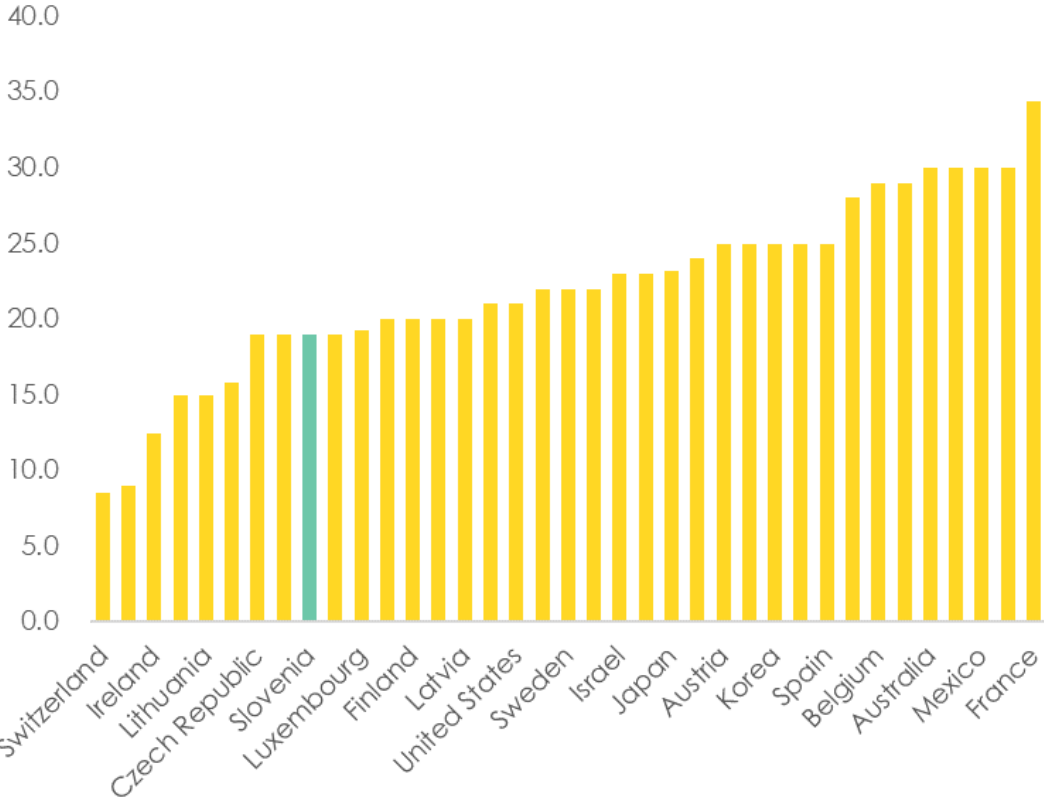
Source: International Tax Competitiveness Index

Source: International Tax Competitiveness Index, 2000.

The profit tax rate in Slovenia went through several changes since 2006 when it started at 25% and was gradually reduced to 20% in 2010. The rate came down further to 18% in 2012 and then 17% from 2013-2016. Finally, in 2017 the rate of profit tax was increased back to 19%. Given that considerable tax deductions are possible, the effective rates of the profit tax were 11.7% and 11.5% in 2015 and 2016, 13.1% in 2017 and 9.5% in 2019.

In terms of the nominal corporate tax rate, Slovenia remains one of the OECD members with the lowest tax rate ranking 10th out of 36 countries in the OECD report shown in Figure 8. The 19 per cent corporate profit tax in Slovenia is broadly comparable with other former transition countries (Poland, Czechia, Estonia and Latvia), with Hungary and Lithuania the only two former socialist countries with markedly lower profit tax rates.

Figure 8. Nominal corporate profit tax rate by country in 2018 (tax rate in %)



Source: OECD, 2020.

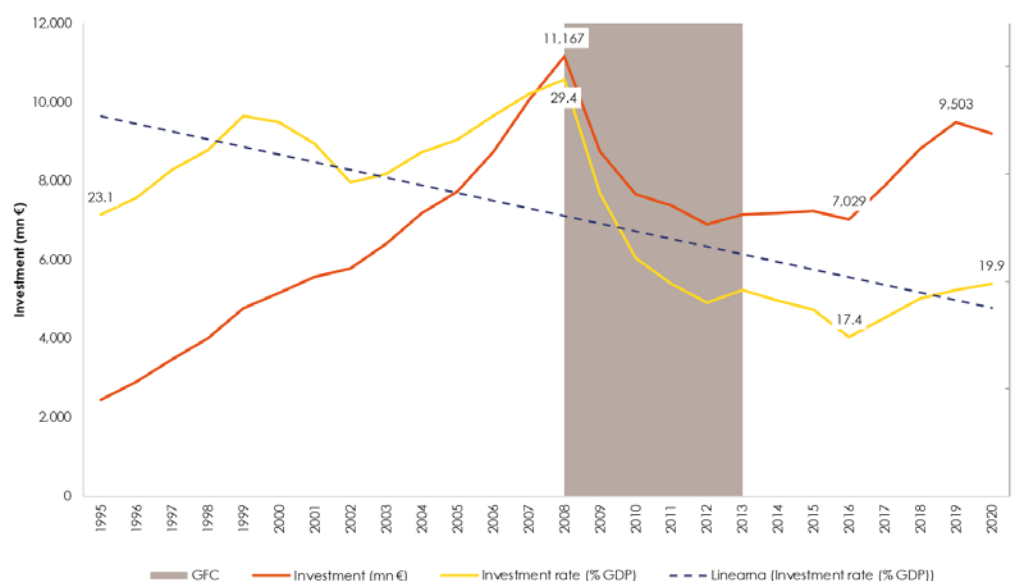
3. MACROECONOMIC ANALYSIS

In this section we study the macroeconomic factors which may explain declining business investment in Slovenia. We analyse this at two levels. First, we conduct a general comparative analysis of investment trends in Slovenia versus EU-15 and EU new member states (EU-NMS) in the period 1999-2019. Second, we conduct an econometric empirical study on the importance of various determinants of business investment.

3.1 COMPARATIVE ANALYSIS OF INVESTMENT TRENDS IN SLOVENIA VERSUS EU MEMBER STATES

Slovenia experienced several distinct periods of investment activity since gaining independence in the early 1990s. Total investment in Slovenia rose steeply between 1995 and 2004, and speeded up additionally during the pre-GFC boom, only to fall after the outburst of the GFC by almost 40 percent by 2012 and remain depressed at that level until 2016 (Figure 9). After 2016, total investment rebounded and exceeded 2006-investment-levels by 2019. Investment plummeted again with the outbreak of the Covid-19 pandemic in 2020.

Figure 9. Gross fixed capital formation in Slovenia, 1999-2020, Total (mn €) and percentage of GDP (%)



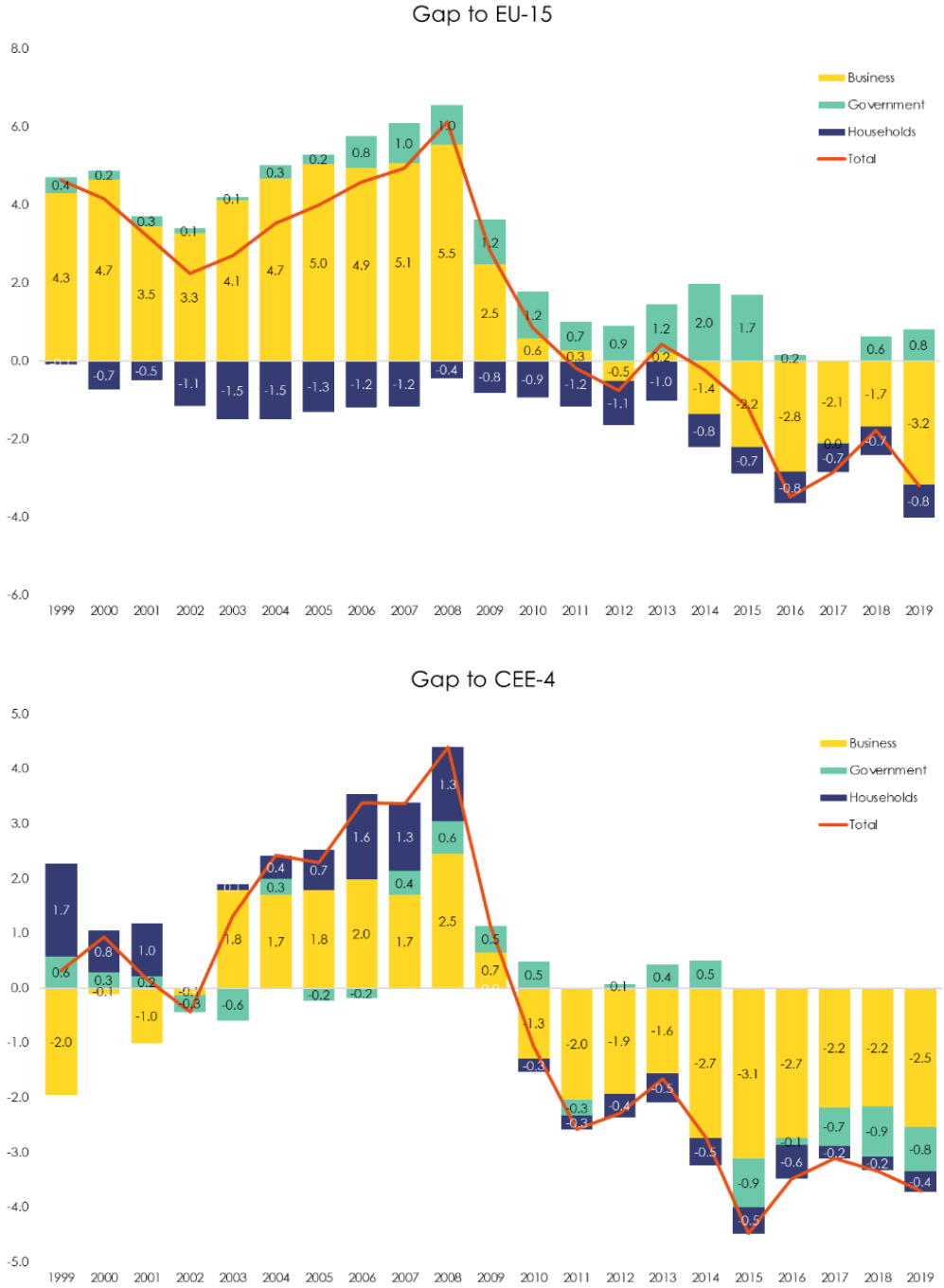
Source: Statistical Office of the Republic of Slovenia.

Most strikingly, while after 2016 Slovenia's investment levels in absolute terms appear to recover from the impact of the GFC, adopting a similar steep upward trend as during the 2005-2008 boom, however, investment relative to GDP remain depressed. The total investment-to-GDP ratio in 2020 lags the 2008 ratio by almost 10 percentage points (19.9 versus 29.4 percent) and lags even the transition-level investment-to-GDP ratio from 1995 by more than 3 percentage points (Figure 9).

A striking picture emerges when comparing the current evolution in Slovenia's investment gaps to the "old" EU member states (EU-15) and the four most industrialised new EU member states (CEE -4:

Czechia, Hungary, Poland, Slovakia). The investment gaps are not closing but appear to be persistent notwithstanding the surge in absolute investment and improvements in investment ratios after 2016. In the period 2015-2019, the Slovenian corporate sector invests on average 2.4 and 2.5 percent of GDP less than the corporate sectors in the EU-15 and CEE-4 countries, respectively.

Figure 10. Decomposition of total investment to GDP ratio gap in Slovenia relative to EU-15 and CEE-4 by investment type, 1999-2019 (percentage points)



Note: CEE-4: Czechia, Hungary, Poland, Slovakia.

Source: Eurostat.

This development suggests that there are structural reasons for the poor investment performance of firms in Slovenia. Given the negative impact of the COVID-19 pandemic on the Slovenian corporate sector reflected also in the decline of absolute investment levels (see Figure 9), the investment gap in Slovenia

relative to other EU countries is likely to widen. This may significantly hamper the potential future growth of the Slovenian economy.

In the next subsection, the potential macroeconomic factors for low business investment in Slovenia are discussed and empirically evaluated.

3.2 MACRO DETERMINANTS OF DECLINING BUSINESS INVESTMENT IN SLOVENIA

Based on the above historical comparative analysis of the investment climate in Slovenia and the EU, we conduct an econometric empirical study on the importance of various determinants of business investment in Slovenia in this section. In line with the recent literature, we model macroeconomic corporate investment as a function of standard macroeconomic determinants of investment, such as:

- GDP growth (capturing the demand factor via business cycle),
- lending interest rate (1-year and 5-year loan maturity),
- profitability of non-financial corporations,
- financial liabilities of non-financial corporations,
- availability of foreign funds (such as foreign direct investment and EU funds),
- use of ICT capital,
- composition of international trade, and
- institutional factors.

Institutional factors that we consider are the following:

- Corporate tax rate and average labor tax burden (income tax + social contributions),
- Overall competition and market regulation (in Slovenia: favouring indigenous firms and leading to significant barriers to entry);
- Flexibility of labour market regulation (in Slovenia: deterring new, domestic and foreign, investments);
- Government-financed Business enterprise R&D expenditures (BERD);
- Indirect government support through R&D tax incentives and through subnational R&D tax incentives;
- Other structural reasons leading to the fact that in spite of a robust economic recovery since 2014, the investment intensity does not seem to rebound at all. In particular, we look at the severity of financial crisis after 2008 resulting in prolonged overall corporate deleveraging. In Slovenia, more so than in other countries, this might have led to possible permanent effects due to reduced investment capacity or depressed investment sentiments (so-called hysteresis effect).

3.2.1 Empirical model specification of macro investment function

Following the literature, we will seek to estimate an accelerator type of aggregate investment model², which we can generally specify as follows:

$$\frac{I_t}{GDP_t} = \beta_0 + \beta_1 GFC + \beta_2 \Delta Y_{t-1} + \beta_3 R_t + \beta_4 \mathbf{X}_t + \delta \mathbf{Z}_t + \varepsilon_t \quad (1)$$

² e.g. Bloom, Bond & van Reenen (2007, 2019)

where $\frac{I_t}{GDP_t}$ refers to business investment rate as a share of gross fixed capital formation in GDP in year t in a country (we suppress subscripts for countries). ΔY_{t-1} refers to the growth rate in real GDP (lagged one year) to capture the business cycle or demand. R_t refers to the real interest rate for short-term (1 year) and long-term (5 year) maturity loans. Other main structural explanatory variables are captured in the vector of variables, \mathbf{X}_t , including lagged corporate profitability, lagged corporate financial leverage, availability of foreign investment funds (such as foreign direct investment and EU funds), use of ICT capital and composition of international trade. Finally, we include a vector of variables, \mathbf{Z}_t , capturing institutional factors discussed above. We also include a crisis dummy variable (GFC) for the period 2009-2013 to capture the prolonged crisis effect in Europe after 2008 and interact it with GDP growth, indicating post-GFC period 2009-2013 to capture increased uncertainty.⁴ In addition, we also add a combined indicator variable for the crisis and Slovenia (GFC x SVN) and interact this dummy with all variables in the model to capture the specific post-GFC effects of selected variables on the business investment ratio in Slovenia as opposed to other countries in our sample. The estimation also includes country fixed effects, while most time fixed effects are captured by the crisis (GFC) dummy variable.

Our sample consists of 30 European countries for the period 1995-2019. It includes EU-27 (less Malta due to unavailability of some key data), United Kingdom, Iceland, Norway and Switzerland.

Model (1) is in general estimated for the period 1995-2019, but the time dimension is accordingly shortened based on the availability of the data. Note that cross-country data on lending interest rates are available only since 2003.

We use data from several sources, with the main sources being Eurostat, OECD, European Central Bank (ECB), World Bank and European Commission. Eurostat is a source of data on GDP, GDP growth rates, corporate investment rates, gross fixed capital formation, profitability, and liabilities of non-financial corporations. The 1-year and 5-year lending rates are taken from the ECB. The OECD provides data on foreign direct investment, the use of ICT capital, the composition of international trade (domestic value added in exports, share of intermediate and consumption goods in total exports), corporate tax rate and labor income tax burden, flexibility of labour market regulation, government-financed Business enterprise R&D expenditures (BERD), indirect government support through R&D tax incentives and through subnational R&D tax incentives. Data on overall competition and market regulation is taken from the Worldbank. The European Commission is a source of data on structural and investment funds by countries. If data for some countries and variables are not available from the above sources, we refer to national sources.

3.2.2 Stylised facts on macro determinants of investment

To explore to what extent the selected variables in our model (1) can contribute to explain the declining business investment in Slovenia relative to other European countries, we start by presenting the evolution

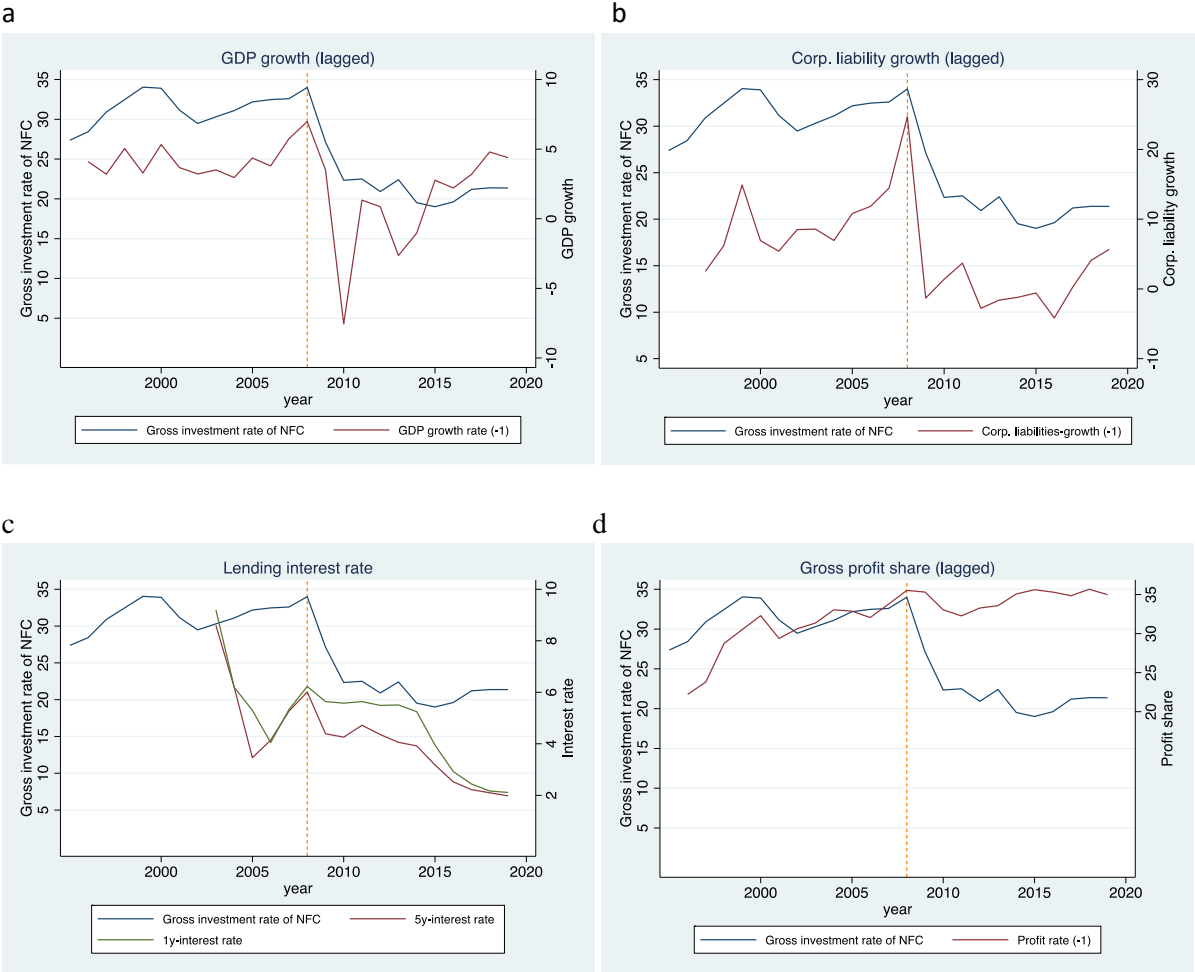
³ We normalise by GDP at the macro level, alternatives are to normalize by the capital stock, we chose here the former as cross country data on investment to GDP ratios are readily available.

⁴ We chose the crisis period based on the prevalence of negative annual GDP growth rates or weak growth after the start of GFC in the third quarter of 2008. According to Eurostat, in 2009 all 30 countries in our sample experienced negative GDP growth. In 2010 and 2011 there was a brief recovery (though, 5 countries still experienced negative growth), while in 2012 the recession resumed and lasted for two years (13 and 10 countries experienced negative growth in 2012 and 2013, respectively). Slovenia faced a similar GDP growth trend as described above, while in some countries negative growth rates extended as long as until 2016. In the Appendix, we provide evidence on development of crisis (see Table A0 and Figure A0) and robustness checks regarding the effects of different length of the GFC crisis on our main results.

of the correlation between the investment rate and the key variables of interest in Figures. The overview for the other countries in our sample is provided in the Appendix.

For most countries, gross business investment rates at the aggregate level are highly correlated with the business cycle (captured by the lagged GDP growth). This is particularly true for the period before the GFC, while after 2008 in many countries there is a disconnect between the investment rate and the business cycle (Figure A1 in Appendix). Slovenia (Figure 11a) along with most of the EU new member states from CEE region belong to the latter group suggesting that despite the macroeconomic recovery the investment rate did not pick up after the outbreak of the GFC. At the same time, the gross business investment rate is strongly correlated to lagged corporate liabilities growth in Slovenia (Figure 11b). This indicates that business investment, which in Slovenia is financed predominantly through bank loans, is heavily dependent on firms' access to finance as well as their financial leverage. Between 2009 and 2016, overall corporate liabilities growth in Slovenia was mainly negative, indicating a process of deleveraging after a big surge in leverage in the pre-GFC boom. This is in line with Figure 5 above which demonstrated a sharp net contraction in bank loans to the corporate sector in Slovenia for six consecutive years between 2011 and 2016. With a few exceptions (such as the Czechia, Poland, and Sweden), similarly close correlations of corporate investment to corporate liabilities can also be observed in other European countries (Figure A2 in the Appendix).

Figure 11. Gross investment rate and selected variables in Slovenia – Part 1, 1995-2019 (%)



Source: Eurostat, ECB.

Macroeconomic theory and all classes of macroeconomic models in the range of early Keynesian (IS-LM) to modern Post-Keynesian models (DSGE) are based on the key premise that corporate investment is a negative function of the interest rate. Companies are believed to respond positively to declines in interest rates and negatively to increases in interest rates. The evidence for the period 2002-2019 for European countries (Figure A3 in the Appendix), however, is at odds with this macroeconomic assumption as there is evidently a positive correlation between gross business investment rate and the lending rates. With the exception of a few countries (Belgium, France, Spain, Sweden and Switzerland), both 1-year and 5-year loan maturity lending rates generally move in the same direction as the gross investment rate.

Hambur and La Cava (2018) confirm similar positive correlations between the investment rate and the cost of borrowing for Australia. However, traditional Keynesian models do predict that in a liquidity trap, ever lower interest rates may have little effect on boosting the levels of investment. This situation has also been observed in the Euro Area and other advanced economies with loose monetary policy over the past decade after the GFC, where central banks had to resort to unconventional measures such as zero lending rates and negative deposit rates to encourage banks to increase lending. In Slovenia, these measures had little effect on boosting investment indicating a deeply depressed investment sentiments, both due to the prolonged economic crisis (until 2014) and the corporate needs for extensive deleveraging after 2008 (Figure 11c).

Business investment is generally driven by business sentiments captured by past profits. This is confirmed for most European countries (Figure A4 in the Appendix) showing a positive correlation between lagged corporate profit rates and investment ratios. In Slovenia, a strong positive correlation between lagged corporate profit rates and the investment rate is observed for the period 1995-2008, while after 2008 there is a disconnect between the two. Despite steadily rising profit rates after 2010, investment rates did not follow suit (Figure 11d).

Among the institutional factors, there seems to be no consistent correlation pattern between the corporate tax rate and investment rate across countries. In spite of this, the relationship appears to be positive for most of the countries (see Figure A5 in the Appendix). This is due to the fact that in 2000s most EU countries started to decrease the corporate tax rates, while the investment rate was also declining. The same pattern, but more pronounced, is also observed for Slovenia (Figure 12a). Similar patterns are found also for the correlation between the labor income tax burden and investment rate across countries (see Figure A6 in the Appendix) and an even more pronounced positive correlation in Slovenia (Figure 12b). Hence, neither declining corporate tax rates nor declining labor taxes seem to have helped in reversing the trends of declining corporate investment rates across EU countries and in particular in Slovenia.

Figure 12. Evolution of gross investment rate and selected variables in Slovenia – Part 2, 1995-2019 (%)



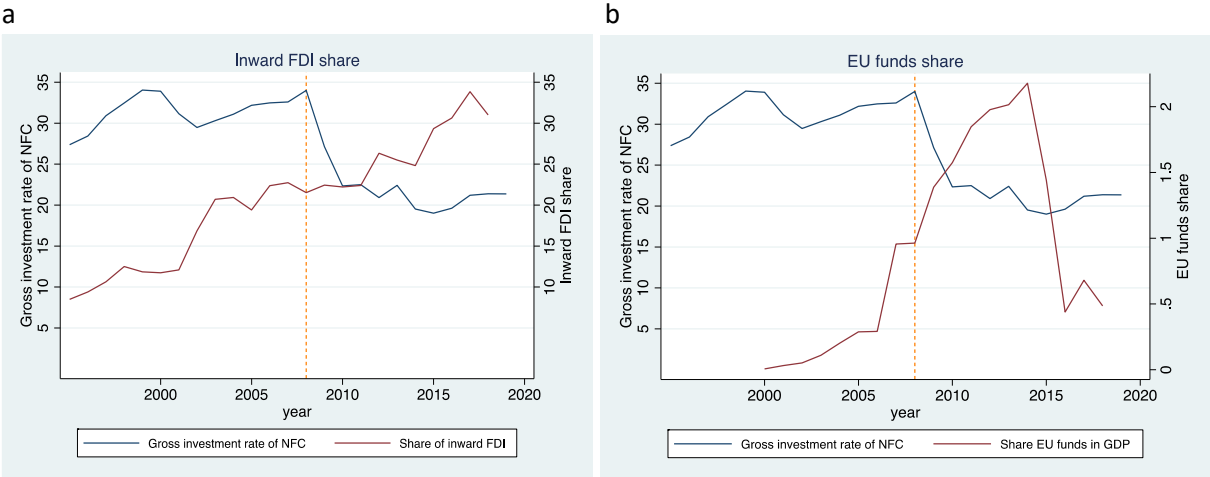
Source: Eurostat, OECD.

The same is true for the changes in employment protection legislation for regular full time employment, which was made more flexible after 2010 (Figure 12c), indicating the correlation is going in the opposite direction than expected. A positive correlation between employment protection and investment rates also seems to be a prevailing pattern for other countries (see Figure A7 in the Appendix). This implies that more flexible labor markets do not necessarily boost investment. A very similar picture emerges for

overall competition and product market regulation. Regulation has improved after 2008, but contrary to expectations it is positively correlated with a declining trend in corporate investment rate (Figure 12d).

Government financed business R&D expenditures and indirect government support through R&D tax incentives also seem to be correlated with investment rate in Slovenia in the “wrong direction”. Both policy measures have been scaled up after 2008 but do not appear to have ended up promoting investment in a significant way (Figures 12e and 12f). For other European countries, the correlations of both variables to the corporate investment rates are mixed (Figure A8 – A9 in the Appendix).

Figure 13. Evolution of gross investment rate and selected variables in Slovenia – Part 3, 1995-2019 (%)



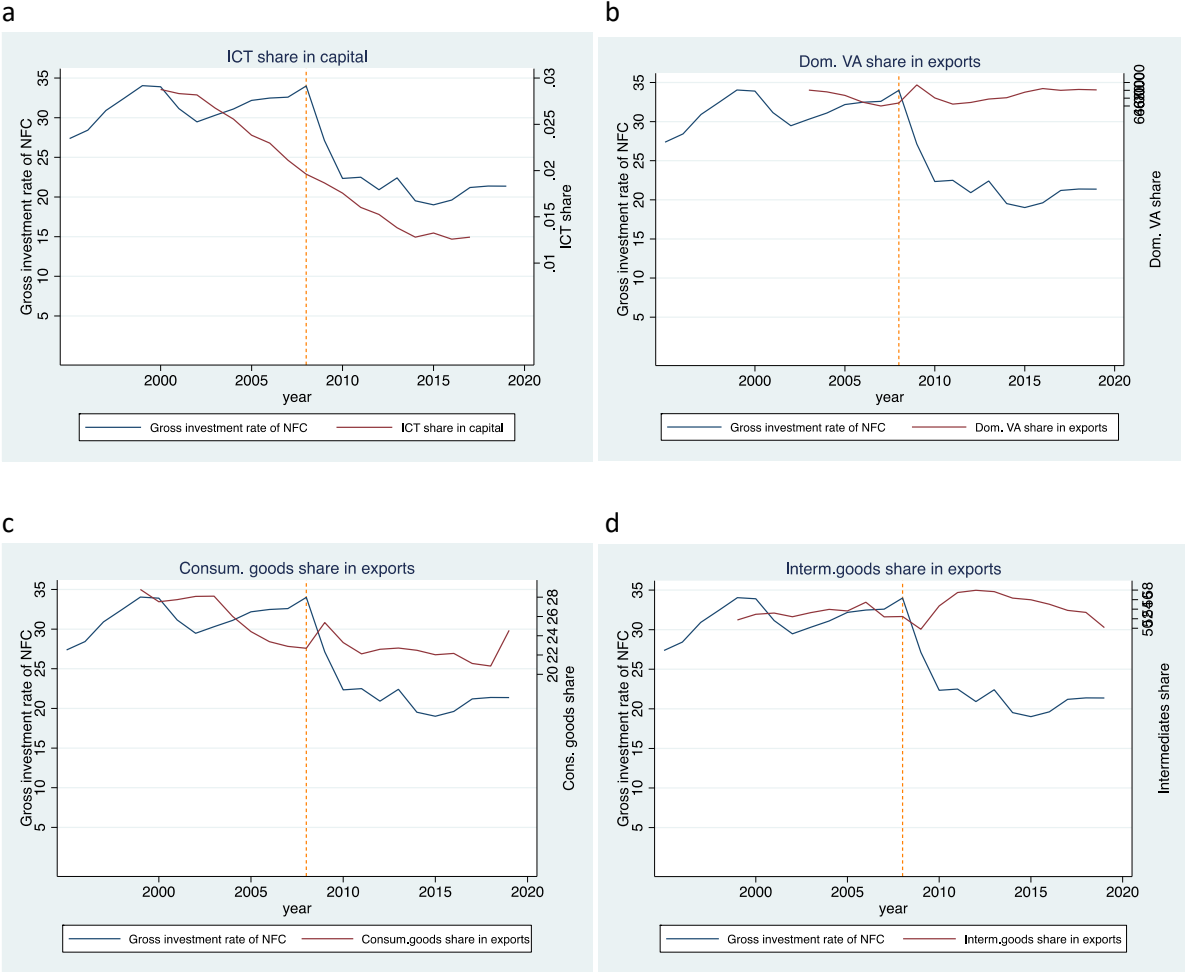
Note: Inward FDI stock ratio to GDP; total eligible spending of EU funds as a share in GDP.
 Source: Eurostat, OECD, European Commission.

In terms of available foreign investment funds, both the stock of inward FDI and EU structural and investment funds (as a share of GDP) have been scaled up after 2008 (EU funds only until 2014), but did not seem to promote investment in a significant way (Figures 13a and 13b). This implies that the two policy measures were expanded but were not strong enough to offset other negative effects on the investment rate.

The share of information and communication technologies capital in total capital invested (ICT share) in Slovenia is steadily declining since early 2000s, notwithstanding that the overall investment rate was showing an upward trend prior to the GFC (Figure 14a). Evidence for other European countries is mixed (Figure A9 in the Appendix).

The Slovenian economy is heavily dependent on exports, which represent about 38% of GDP in value added terms. In the period until 2012, domestic value added as a share of gross exports steadily decreased (by 4 percentage points) but gained momentum afterwards (Figure 14b). According to the Global Value Chain Development Report 2019 (WTO, OECD, WB, IDE-JETRO, UIBE, 2019), the Slovenian economy is one of the 8 most integrated OECD economies into global value chains (GVCs) in terms of both backward and forward integration. However, the composition of exports is deteriorating. Figures 14c and 14d demonstrate an increasing share of intermediate goods’ exports (an increase of 5 percentage points) in the period 2000-2015 and a declining share of final consumption products in exports (a decrease by 6 percentage points). This indicates a structural shift in Slovenian exports away from final goods to intermediate products where markups are traditionally tighter, but also where the need for investing both in R&D and break-through technologies are lower. Hence, this shift in the composition of Slovenian exports could also be contributing to a declining trend of business investment.

Figure 14. Evolution of gross investment rate and selected variables in Slovenia – Part 4, 1995-2019 (%)



Source: Eurostat, OECD.

3.2.3 Results

The above analysis has shown that the main macroeconomic determinants of investment in Slovenia are likely to be the business cycle (lagged GDP growth), the evolution of corporate liabilities (financial leverage), the profitability of firms and the composition of exports, while institutional factors do not seem to be decisive factors. Below we present our main estimation results of model (1) on a sample of 30 European countries. First, we present our baseline results for a reduced-form model, followed by results for the extended model including also institutional factors.

The model (1) is estimated using country fixed effects, while time fixed effects are captured by the GFC dummy (taking value of 1 for the period 2009-2013 and 0 otherwise). Note that our estimations of model (1) are crucially limited by the data availability. While in principle there is 750 data points available (30 countries x 25 years), the data on lending interest rates are available only for the period 2003-2019, reducing our sample to a maximum of 510 observations. The number of observations is further brought down by the inclusion of lagged variables and by the limited availability of certain variables on institutional factors, available only for a sub-sample of OECD countries. Therefore, our sample varies

between 411 and 476 observations for the reduced-form model and between 275 and 378 observations for the full model including institutional variables.

Table 1 presents our baseline results for estimating the reduced-form macro investment model (1). This model specification includes structural variables only and excludes institutional factors. The table provides separate results for lending interest rates for 1-year and 5-year maturity loans.

Table 1. Baseline results for macro investment model, reduced-form model

	(1)	(2)	(3)	(4)	(5)	(6)
	1y-interest rate			5y-interest rate		
Interest rate	0.763 [5.97]***	0.431 [3.32]***	0.374 [3.60]***	0.354 [3.56]***	0.454 [6.26]***	0.437 [6.12]***
GFC	-2.525 [-6.93]***	1.010 [2.75]***	1.085 [2.93]***	-2.749 [-7.94]***	0.382 [1.17]	0.285 [0.85]
SVN_GFC	-1.389 [-0.75]	-0.500 [-0.29]	-0.075 [-0.05]	-0.500 [-0.26]	0.029 [0.02]	0.393 [0.27]
GDP growth rate (-1)		1.065 [11.33]***	0.982 [11.77]***		0.953 [11.40]***	0.898 [11.36]***
GDP growth rate x GFC (-1)		-0.755 [-6.94]***	-0.684 [-7.15]***		-0.667 [-6.92]***	-0.624 [-7.04]***
GDP growth rate x SVN x GFC (-1)		-0.059 [-0.27]	0.227 [2.17]**		-0.047 [-0.21]	0.245 [2.23]**
Corp. liabilities-growth			0.067 [3.14]***			0.022 [1.44]
Corp. liabilities-growth x GFC			0.035 [0.98]			0.068 [2.15]**
Corp. liabilities-growth x SVN x GFC			0.706 [3.90]***			0.729 [3.88]***
Constant	21.657 [39.24]***	19.572 [34.39]***	19.526 [39.54]***	23.353 [47.07]***	19.886 [50.29]***	19.784 [49.56]***
Observations	476	473	458	491	484	460
R-squared	0.539	0.671	0.711	0.545	0.690	0.722

Note: Dependent variable: Gross investment share. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. Source: Own calculations.

Baseline results confirm the findings from the above descriptive analysis, showing that the main drivers of investment across Europe are the *business cycle (lagged GDP growth)* and *corporate leverage (lagged)*, while investment is perversely related to the variation in bank lending rates (a positive and significant correlation).⁵ These factors, including GFC crisis dummy and country fixed effects, can explain more than 70 percent of variation in investment rates across Europe in the past two decades.

While lagged GDP growth generally positively impacts the investment rates in Europe, the estimations show that during the prolonged period of recession and weak growth of 2009-2013, captured by the interaction term with GFC, the impact of the business cycle component as a driver of investment has weakened significantly. During the post-GFC period the business cycle coefficient has decreased in size by about 70 per cent. Note that the reduced impact of the business cycle during the post-GFC period is

⁵ Results for 5-year interest rates show that this positive correlation between interest rates and investment rate is very robust.

also characteristic of the Slovenian economy albeit to a lesser degree than in the other European countries (e.g. interaction coefficients in specification (6) between GDP, GFC and SVN).

On the other hand, the results show that the (positive) effect of corporate debt growth on investment dynamics across European countries remained intact also during the post-GFC period. In contrast, the impact of corporate debt on investment dynamics in Slovenia during the post-GFC period has become substantially more pronounced. Depending on the specification in table 1, the coefficient for corporate liabilities growth in Slovenia for the post-GFC period is bigger by a factor between 6 and 17 as compared to other European countries. Note that as the aggregate investment rate and corporate debt dynamics were moving in the same direction (declining) during the period 2009-2013, this result indicates the severity of the financial crisis and the importance of corporate sector deleveraging for investment potential and/or willingness to invest. Overleveraged firms were forced to deleverage, while also for financially sound companies access to credit during the financial crisis has deteriorated, limiting potential to invest for both groups of firms.

Our findings for Slovenia suggest that the drop in investment is driven by a lower sensitivity of corporate investment to the business cycle and a higher deleveraging process of highly leveraged firms. This raises two relevant questions. Firstly, why did investment drop that much in the first place before deleveraging took place, if it is not sensitive to the business cycle? Secondly, why investment did not recover when deleveraging ‘faded out’ in recent years?

More detailed explanation of this finding is as follows:

- Investment drop in Slovenia happened immediately after the start of GFC due to negative economic shock. There are two key issues to be taken in to account: First, the volume of investment and the investment rate were abnormally high in the boom period 2005-2008, hence the drop in investment after the boom was over was inevitable. Second, investment is part of the GDP (about 20%) and hence in 2009 GDP in Slovenia fell by 7.5% also due to a big drop in corporate investment following the drop in final demand (domestic and foreign)).
- The above implies that the external shock of the GFC turned an “overshooting” of investment into an “undershooting”, which was then reinforced by the corporate deleveraging process.
- Lower sensitivity of corporate investment to the business cycle applies to the whole post-crisis period which is picked up by the interaction term with the GFC dummy variable (i.e. 2009-2013) and in particular for the latter part of this period. While Slovenia's GDP recovered briefly and marginally in 2010-2012, investment did not pick up as corporate deleveraging began. In 2012-2013, the Slovenian economy slipped into the next recession (double-dip). The process of deleveraging dragged on until after the bank restructuring at the end of 2013. For most of the over-indebted companies, this process lasted until 2015 or 2016. Although economic growth resumed in 2014, most companies were still in the middle of the deleveraging process due to the delayed bank restructuring.

In the next step, we present results for estimating the investment model adjusted for the role of institutional factors. However, note that when estimating this full model, our estimations are constrained by two major limitations. The first one stems from the low degrees of freedom available due to the limited sample size as indicators of regulation and other institutional factors are not available for all countries in the same way. The second restriction arises due to the short post-GFC period (5 years) and interactions with the GFC dummy for Slovenia only. Due to low number of data points to which the interaction term $SVN \times GFC$ applies (only 5 data points for each variable out of 476 total observations), a number of coefficients for interaction terms cannot be estimated efficiently or effectively. When more

variables are included in the model, both restrictions cause most interaction terms to drop out of the estimates because they cannot be estimated efficiently.

In order to overcome these restrictions we apply the following strategy. We estimate the full model in two steps. We first estimate the model by including the interaction terms of all variables with the dummy variable for Slovenia (SVN). In this way, we check for differences in investment rate dynamics between Slovenia and the average of the other countries throughout the period. In the second step, we estimate the full model by including the interaction terms for Slovenia and post-GFC period (SVN x GFC). Here, the post-GFC period is defined as the whole period after 2008 (i.e. 2009-2019). This approach helps increasing the number of different data points for estimating the interaction terms (from 5 to 11) and at the same time it enables to check for differences in evolution of the investment rate dynamics between Slovenia and other countries after the start of GFC.

Table 2. Robustness check for length of the post-GFC period, reduced-form model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GFC period	2009	2009- 2010	2009- 2011	2009- 2012	2009- 2013	2009- 2014	2009- 2015	2009- 2019
1y-interest rate	0.500 [4.94]***	0.431 [4.29]***	0.426 [4.23]***	0.413 [4.06]***	0.374 [3.60]***	0.363 [3.46]***	0.339 [3.11]***	0.332 [1.93]*
GFC	-0.210 [-0.42]	1.100 [2.45]**	0.841 [2.44]**	0.640 [1.86]*	1.085 [2.93]***	1.364 [3.59]***	1.332 [3.33]***	1.454 [2.39]**
SVN_GFC	1.812 [1.44]	1.394 [1.25]	0.101 [0.09]	-0.399 [-0.30]	-0.075 [-0.05]	-0.703 [-0.46]	-1.252 [-0.83]	-1.923 [-0.92]
GDP growth rate (-1)	0.600 [9.59]***	0.859 [11.76]**	0.879 [11.87]**	0.902 [12.28]**	0.982 [11.77]**	1.050 [12.14]**	1.061 [11.55]**	1.034 [9.22]***
GDP growth rate x GFC (-1)	-0.182 [-0.95]	-0.578 [-5.86]***	-0.616 [-6.66]***	-0.629 [-7.24]***	-0.684 [-7.15]***	-0.744 [-7.60]***	-0.769 [-7.55]***	-0.521 [-3.29]***
GDP growth x SVN x GFC (-1)		0.171 [2.82]***	0.337 [7.02]***	0.359 [5.43]***	0.227 [2.17]**	0.246 [1.70]*	0.261 [1.73]*	-0.727 [-2.35]**
Corp. liabilities-growth	0.082 [3.86]***	0.072 [3.49]***	0.069 [3.26]***	0.066 [3.11]***	0.067 [3.14]***	0.066 [3.04]***	0.069 [3.03]***	0.067 [2.57]**
Corp. liabilities-growth x GFC	0.063 [1.48]	0.022 [0.59]	0.029 [0.82]	0.047 [1.37]	0.035 [0.98]	0.037 [0.93]	0.025 [0.58]	0.005 [0.13]
Corp. liabilities-growth x SVN x GFC			0.705 [22.32]**	0.875 [4.22]***	0.706 [3.90]***	0.774 [3.09]***	0.906 [4.25]***	-0.014 [-0.05]
Constant	20.172 [44.21]**	19.650 [43.22]**	19.669 [42.46]**	19.738 [41.67]**	19.526 [39.54]**	19.269 [36.14]**	19.366 [33.64]**	19.488 [18.21]**
Observations	458	458	458	458	458	458	458	458
R-squared	0.683	0.704	0.706	0.709	0.711	0.714	0.718	0.698

Note: Dependent variable: Gross investment share. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Source: Own calculations.

This approach is warranted by the descriptive analysis above showing that the GFC was a game-changer for Slovenia's aggregate investment which remained depressed after 2008 despite robust economic growth after 2015. Furthermore, the results in Table 2 show that coefficients for main variables in our model are very robust to the selected length of the crisis period. By increasing the length of the post-GFC period, the average impact of the business cycle on investment rate increases slightly for all

countries, also for Slovenia. On the other hand, the average impact of corporate debt for all countries remains constant despite increasing the length of the post-GFC period, while it increases slightly for Slovenia. This suggests that, for the Slovenian corporate sector, the depressing effects of financial leverage taken on before 2008 continued to have persistent negative effects that spread beyond the end of the economic recession after 2013.

Tables 3, 4 and 5 present results of estimating the full model, which in addition to the key structural factors also includes some other structural factors and institutional factors. Note that we include additional variables stepwise to check for the changes in coefficients. In order to allow for a direct comparison of the prolonged post-GFC effects versus the period before 2008 we present next to each other coefficients for interactions with the Slovenia dummy and with the dummy for Slovenia in the post-GFC period (2009-2019).

Note that due to data availability issues the sample size may drop by as much as 40 percent, making these results incompatible to the baseline estimates (by including some institutional factors entire countries are omitted from the sample). Hence, some key coefficients from the baseline estimations can change in size and even in sign once the model is estimated for the subsample and so these results should be interpreted with caution.

The results in Tables 3 to 5 shed light on the importance of institutional factors for aggregate investment dynamics. First, the results show that institutional factors, in addition to some structural factors, can explain only a small part of the variation in investment rates in Europe. While the three key variables in the reduced-form model (investment rate, business cycle and corporate debt) and fixed effects can explain about 72 per cent of variation in the investment rates, these additional structural and institutional factors contribute only between 5 and 12 percent in explaining the variation in investment rates in Europe. Nevertheless, the full model can explain up to 84 per cent of total variation in aggregate investment rates.

Starting with results presented in Table 3, it can be seen that the profitability of the corporate sector positively impacts the investment dynamics in the European countries in all model specifications. The effects for Slovenia do not differ from those of the other EU countries. This is true both for the pre-crisis period and for the post-GFC period.

Corporate tax rates are shown not to significantly affect aggregate investment dynamics in Europe either before or after the start of the GFC. On the other hand, the corporate tax rate in Slovenia was perversely (positively) correlated with the investment rate before 2008, while this correlation disappeared after 2008. The same pattern is found for the labor tax burden. Hence, similar to interest rates, corporate and labor taxes do not seem to be of importance as the drivers of corporate investment in Europe and Slovenia, neither before nor after the start of GFC.

Table 3. Main results for macro investment model, full model (Part 1)

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole period	Post-GFC	Whole period	Post-GFC	Whole period	Post-GFC
1y-interest rate	0.230 [1.80]*	0.209 [1.63]	-0.146 [-1.37]	-0.159 [-1.50]	-0.137 [-1.34]	-0.144 [-1.42]
GDP growth rate (-1)	0.467 [8.17]***	0.467 [8.17]***	0.366 [5.18]***	0.366 [5.18]***	0.374 [4.61]***	0.374 [4.62]***
GDP growth rate x SVN (-1)	-0.330 [-3.07]***	-0.175 [-1.83]*	-0.051 [-0.36]	-0.237 [-1.99]**	0.003 [0.02]	0.044 [0.41]
Corp. liabilities-growth	0.066 [3.18]***	0.065 [3.18]***	0.020 [1.30]	0.019 [1.27]	0.013 [0.87]	0.013 [0.85]
Corp. liabilities-growth x SVN	-0.098 [-1.44]	0.278 [3.12]***	0.007 [0.09]	0.192 [2.02]**	0.041 [0.49]	0.619 [5.21]***
Profit rate (-1)	0.353 [2.56]**	0.355 [2.57]**	0.408 [2.71]***	0.408 [2.72]***	0.281 [2.60]***	0.281 [2.61]***
Profit rate x SVN (-1)	0.403 [1.05]	0.111 [0.35]	0.239 [0.49]	0.549 [1.00]	0.278 [0.63]	0.359 [1.02]
Corp.tax (-1)	-0.034 [-0.70]	-0.030 [-0.62]	-0.009 [-0.21]	-0.007 [-0.16]	-0.045 [-0.92]	-0.044 [-0.91]
Corp.tax x SVN (-1)	0.758 [2.47]**	0.212 [0.97]	1.283 [3.30]***	0.283 [1.21]	1.083 [2.79]***	-0.476 [-2.28]**
Labor tax burden (-1)	0.121 [0.82]	0.122 [0.82]				
Labor tax burden x SVN (-1)	3.279 [3.47]***	-0.824 [-1.30]				
Emp.prot. regular jobs			4.661 [8.21]***	4.682 [8.24]***	4.065 [6.00]***	4.067 [5.99]***
Emp.prot. regular jobs x SVN			0.917 [0.25]	-16.148 [-1.52]	-2.620 [-0.60]	-15.515 [-2.74]***
Prod.market regulation					2.181 [1.98]**	2.206 [2.01]**
Prod.market regulation x SVN x GFC					5.535 [1.68]*	12.407 [3.90]***
Constant	-0.825 [-0.11]	3.977 [0.51]	-6.950 [-1.05]	-5.052 [-0.74]	-2.340 [-0.46]	-0.509 [-0.10]
Observations	378	378	365	365	345	345
R-squared	0.719	0.720	0.756	0.759	0.795	0.799

Note: Dependent variable: Gross investment share. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. Source: Own calculations.

On the other side, a positive but spurious correlation can be observed between the employment protection index of regular jobs and corporate investment in Europe. Most European countries have softened their labor market regulation in the past decade, which however did not result in increased investment. For Slovenia, the effects of reducing the employment protection after 2008 do not boost investment as the coefficients do not differ significantly from the coefficients for other EU countries (see Table 3).

Similarly, product-market regulation is perversely (positively) correlated to investment rate across Europe, indicating that, in contrast to expectations, strengthening competition (i.e. lowering state control, barriers to entrepreneurship, and barriers to trade and investment), did not promote investment growth. These coefficients are much higher for Slovenia, indicating an even stronger spurious correlation

between investment rate and market regulation, implying that this variable might be picking up the effects of an omitted variable. One has to note, however, that both employment protection regulation and product market regulation have been softened during the decade of post-GFC depression / low growth, whereby the latter being the main inhibitor of investment. This indicates that the effects of deregulation on corporate investment might still be materialised in the future.

Among other structural factors presented in Table 4, the inward FDI stock appears to be robustly positively correlated with investment dynamics across Europe, suggesting that foreign investment is an important factor in European investment dynamics. The coefficient for inward FDI stock for Slovenia, however, is significantly negative in most model specifications implying that in the post-GFC period foreign direct investment was moving in the opposite direction than the aggregate corporate investment. This suggests that foreign-owned companies remained stable contributors to corporate investment even during the period when domestically-owned firms significantly reduced their investment (see also Figure 13 revealing a steady increasing trend in FDI stock to GDP ratio).

Conversely, the share of EU structural funds in GDP is systematically negatively, though not significantly, correlated with investment dynamics across Europe. In Slovenia, this coefficient is mostly not significantly different from zero as well. As shown above in Figure 13, EU funds as a share of GDP were increasing up to 2014 while corporate investment rate was declining in this period. Hence, similarly to foreign direct investment, this indicates that EU-funded investment might have counteracted the negative trend in corporate investment, at least in part of the post-GFC period.

Table 4. Main results for macro investment model, full model (Part 2)

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole period	Post-GFC	Whole period	Post-GFC	Whole period	Post-GFC
1y-interest rate	-0.495 [-2.44]**	-0.486 [-2.54]**	-0.267 [-1.82]*	-0.277 [-2.06]**	-0.021 [-0.16]	-0.049 [-0.41]
GDP growth rate (-1)	0.357 [4.77]***	0.356 [4.76]***	0.355 [3.91]***	0.355 [3.93]***	0.356 [4.66]***	0.357 [4.70]***
GDP growth rate x SVN (-1)	-0.069 [-0.42]	-0.259 [-1.93]*	-0.059 [-0.41]	0.003 [0.02]	0.086 [0.66]	0.115 [0.95]
Corp. liabilities-growth	0.036 [2.05]**	0.035 [2.00]**	0.027 [1.65]	0.026 [1.61]	0.021 [1.23]	0.021 [1.22]
Corp. liabilities-growth x SVN	-0.053 [-0.47]	0.164 [1.45]	-0.019 [-0.18]	0.396 [4.65]***	0.120 [1.30]	0.488 [3.60]***
Profit rate (-1)	0.436 [2.99]***	0.434 [2.99]***	0.300 [2.73]***	0.300 [2.74]***	0.191 [2.24]**	0.194 [2.30]**
Profit rate x SVN (-1)	0.138 [0.27]	0.403 [0.68]	0.355 [0.74]	-0.770 [-1.60]	0.515 [1.19]	-0.153 [-0.40]
Corp.tax (-1)	0.037 [0.77]	0.036 [0.77]	0.032 [0.73]	0.033 [0.78]	0.034 [0.81]	0.038 [0.90]
Corp.tax x SVN (-1)	1.370 [2.27]**	0.029 [0.11]	1.200 [1.82]*	-0.267 [-1.31]	-0.102 [-0.15]	-0.915 [-2.45]**
Emp.prot. regular jobs	5.534 [8.02]***	5.520 [8.15]***	5.269 [8.89]***	5.287 [9.01]***	5.011 [8.66]***	5.058 [8.81]***
Emp.prot. regular jobs x SVN	0.608 [0.13]	-20.519 [-1.86]*	0.882 [0.15]	-7.285 [-1.15]	4.197 [1.02]	2.102 [0.29]
Cons. goods share in exp.	-0.366 [-2.29]**	-0.354 [-2.32]**	-0.208 [-2.18]**	-0.208 [-2.31]**	-0.165 [-1.87]*	-0.173 [-2.08]**
Cons. goods share in exp. x SVN	0.374 [0.84]	0.805 [2.60]***	0.236 [0.55]	1.664 [4.59]***	-0.089 [-0.25]	0.910 [2.98]***
Share EU funds in GDP			-0.289 [-1.07]	-0.294 [-1.10]	-0.384 [-1.46]	-0.371 [-1.44]
Share EU funds in GDP x SVN			-0.193 [-0.17]	0.849 [1.46]	-2.092 [-1.96]*	-0.154 [-0.19]
Share of inward FDI					0.029 [4.06]***	0.029 [4.02]***
Share of inward FDI x SVN					-0.643 [-2.47]**	-0.413 [-2.53]**
Constant	-2.108 [-0.42]	0.229 [0.05]	0.204 [0.04]	2.682 [0.56]	3.706 [0.90]	4.257 [1.04]
Observations	334	334	315	315	313	313
R-squared	0.757	0.760	0.784	0.789	0.807	0.811

Note: Dependent variable: Gross investment share. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1
Source: Own calculations.

As opposed to other European countries, in Slovenia an important factor affecting business investment is a declining share of consumer goods in total exports, which is positively correlated with the (declining) gross investment rate. This effect has increased by up to tenfold in the post-GFC period. We argue that due to the increasing specialisation in the production of intermediate goods, where margins are traditionally lower, Slovenian firms are likely to invest less in R&D and breakthrough technologies.

Therefore, a further decline in the share of consumer goods in total exports may contribute to a further downward trend in business investment.

Finally, the last set of estimations presented in Table 4b shows that government-financed business R&D expenditures do not seem to contribute significantly to investment dynamics in EU countries. In Slovenia the correlation in the period before 2008 was negative, while for the post-GFC period this coefficient turned positive implying that government-financed business R&D expenditures contributed at least in part to corporate investment.

Among other institutional factors, R&D tax incentives appear to have a significant positive impact on investment dynamics. But not in Slovenia where the correlation to the investment dynamics is significantly negative both before and after 2008. While ICT share in capital is shown not to contribute significantly to corporate investment in other European countries, it is positively correlated with corporate investment dynamics in Slovenia. However, as shown in Figure 14, this positive correlation stems from the fact that investment rate and ICT share in capital were both on the declining path for most of the period before 2008 and after 2008.

Table 4b. Main results for macro investment model, full model (Part 3)

	Whole period	Post-GFC	Whole period	Post-GFC
1y-interest rate	0.109 [0.82]	0.090 [0.71]	-0.091 [-0.49]	-0.104 [-0.64]
GDP growth rate (-1)	0.383 [5.53]***	0.383 [5.53]***	0.429 [5.83]***	0.429 [5.80]***
GDP growth rate x SVN (-1)	-0.042 [-0.45]	-0.444 [-5.33]***	-0.018 [-0.16]	0.078 [1.00]
Corp. liabilities-growth	0.033 [1.37]	0.031 [1.34]	0.029 [1.43]	0.028 [1.40]
Corp. liabilities-growth x SVN	0.025 [0.37]	-0.011 [-0.31]	0.130 [1.36]	0.516 [16.48]***
Profit rate (-1)	0.172 [2.10]**	0.173 [2.14]**	0.090 [0.82]	0.092 [0.87]
Profit rate x SVN (-1)	-0.291 [-1.10]	1.785 [15.70]***	1.269 [2.55]**	0.420 [0.92]
Corp.tax (-1)	0.033 [0.76]	0.036 [0.83]	0.023 [0.43]	0.024 [0.46]
Corp.tax x SVN (-1)	-0.120 [-0.28]	-0.804 [-17.16]***	-1.384 [-1.23]	-2.429 [-11.78]***
Emp.prot. regular jobs	5.267 [8.68]***	5.291 [8.76]***	4.795 [6.97]***	4.817 [7.06]***
Emp.prot. regular jobs x SVN	8.563 [2.46]**	-25.379 [-7.44]***	5.939 [1.34]	1.691 [0.52]
Consump. goods share in exp.	-0.208 [-2.29]**	-0.210 [-2.43]**	-0.126 [-1.24]	-0.128 [-1.35]
Consump. goods share in exp. x SVN	-0.231 [-0.78]	-0.023 [-0.16]	-1.150 [-2.48]**	0.177 [0.41]
Share of inward FDI	0.027 [2.33]**	0.027 [2.33]**	0.026 [3.46]***	0.025 [3.45]***
Share of inward FDI x SVN	-0.309 [-1.81]*	0.347 [8.04]***	-0.275 [-1.73]*	-0.369 [-3.33]***
Government-financed BERD	-1.379 [-0.20]	-1.608 [-0.24]		
Government-financed BERD x SVN	-32.258 [-3.33]***	12.491 [1.74]*		
R&D Tax incentives	14.294 [3.89]***	14.104 [3.86]***		
R&D Tax incentives x SVN	-23.041 [-1.09]	-146.334 [-21.75]***		
ICT share in capital			-58.705 [-0.83]	-59.566 [-0.89]
ICT share in capital x SVN			1,767.221 [2.70]***	1,593.529 [11.49]***
Constant	4.682 [1.19]	4.447 [1.11]	7.166 [1.70]*	9.228 [2.13]**
Observations	297	297	231	231
R-squared	0.831	0.832	0.835	0.838

Note: Dependent variable: Gross investment share. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1
Source: Own calculations.

3.2.4 SUMMARY

The key findings of the macroeconomic investment analysis for Slovenia are the following:

- (i) Investment as a share of gross domestic product in Slovenia averaged at 27 per cent of GDP in the period 1999-2008, which was 4.2 percentage points above the average of the EU-average. However, after the financial crisis average investment in Slovenia dropped to 19.6 per cent between 2009 and 2019, 1.2 percentage points below the EU-average.
- (ii) Institutional factors, such as product and labor market regulation and corporate tax policy, do not seem to explain much of the variation in aggregate investment in European countries and certainly not in Slovenia. More than 70 percent of the aggregate investment growth can be explained by factors such as aggregate demand (the business cycle) and the deleveraging process after the global financial crisis.
- (iii) The key drivers of the drop in investment in Slovenia are a low sensitivity of corporate investment to the business cycle after the GFC, but especially, a higher deleveraging process of highly leveraged firms compared to other European countries.
- (iv) The macroeconomic investment analysis hides important heterogeneity between firms and sectors, which cannot be captured, but requires a micro approach. This may explain the lack of statistical significance of typical factors determining corporate investment according to the theory. These include the interest rate and a number of institutional factors, such as the tax burden, product and labor market regulation, which now do not seem to contribute much to overall investment dynamics or have the opposite effect of what theory predicts.

4. INDUSTRY-LEVEL ANALYSIS

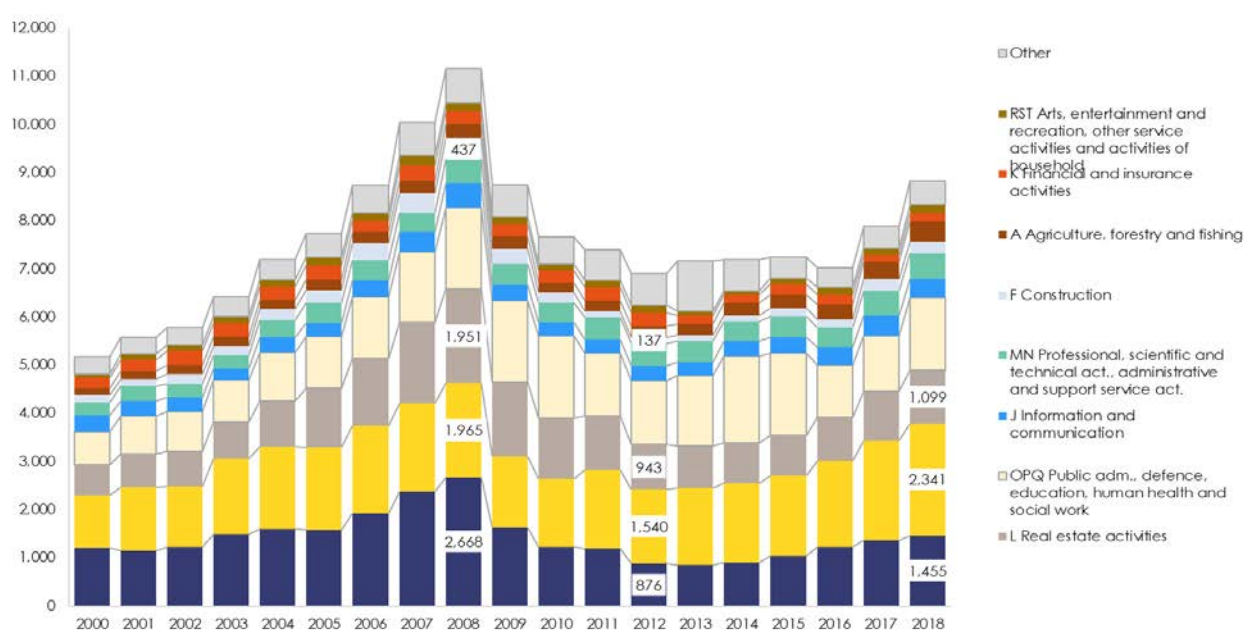
The macro analysis in the previous section has shown the importance of demand factors (business cycle) and of deleveraging processes in Slovenia in explaining the declining trend in the aggregate investment rate in the post-GFC period. In this section, we analyse which industries contributed the most to the aggregate investment rate decline and what are the industry-specific determinants driving the downward trend in investment.

The industry-specific determinants of declining business investment in Slovenia are studied at two levels. First, we conduct a general analysis of investment dynamics in Slovenia by industry for the period 1995-2019. In this way, we will be able to uncover the role that industry structure plays in aggregate corporate investment activity. We want to answer the question whether it is about the fact that Slovenia is more dependent on industries that have a longer investment cycle and that may have been disproportionately affected by the crisis. Second, we conduct an econometric empirical study on the importance of various industry-specific determinants of business investment in the period 2000-2019.

4.1 INDUSTRY TRENDS OF BUSINESS INVESTMENT IN SLOVENIA

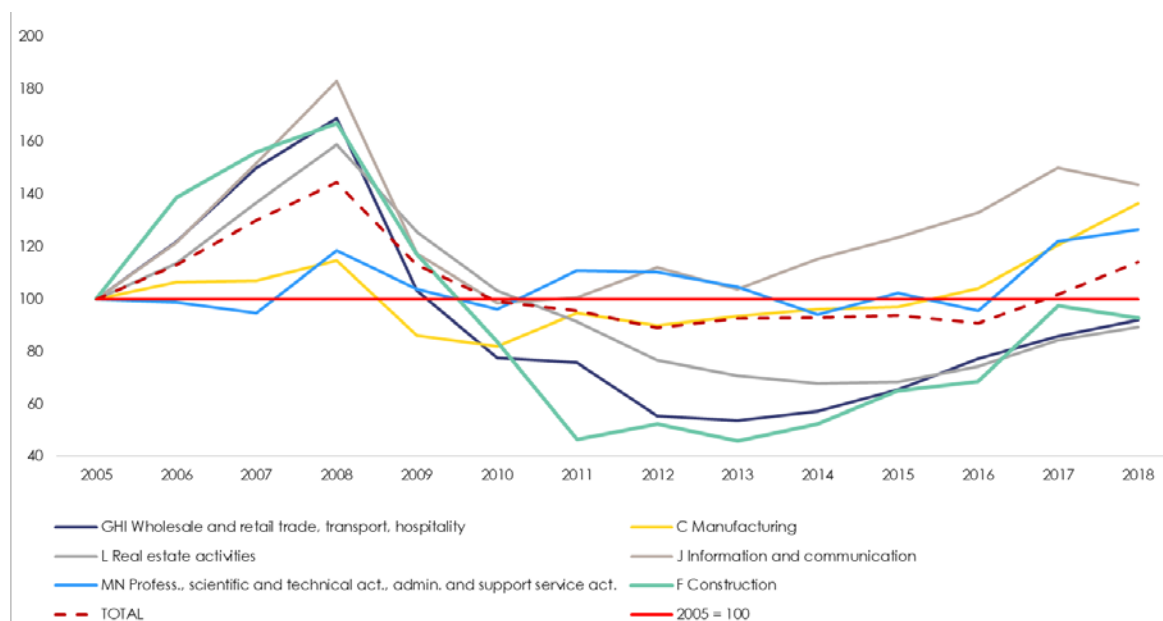
The main sectors of the investment surge in the boom period prior to 2008 were *retail trade, transport and accommodation* (24 percent of total), *manufacturing* (18 percent), *real estate* (18 percent) and *public sector investment* (17 percent), accounting for 76 percent of aggregate gross fixed capital formation in 2008 (Figure 15). With the financial crisis unfolding after 2009, investment in absolute terms collapsed by 50 percent in the retail trade, transport and accommodation sector and real estate, while investment in manufacturing collapsed by 25 percent only. Among these four largest sectors, manufacturing is the only sector that has recovered to pre-GFC levels in terms of investment, although it only managed to do so in 2017.

Figure 15. Breakdown of aggregate gross fixed capital formation by activity, 2000-2018 (mn €)



Source: Statistical Office of the Republic of Slovenia.

Figure 16. Gross fixed capital formation: Deviations from pre-boom levels, 2005-2018 (2005=100)



Source: Statistical Office of the Republic of Slovenia.

Manufacturing appears to be a sector which is most resilient to business cycle fluctuations. Compared to the pre-boom period (2005), manufacturing investment increased by less than 20 percent during the boom period and declined by less than 20 percent during the first two years of the recession. After 2010, manufacturing investment returned almost completely to its pre-boom levels. On the other side, construction, retail, transport and accommodation and real estate are the sectors most volatile in terms of investment during the business cycle. In 2018, the latest official figures available, all of these three sectors are still 45 percent below the 2008 investment levels and 10 percent below the 2005 levels.

4.2 DETERMINANTS OF DECLINING BUSINESS INVESTMENT ACROSS INDUSTRIES

The analysis above shows that there is a large heterogeneity across broad economic sectors in terms of investment activities and probably also within these sectors there are likely to be large differences between firms (which will be the main focus of analysis in chapter 5). In this section we will conduct an econometric empirical exploration on the importance of various industry-specific determinants of business investment in the period 2000-2019. Similarly to the macro analysis, the following factors will be taken into account:

- Importance of demand (lagged domestic sales growth and export growth),
- Corporate interest rate,
- Access to finance measured by long-term debt growth rate: Slovenian firms are heavily reliant on debt financing making them vulnerable to financial shocks,
- Corporate financial leverage (lagged),
- Average sector profit rate (lagged),
- Corporate tax rate (lagged),
- Labor cost per employee (lagged),
- Sectoral trade openness,
- Qualitative aspects of trade exposure, measured by the domestic value added in overall gross exports as well as in exports of intermediate and final goods,
- Importance of concentration effects of largest investors via supply and demand links.

Unlike the macro analysis, it is difficult to obtain industry-specific institutional factors that would be available at the very detailed sector level as it is used in this analysis. For instance, while OECD provides a set of sectoral indicators of product market regulation, these indicators are collected only for a few of sectors, such as several network sectors (transport, energy and e-communications) and for several regulated professions.⁶ Our underlying industry data is, however, much more detailed as it comprises of 28 industries. Next, The OECD's Structural Policy Indicators Database for Economic Research (SPIDER) provides a range of data with about 500 policy and institutional indicators.⁷ The database covers some broad categories of policy variables, such as: (1) legal infrastructure and institutions (political system, the underlying legal institutions and indicators measuring the quality and various aspects of public governance); (2) framework condition policies (business environment in which firms operate, such as product market regulation indicators, the competition law and policy indicator and a number of labour market institutions); and (3) specific policies, such as labour market (older workers, women or the youth) and other specific policies designed to support R&D investment or exports. Unfortunately, these indicators are either not sector specific or limited to several selected sectors only. Similarly, European Commission provides useful information on single market integration of several sectors, barriers to trade, public procurement, European standards, etc.⁸ However, while useful, these data is difficult to apply in an empirical study as it is either not (detailed) sector specific or not available in the form of quantitative indicators.

Hence, in the absence of available industry-specific institutional factors we rely on the industry-level data that is available for empirical research.

4.2.1 Empirical model specification of industry investment function

We follow the same approach as for the macro-level analysis and apply a similar model as in (1) to study the variation of industry level investment in Slovenia. Since we conduct this analysis at the industry level in Slovenia, we will be able to explore specific cross-sectional variation between industries as discussed above. We adjust equation (1) to allow for industry level characteristics and growth in the following way, where subscript j refers now to industry j .

$$\frac{I_{jt}}{K_{jt-1}} = \beta_0 + \beta_1 GFC + \beta_2 \Delta Y_{jt-1} + \beta_3 R_{jt} + \delta \mathbf{X}_{jt} + \varepsilon_t \quad (2)$$

I_{jt}/K_{jt-1} is gross investment rate, calculated as net investment plus depreciation divided by lagged capital stock. ΔY_{jt-1} refers to lagged sales growth rate in industry j at time t in Slovenia. R_{jt} is the effective interest rate in industry j , calculated as the annual interest paid divided by total outstanding debt of companies in each industry. Vector \mathbf{X}_{jt} now captures various industry characteristics, which we could not control for with a macroeconomic approach as in model (1). In particular, it includes determinants outlined above, such as long-term debt growth rate, financial leverage measured by net debt/EBITDA, effective corporate tax rate measured as tax on profits paid divided by profits, profit rate

⁶ OECD, Indicators of product market regulation, <https://www.oecd.org/economy/reform/indicators-of-product-market-regulation/>.

⁷ OECD, Structural Policy Indicators Database for Economic Research (SPIDER), <https://www.oecd.org/economy/growth/structural-policy-indicators-database-for-economic-research.htm>.

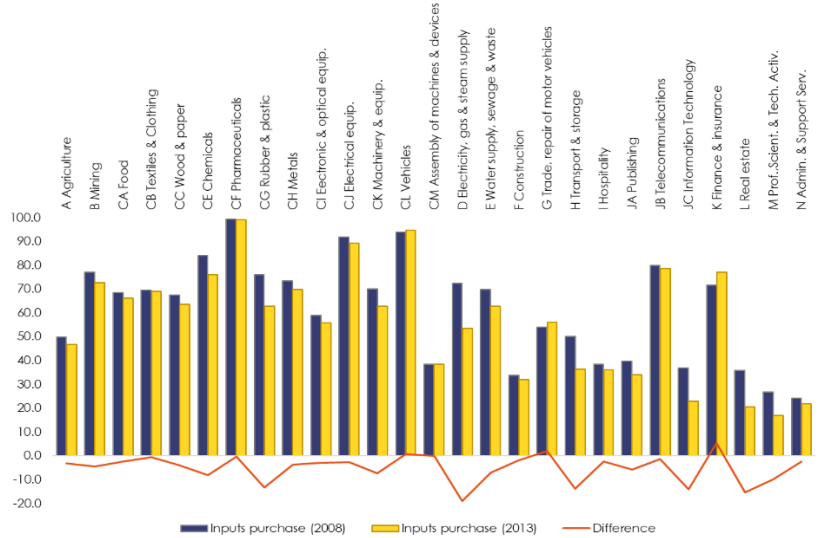
⁸ European Commission, The European single market, https://ec.europa.eu/growth/single-market_en.

measured by EBITDA/Sales, and concentration effects proxied by the supply and demand links of largest investors via supply and demand links.

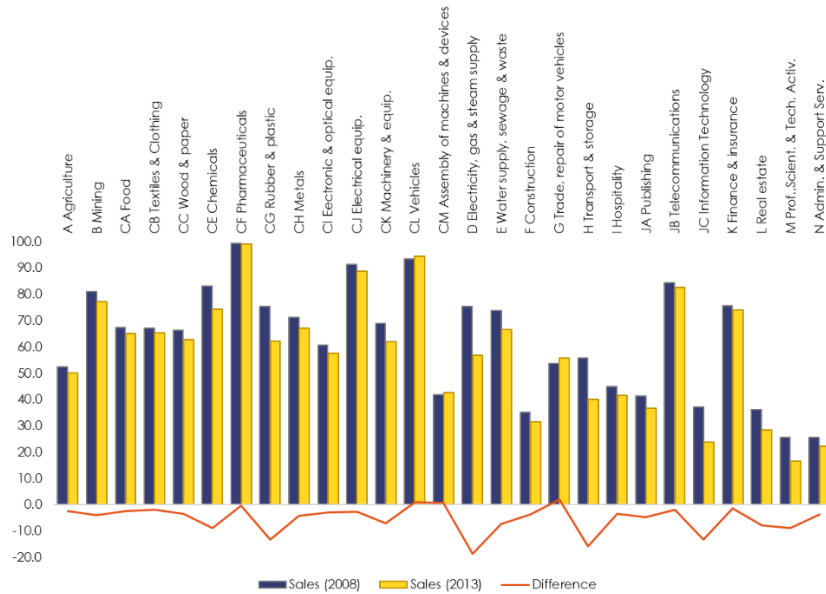
The concentration effects via the largest investors contribute significantly to explaining the dynamics of the aggregate investment rate. As we present evidence in the next chapter, investment is heavily concentrated in the Slovenian corporate sector. We show that before 2008 top 1 percent of investors contributed as much as two thirds to total investment in fixed assets, while the next largest 4 percent of firms by the volume of investment contributed another 20 percent to total investment. Hence, top 5 percent of investors is responsible for more than 85 percent of total investment. These large concentration of investment can have important effects on other firms. During the boom period, the investment activity of these largest investors creates a surge in demand for inputs from other firms and industries, while these investors provide also supply of inputs to other firms (and industries). On the other side, during the recession phase when largest investors cut back their investment, this missing investment leads to a declining demand for inputs and declining supply of inputs to other firms.

Figure 17. Share of top 5 percent of investors in total sales, 2008 and 2013, in %

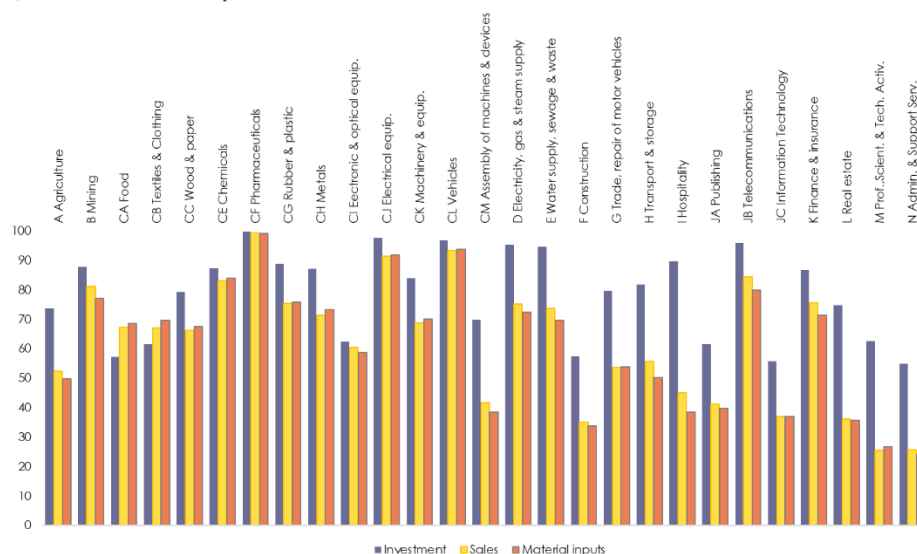
(a) Share in investment, sales and inputs purchase in 2008



(b) Sales Material inputs



(c) Material inputs



Note: Shares are calculated for the cohort of largest investors in the period 2002-2008.
 Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services; own calculations.

This is illustrated in Figure 17 showing that both sales and purchase of inputs by top 5 percent of investors are heavily concentrated. In half of the industries, the share of pre-GFC top 5 percent of investors exceeds 60 percent of total sales and inputs purchases, while in some industries it exceeds 90 percent (pharmaceuticals, electric appliances and car industry). It also shows that during the post-GFC period the shares of the pre-GFC top 5 percent of investors were mostly decreased by about 5 to 10 percent or more.⁹

Hence, the dynamics of the largest investors is an important part of the business cycle as it propagates and aggravates the initial shock along their supplier and customer networks. We control for the importance of the concentration effects of largest investors by including four variables into our model. First, to control for the supply effects, we include rate of growth of sales of top 5 percent of investors within the same industry and similarly for the economy as whole (in the latter variable sales of top 5 percent of investors from the same industry is subtracted from the aggregate sales). Similarly, to control for the demand effects, we include rate of growth of cost of material, services and energy of top 5 percent of investors within the same industry and the economy as whole.

As before we will include the post-crisis dummy (GFC) for the period 2009-2013 and interact it with all variables in the model to analyse the impact of post-GFC uncertainty.

Model (2) will be estimated for the period 2000-2019 using Slovenian Industry level data. Unfortunately, there is no official industry-level data available covering the variables in the model (2) in a sufficient detail. Therefore, we have computed industry-level aggregates (for 28 Nace 2-digit industries) from firm-level data based on the whole population of firms in Slovenia (Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services). The data contains all industries classified under agriculture, manufacturing and business services. We exclude companies in the financial and

⁹ Note that shares are calculated for the cohort of largest investors in the period 2002-2008.

insurance sector and companies providing public services (public administration, defence, education, human health and social work activities).

4.2.2 Stylised facts on industry determinants of investment

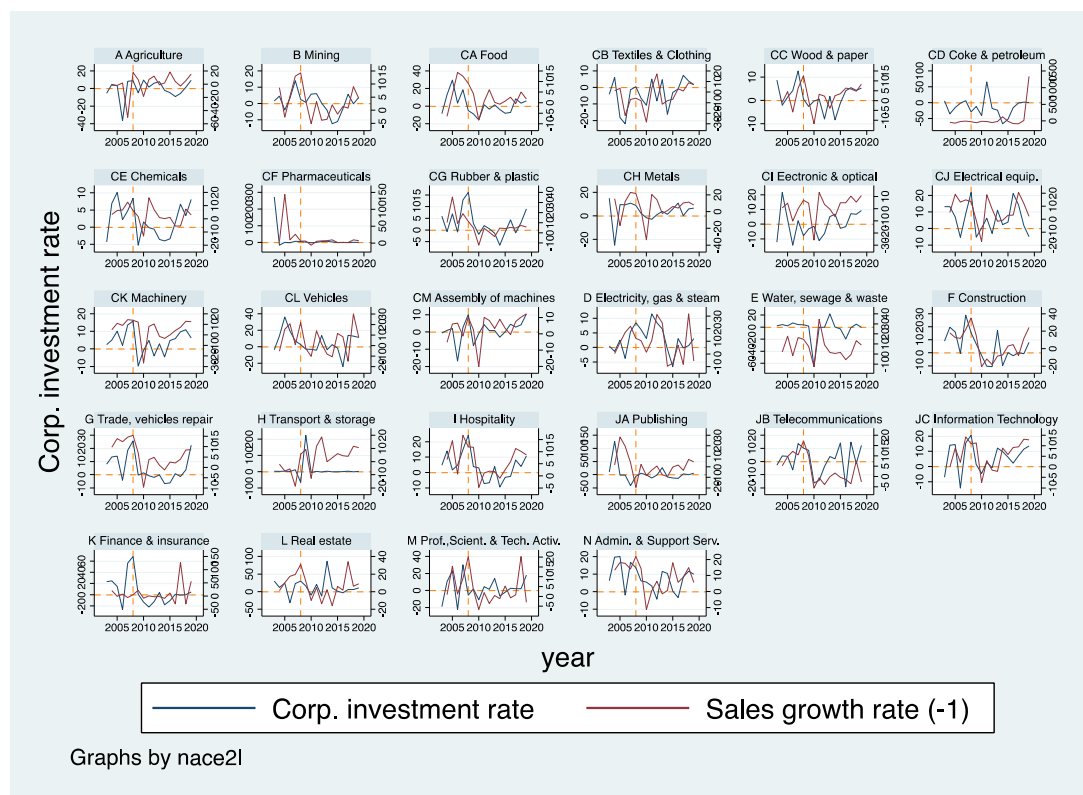
To explore to what extent the selected variables in our model (2) can contribute to explain the declining business investment in Slovenia at the industry level, we investigate most of variables in a graphic analysis first.

Figure 18 shows that for most industries the gross investment rate is closely correlated to the business cycle (captured by the lagged sales growth). This indicates the importance of a demand factor for investment dynamics.

Similarly to the macro analysis, effective interest rates for long-term debt at the industry level are declining since early 2000s and are, with a few exceptions only, positively correlated with the industry-level investment rate.

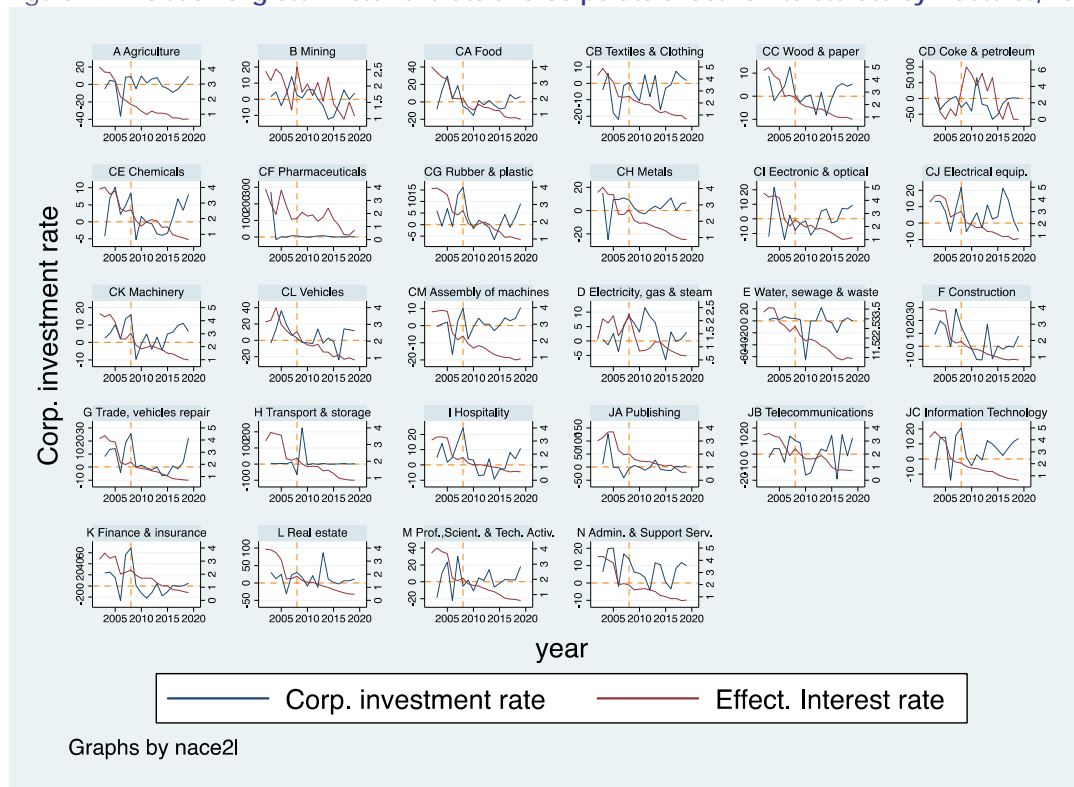
Industry gross investment rate is strongly correlated to long-term debt growth (Figure 20). This confirms that business investment is mainly financed through bank loans and is hence also heavily dependent on firms' access to finance as well as their financial leverage.

Figure 18. Evolution of gross investment rate and lagged sales growth by industries, 2000-2019 (%)



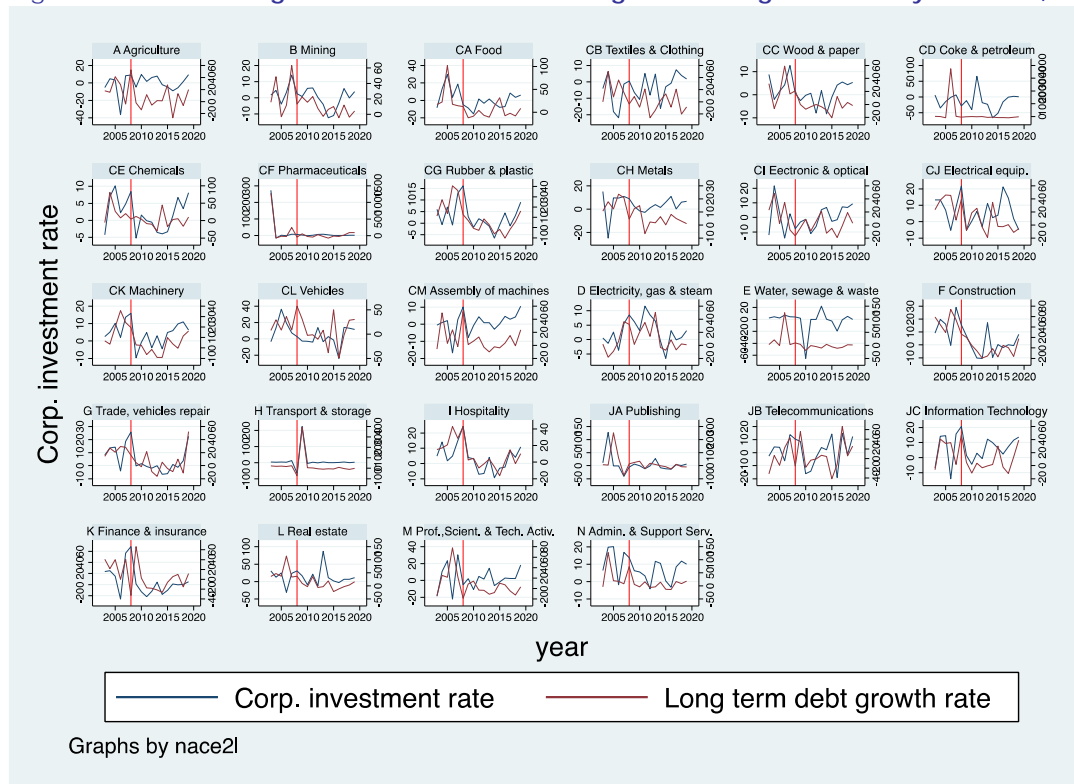
Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services.

Figure 19. Evolution of gross investment rate and corporate effective interest rate by industries, 2000-2019 (%)



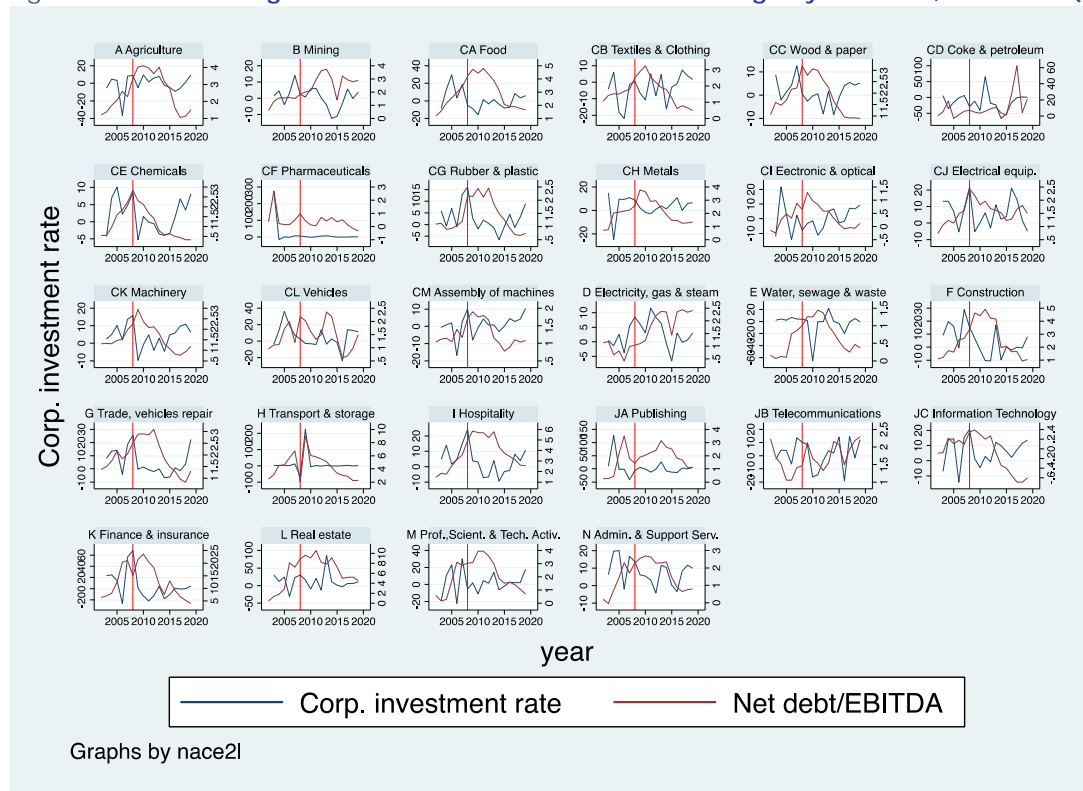
Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services.

Figure 20. Evolution of gross investment rate and long-term debt growth rate by industries, 2000-2019 (%)



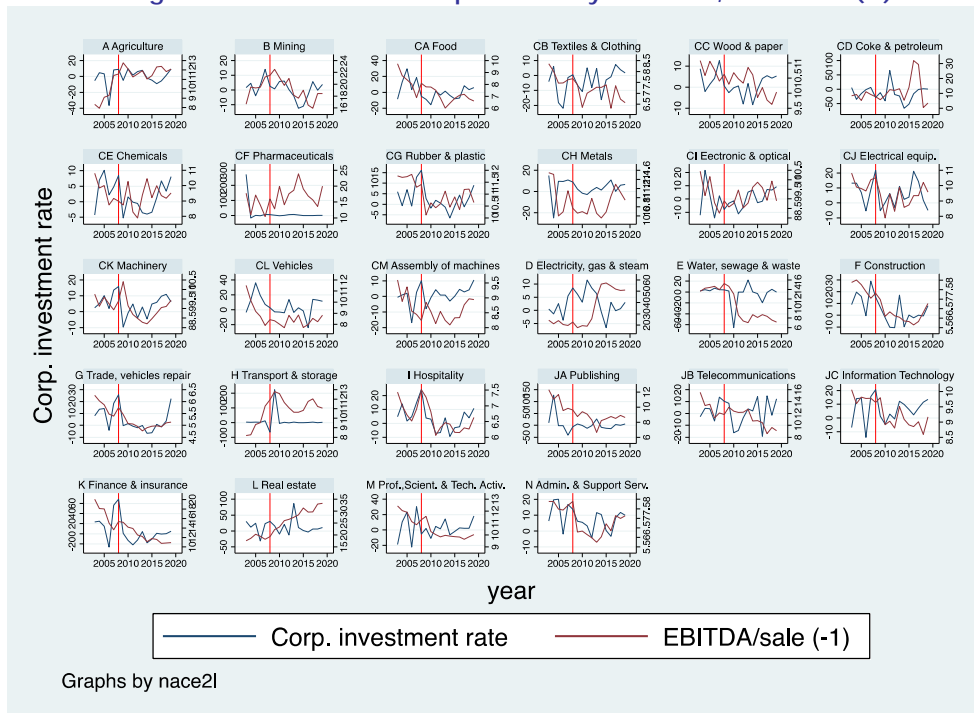
Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services.

Figure 21. Evolution of gross investment rate and financial leverage by industries, 2000-2019 (%)



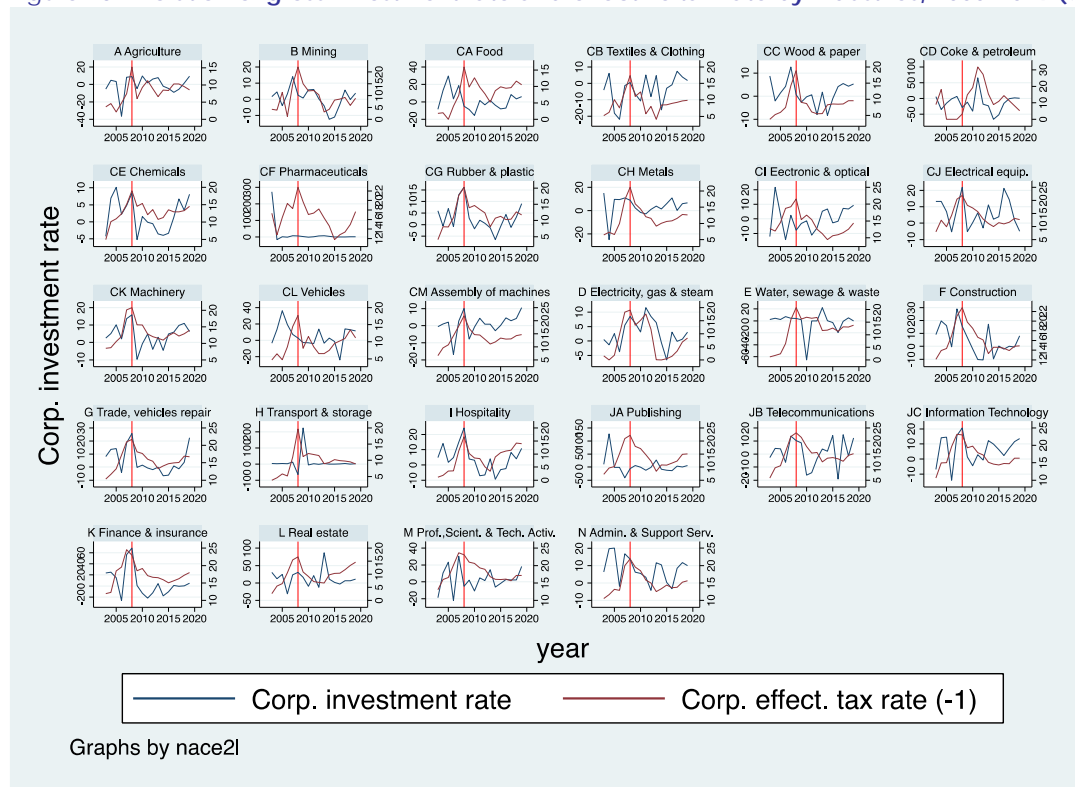
Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services.

Figure 22. Evolution of gross investment rate and profit rate by industries, 2000-2019 (%)



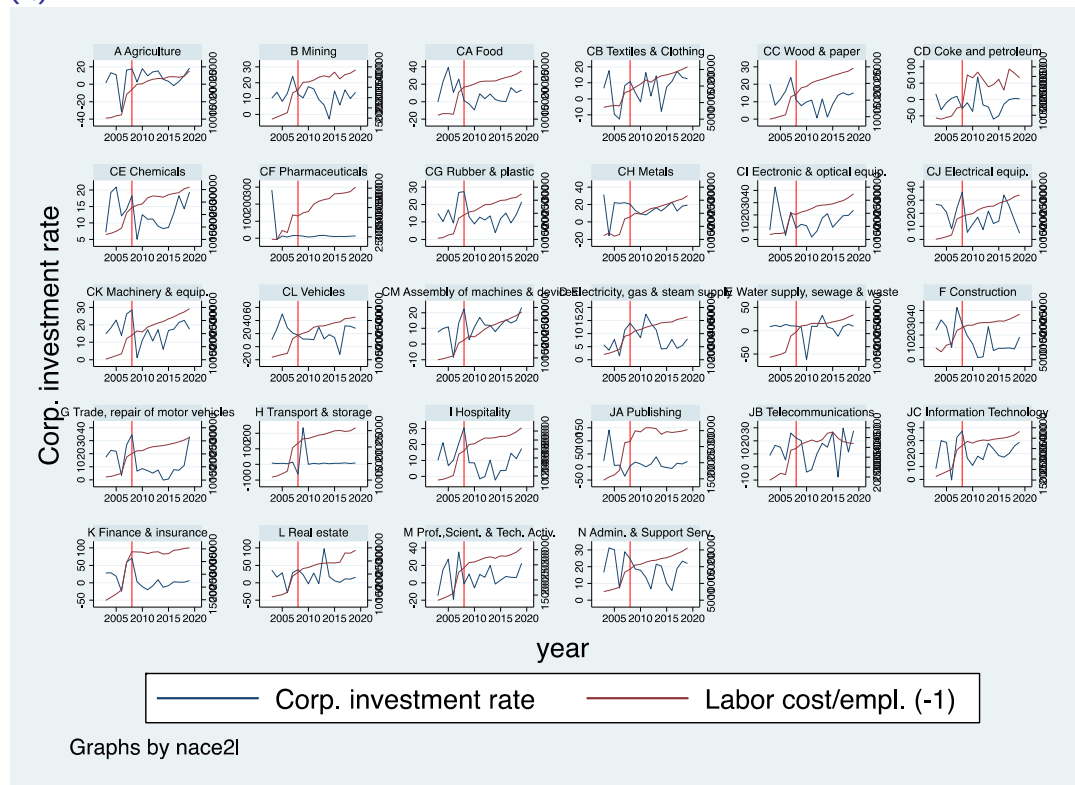
Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services.

Figure 23. Evolution of gross investment rate and effective tax rate by industries, 2000-2019 (%)



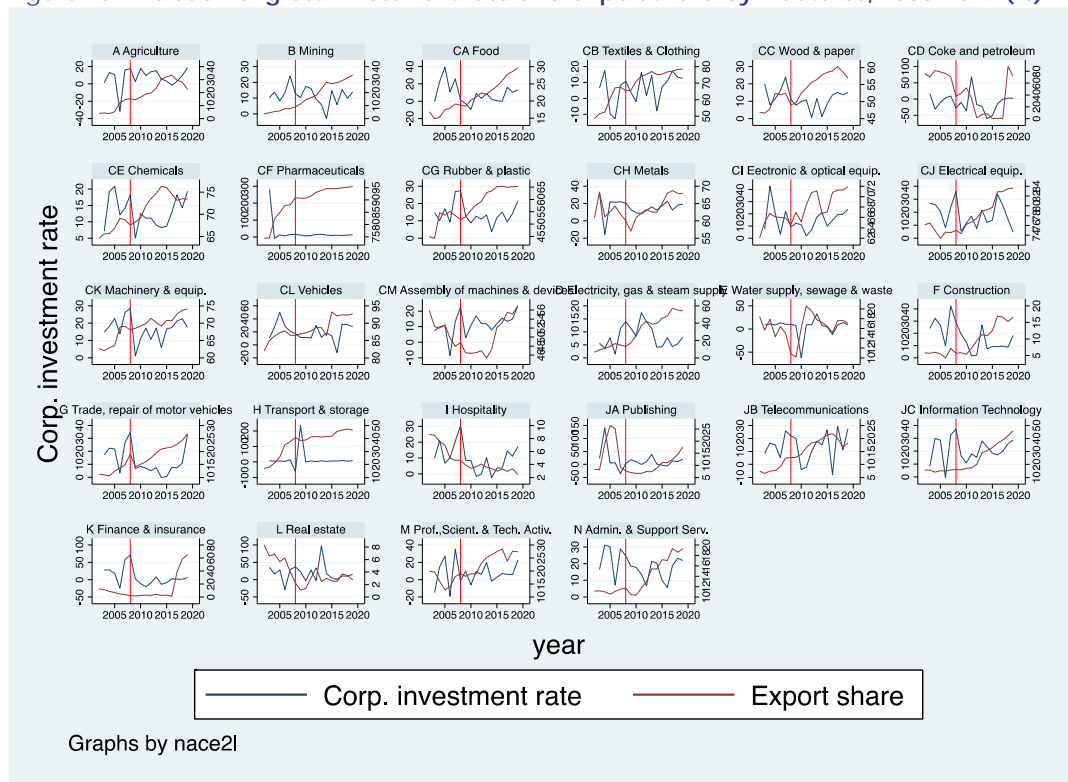
Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services.

Figure 24. Evolution of gross investment rate and lagged labour cost/employee by industries, 2000-2019 (%)



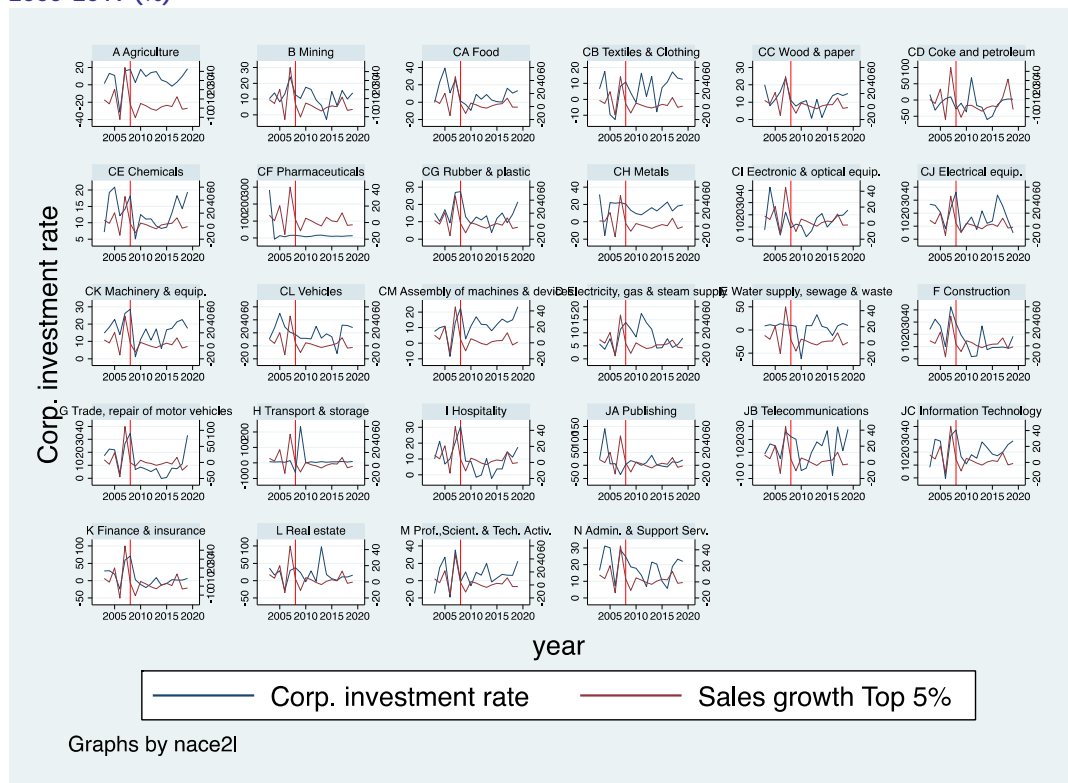
Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services.

Figure 25. Evolution of gross investment rate and export share by industries, 2000-2019 (%)



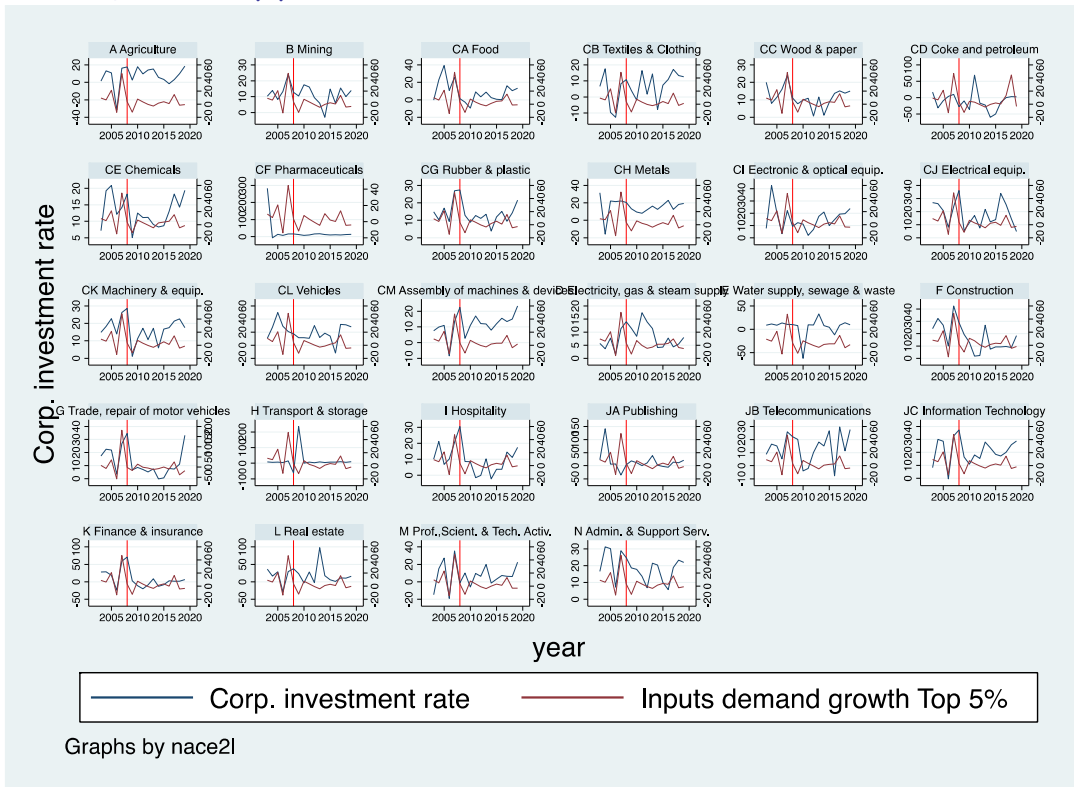
Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services.

Figure 26. Evolution of gross investment rate and growth rate of sales of top 5% investors by industries, 2000-2019 (%)



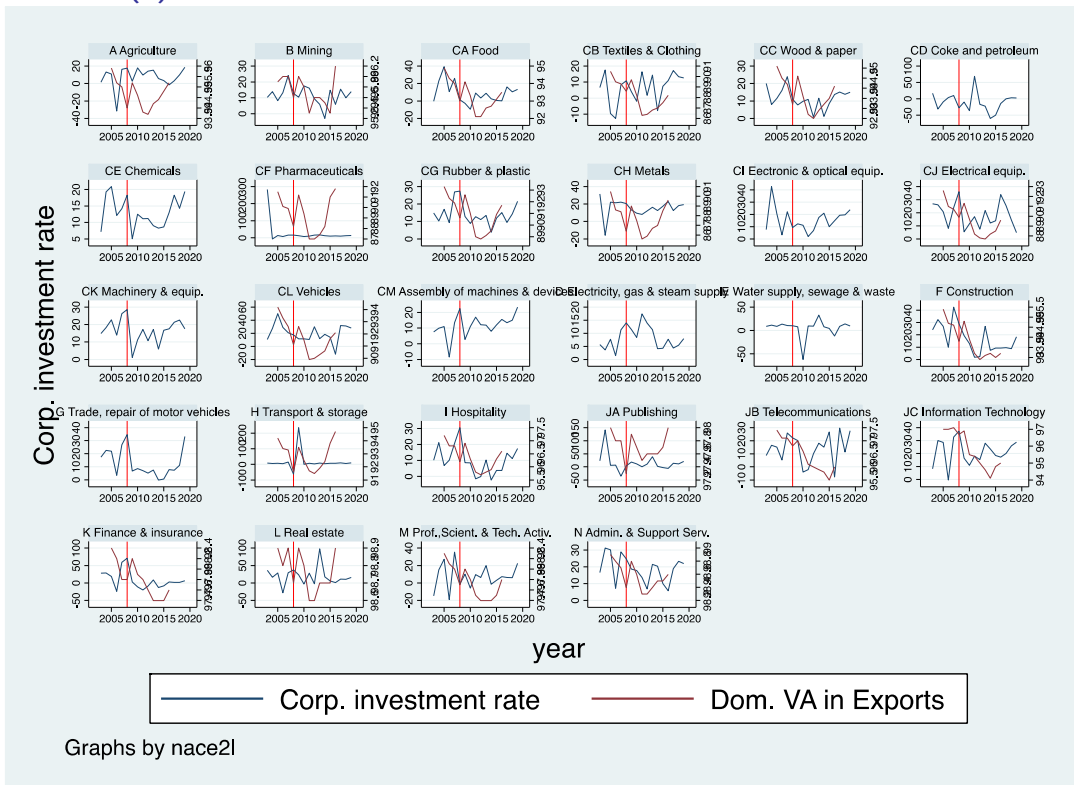
Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services.

Figure 27. Evolution of gross investment rate and growth rate of input demand of top 5% investors by industries, 2000-2019 (%)



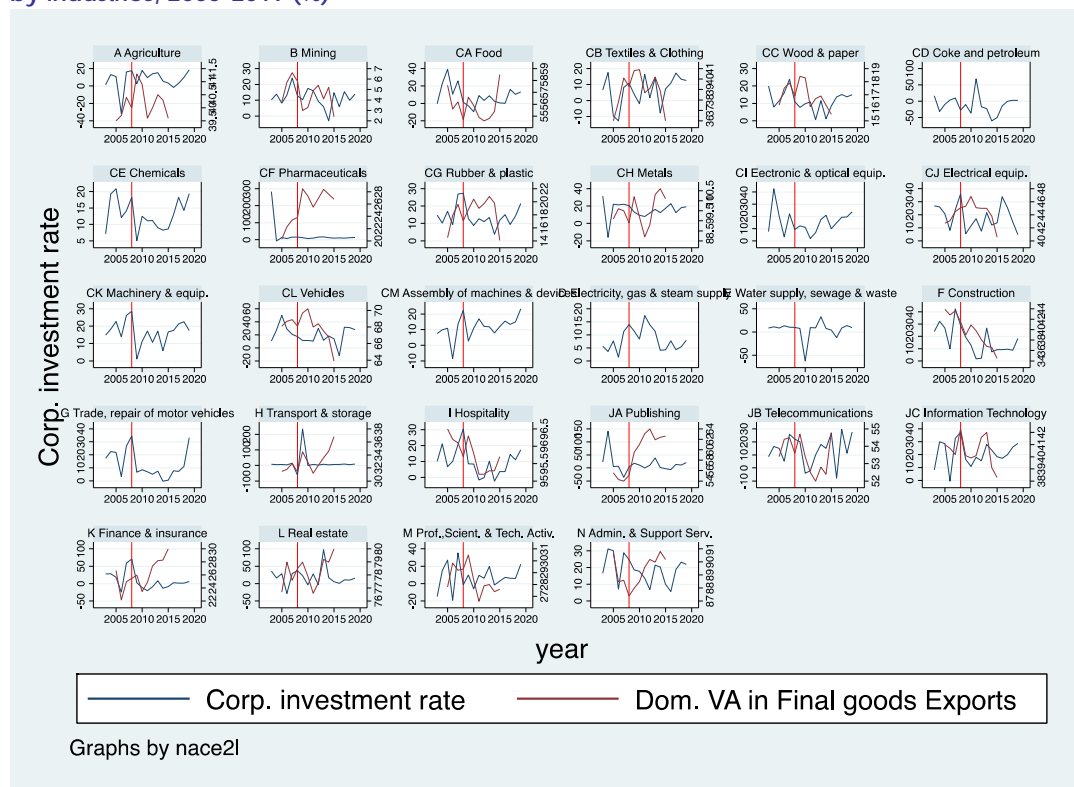
Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services.

Figure 28. Evolution of gross investment rate and share of domestic value added in exports by industries, 2000-2019 (%)



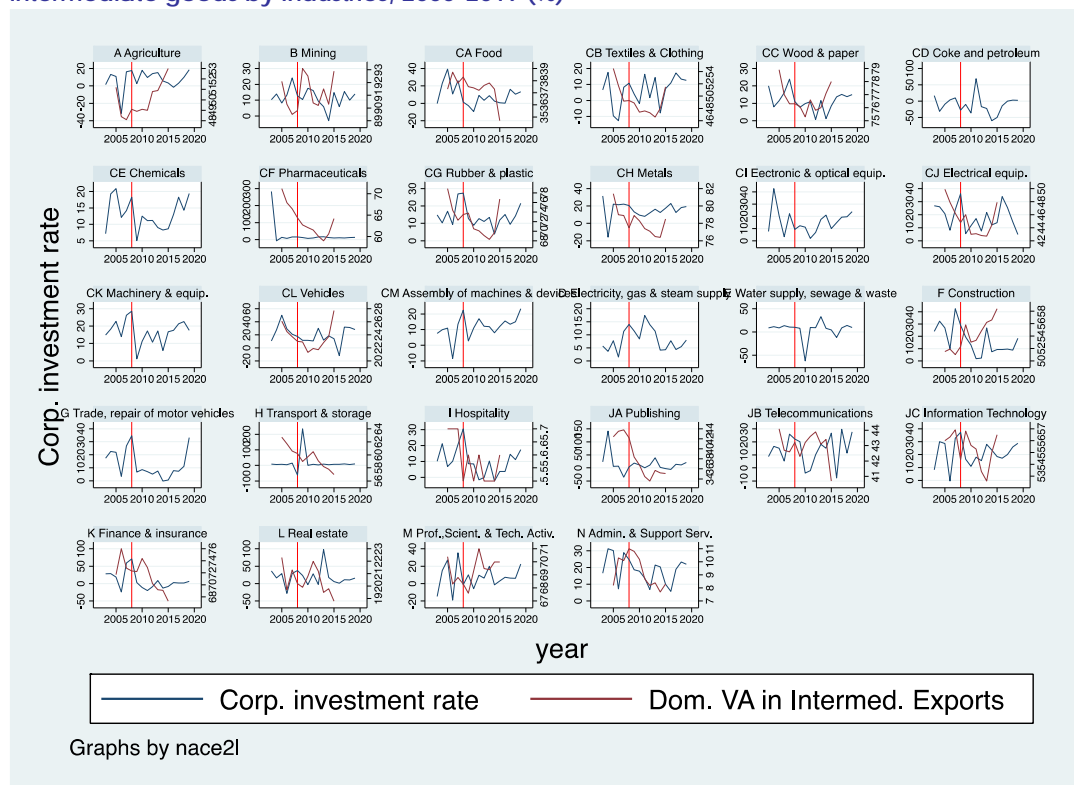
Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, OECD.

Figure 29. Evolution of gross investment rate and share of domestic value added in exports of final goods by industries, 2000-2019 (%)



Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, OECD.

Figure 30. Evolution of gross investment rate and share of domestic value added in exports of intermediate goods by industries, 2000-2019 (%)



Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, OECD.

Figure 21 shows weak correlation between gross investment rate and financial leverage (Net debt / EBITDA) across industries. Profit rate (EBITDA / Sales) appears to be weakly correlated to industry investment dynamics (Figure 22). On the other hand, there is a moderate but positive correlation between the effective corporate tax rate and the industry investment rate (Figure 23). This suggests that corporate tax rates do not lower investment across industries. Figure 24 shows no correlation between sectoral investment rates and labour cost dynamics. Similarly, there is no apparent correlation between sectoral investment rates and export exposure for most of the industries (Figure 25). On the other side, Figures 26 and 27 show that growth rates of sales and input demand of top 5% investors are mostly trended in the same direction as sectoral investment rates. Finally, while there appears to be no correlation between sectoral investment rates and domestic value added in overall exports (Figure 28), the evolution of investment rates and shares of domestic value added in exports of final goods seem to be trended in the same direction (Figure 29). On the other side, the evolution of investment rates and shares of domestic value added in exports of intermediate goods seem not to be correlated (Figure 30).

Actual average correlations of the variables listed with the sectoral investment rates will, however, be revealed in the econometric estimations that we present in the next subsection.

4.2.3 Results

The above analysis suggests the importance of a demand factor and access to bank loans as the main determinants of industry-level investment dynamics in Slovenia. We test these propositions formally by estimating the empirical model (2). Below we present main results. We first present results on the whole sample available (see Table 5). As the value added data for exports (provided by the OECD) is available only for the period 2005-2015 and for a limited set of industries, we then reestimate the full model on a smaller sample and add stepwise include the additional variables for exports (see results in Table 5).

Note that the model (2) is estimated using sector fixed effects, while time fixed effects are captured by the GFC dummy (taking value of 1 for the period 2009-2013 and 0 otherwise).

The baseline results in Table 6 confirm the results of our analysis above and show that the demand factor captured by the industry sales growth is the main driver of industry investment dynamics in Slovenia. The interaction term with the post-crisis dummy (GFC) shows that this demand-based driver weakened after 2008, although the differences are not statistically significant. It is important to note that industry investment dynamics cannot be attributed to either domestic sales growth or export growth, but to total industry sales growth. This is a similar result as in the macro analysis.

The results also underline the importance of corporate liabilities for the industry investment dynamics. While before 2008 the correlation between investment rates and long-term debt growth rates is not significant, it turns positive and significant for the period 2009-2013. Given the decline in investment rates during the post-GFC period, this positive correlation suggests that the decline in investment by industries were driven by the extensive deleveraging processes (i.e. negative long-term debt growth rates).

Similarly to the macro analysis, effective corporate interest rates are positively correlated to sectoral investment rates for the whole period (though significant in few specifications only). However, for the post-GFC period the coefficients for effective interest rates turn negative and significant. While this would be consistent with the theory, visual inspection of trends in Figure 19, however, shows that this

sudden turn to negative correlation is most likely coincidental. The interest rates were monotonically declining since 2005, while sectoral investment rates in this period were experiencing three different trends – from increasing (until 2008), to decreasing (between 2009 and 2014) and again increasing (after 2015). This implies that the dynamics of sectoral investment rates and effective interest rates are rather independent from each other.

These three factors along with the industry fixed effects and the GFC dummy can explain up to 40 percent of variation in investment rates across sectors in Slovenia in the past two decades. Effective corporate tax rates are shown to be positively and significantly correlated with sectoral investment rates for the whole period (i.e. a perverse relationship), but turn negative and significant for the post-GFC period. However, this is mostly due to the fact that in this period in most cases investment rates declined more than the effective corporate tax rates. Of the other variables in the model, sectoral export exposure, lagged profitability and lagged labour cost dynamics are not correlated with the dynamics of sectoral corporate investment rates.

In contrast, the concentration effects stemming from the largest (top 5 percent) investors seem to positively affect the sectoral investment dynamics. Both supply link (running through the sales growth dynamics of largest investors) and demand link (running through the inputs demand growth dynamics of largest investors) seem to be equally important. Importantly though, when both sales growth of largest investors at the economy level and at the sectoral level are jointly included in the model, only the coefficients for the sectoral level concentration effects of largest investors remain significant. The same is true for the demand links. This implies that within-industry concentration effects of largest investors are more important than between-industry effects.

Table 5. Main results for industry investment model (full sample)

	(1)	(2)	(3)	(4)	(5)	(6)
Post-GFC	-0.833 [-0.23]	3.391 [0.66]	0.455 [0.06]	-0.055 [-0.01]	7.027 [0.75]	7.469 [0.79]
Effect. Interest rate	0.289 [0.59]	0.197 [0.36]	0.599 [1.06]	0.552 [1.03]	1.018 [2.08]**	0.836 [1.67]*
Effect. Interest rate x GFC	-1.425 [-0.94]	-2.104 [-1.55]	-2.761 [-2.01]**	-2.481 [-1.78]*	-4.484 [-2.55]**	-4.440 [-2.52]**
Sales growth rate (-1)	0.007 [1.08]	0.012 [2.37]**	0.014 [2.33]**	0.014 [2.86]***	-0.040 [-0.78]	-0.030 [-0.62]
Sales growth rate (-1) x GFC	-0.090 [-1.20]	-0.020 [-0.34]	-0.014 [-0.21]	-0.031 [-0.51]	0.063 [0.60]	0.026 [0.25]
Long term debt growth rate	0.003 [0.77]	0.004 [1.50]	0.006 [1.56]	0.007 [1.82]*	0.027 [0.49]	0.028 [0.51]
Long term debt growth rate x GFC	0.443 [4.07]***	0.429 [4.35]***	0.425 [4.44]***	0.416 [4.24]***	0.417 [3.92]***	0.419 [3.97]***
Net debt/EBITDA (-1)		-0.009 [-0.85]	-0.012 [-1.10]	-0.013 [-1.16]	-0.011 [-1.08]	-0.009 [-0.90]
Net debt/EBITDA (-1) x GFC		0.011 [1.13]	0.014 [1.26]	0.014 [1.28]	0.004 [0.35]	0.003 [0.23]
EBITDA/sales (-1)		-0.157 [-0.67]	-0.172 [-0.76]	-0.117 [-0.53]	-0.023 [-0.11]	-0.023 [-0.10]
EBITDA/sales (-1) x GFC		0.141	0.124	0.097	0.229	0.220

		[0.50]	[0.34]	[0.27]	[0.53]	[0.53]
Effect. corp. tax rate (-1)	0.635	0.643	0.589	0.420	0.425	
		[3.23]***	[3.30]***	[2.86]***	[2.19]**	[2.19]**
Effect. corp. tax rate (-1) x GFC	-0.472	-0.485	-0.431	-0.551	-0.567	
		[-2.39]**	[-2.48]**	[-2.09]**	[-1.99]**	[-2.02]**
Labor cost/empl. (-1)		0.000	0.000	0.000	0.000	0.000
		[1.45]	[1.55]	[1.27]	[1.29]	
Labor cost/empl. (-1) x GFC		0.000	0.000	0.000	0.000	0.000
		[0.03]	[0.17]	[0.07]	[0.10]	
Export share		-0.108	-0.066	-0.064	-0.086	
		[-1.03]	[-0.66]	[-0.36]	[-0.48]	
Export share x GFC		0.072	0.069	0.069	0.066	
		[1.28]	[1.24]	[1.13]	[1.07]	
Sales growth Top 5%			0.182	0.035		
			[3.24]***	[0.62]		
Sales growth Top 5% x GFC			-0.466	-0.189		
			[-2.40]**	[-0.89]		
Sales growth Sector Top 5%				0.157		
				[4.18]***		
Sales growth Sector Top 5% x GFC				-0.305		
				[-2.64]***		
Inputs demand growth Top 5%						0.075
						[1.50]
Inputs demand growth Top 5% x GFC						-0.166
						[-1.01]
Inputs demand growth Sector Top 5%						0.084
						[2.12]**
Growth Inputs demand Sector Top 5% x GFC						-0.253
						[-2.61]***
Constant	13.886	8.120	5.801	2.916	1.777	2.581
	[7.63]***	[1.55]	[0.86]	[0.44]	[0.26]	[0.38]
Observations	447	433	433	433	423	423
R-squared	0.391	0.465	0.471	0.488	0.477	0.463

Note: Dependent variable: Gross investment share. Fixed effects estimations. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Source: Own calculations.

Note that these additional factors can explain in addition only up to 8 - 9 percent of variation in investment rates across sectors in Slovenia in the past two decades. This suggests that there are other factors that need to be taken into account in order to explain industry investment dynamics.

We address some of these factors by including the variables describing the “quality” of export exposure of the Slovenian corporate sector. As already mentioned in the macro part, Slovenian exporters, as part of global supply chains, are mainly specialised in the production and export of intermediate goods. This, however, implies lower domestic value added content of exports as opposed to exports of final goods. In order to account for these factors, we re-estimate the model (2). As already mentioned, the value added data for exports (provided by the OECD) is available only for the period 2005-2015 and for a

limited set of industries. Hence, we re-estimate the full model on a smaller sample and stepwise include additional variables for the quality of exports. Results are presented below in the Table 6.

By estimating the model (2) on a smaller sample (about half of observations are dropped), main results are preserved and the explaining power of the baseline model increases (some 58 percent of variation in sectoral investment rates can be explained by the model). By including additional variables depicting the domestic value added content in exports the model is able to explain almost 65 percent of variation in sectoral investment rates.

Table 6. Main results for industry investment model (limited sample)

	(1)	(2)	(3)	(4)
Post-GFC	7.600 [0.68]	71.332 [1.08]	14.586 [0.94]	9.203 [0.70]
Effect. Interest rate	0.740 [1.22]	2.168 [1.25]	1.383 [0.91]	1.235 [0.78]
Effect. Interest rate x GFC	-3.574 [-1.84]*	-5.582 [-2.06]**	-5.723 [-2.09]**	-5.852 [-2.13]**
Sales growth rate (-1)	-0.064 [-0.81]	-0.104 [-1.28]	-0.077 [-1.12]	-0.056 [-0.73]
Sales growth rate (-1) x GFC	0.060 [0.44]	0.080 [0.47]	0.156 [1.03]	0.103 [0.68]
Long term debt growth rate	0.014 [0.22]	0.029 [0.41]	0.019 [0.31]	0.021 [0.33]
Long term debt growth rate x GFC	0.447 [3.91]***	0.445 [3.97]***	0.454 [4.37]***	0.462 [4.46]***
Net debt/EBITDA (-1)	-0.004 [-0.40]	-0.000 [-0.04]	0.003 [0.29]	0.005 [0.43]
Net debt/EBITDA (-1) x GFC	-0.001 [-0.10]	0.008 [0.48]	0.006 [0.37]	0.005 [0.29]
EBITDA/sales (-1)	0.042 [0.08]	0.864 [1.17]	0.905 [1.27]	0.922 [1.26]
EBITDA/sales (-1) x GFC	0.172 [0.40]	-0.350 [-0.56]	-0.430 [-0.71]	-0.385 [-0.62]
Effect. corp. tax rate (-1)	0.462 [1.64]	0.824 [1.88]*	0.887 [2.17]**	0.855 [2.01]**
Effect. corp. tax rate (-1) x GFC	-0.596 [-1.82]*	-0.773 [-2.07]**	-0.882 [-2.41]**	-0.852 [-2.28]**
Labor cost/empl. (-1)	0.001 [1.54]	0.000 [0.73]	0.000 [0.34]	-0.000 [-0.09]
Labor cost/empl. (-1) x GFC	0.000 [0.25]	0.001 [1.45]	0.001 [1.28]	0.001 [1.35]
Sales growth Top 5%	0.047 [0.65]	0.097 [0.80]	0.084 [0.74]	0.115 [0.98]
Sales growth Top 5% x GFC	-0.183 [-0.84]	-0.307 [-1.02]	-0.096 [-0.33]	-0.222 [-0.80]
Sales growth Sector Top 5%	0.167 [3.29]***	0.154 [2.51]**	0.159 [3.00]***	0.156 [2.82]***
Sales growth Sector Top 5% x GFC	-0.370	-0.380	-0.369	-0.396

	[-2.87]***	[-2.26]**	[-2.29]**	[-2.48]**
Dom. VA in Exports		-0.185		
		[-0.11]		
Dom. VA in Exports x GFC		-0.703		
		[-1.05]		
Dom. VA in Final goods Exports			2.178	
			[3.48]***	
Dom. VA in Final goods Exports x GFC			-0.048	
			[-0.65]	
Dom. VA in Intermed. Exports				-1.923
				[-3.43]***
Dom. VA in Intermed. Exports x GFC				0.025
				[0.31]
Constant	-9.294	-12.150	-121.656	74.604
	[-0.89]	[-0.07]	[-3.59]***	[2.28]**
Observations	290	211	211	211
R-squared	0.575	0.623	0.644	0.641

Note: Dependent variable: Gross investment share. Fixed effects estimations. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

Source: Own calculations.

Results show that overall domestic value added content in exports is not correlated with sectoral investment rates. However, accounting for differences in domestic value added content among exports of intermediate and exports of final goods, shows a negative correlation with exports of intermediate goods and a positive correlation with exports of final goods. This relationship has not been altered by the financial crisis and its aftermath.

These results corroborate the similar findings in the macro part. This indicates that, in addition to demand and corporate leverage, there are structural factors at work that affect the dynamics of aggregate and sectoral investment rates. The type of export specialisation, i.e. relying on production and exports of intermediate goods instead of final goods, might explain at least a part of the story of the declining corporate investment rate trend in Slovenia in the past two decades.

This implies that it is important to study the dynamics of corporate investment rates at the micro level in order to take into account firm heterogeneity related to firm size. We will focus on these determinants in the next chapter, which presents the micro-level analysis.

4.2.4 SUMMARY

- (i) The main sectors of the investment surge in the boom period prior to 2008 were retail trade, transport and accommodation (24 percent of total), manufacturing (18 percent), real estate (18 percent), public sector investment (17 percent) accounting for 76 percent of aggregate gross fixed capital formation in 2008.
- (ii) With financial crisis unfolding after 2009, investment in absolute terms collapsed by 50 percent in the retail trade, transport and accommodation sector and real estate, while investment in manufacturing collapsed by 25 percent only.

- (iii) Among these four largest sectors, manufacturing is the only sector that has recovered to pre-GFC levels in terms of investment, although it only managed to do so in 2017.
- (iv) The main driver of industry investment dynamics in Slovenia is industry sales growth.
- (v) As in the macroeconomic analysis, the results also underline the importance of corporate liabilities for the industry investment dynamics.
- (vi) These factors can explain only up to 40 percent of variation in investment rates across Europe in the past two decades, suggesting that there are other factors that need to be taken into account in order to explain industry investment dynamics.

5. FIRM-LEVEL ANALYSIS

The aim of this chapter is to document the role of firm heterogeneity in understanding the macroeconomic investment dynamics in Slovenia. Taking a more granular approach is highly relevant for various reasons. As already pointed out by Fazzari, Hubbard and Peterson (1988) a representative firm approach ignores the fact that a firm's financial structure is relevant for investment decisions if one recognises that external funds are not perfect substitutes for internal capital. In other words, firms facing financial constraints may have a different investment behaviour than firms with no financial constraints. Typically, small and young firms face tougher financial constraints than large and old firms. Furthermore, there exists substantial heterogeneity in terms of firm profitability, firm size and productivity even within narrowly defined sectors (e.g. Caballero, Engel and Haltiwanger, 1995). This suggests that firms may respond very differently to demand shocks and increased uncertainty during crisis period, with implications for macroeconomic policy. And above all, as will be documented in more detail later in terms of gross investment the top 5 % of all firms in the Slovenian economy account for almost 90% of all investment activity in fixed assets both before and after the GFC. Thus this points towards a very strong granularity of the Slovenian economy, where a small group of top investors account for what is going on at the country wide level.

In this section we start with specifying a microeconomic investment model. We then describe the firm level data we use, in doing so, we also decompose the growth in investment into various channels, which allow us to document the role of the macro, sector and firm level channels in explaining aggregate investment. We discuss our baseline results, including differences according to firm size, and show various robustness checks.

5.1 EMPIRICAL MODEL SPECIFICATION OF FIRM INVESTMENT FUNCTION

5.1.1 Baseline specification

Given the importance of the demand side factors for investment activity of Slovenian firms as established by macro and industry analysis, we adopt the framework of the accelerator model of investments. We base our baseline specification on the model by Bloom, Bond and Van Reenen (2007), where they embed a measure of uncertainty to an error correction term of the relationship between investments and the capital stock. Uncertainty is likely to play an important role in explaining the slack in aggregate investment. Their model also fits the macroeconomic data quite well, which is an additional reason to take their micro model as a starting point. The model implies a convex relationship between demand shocks and investments, where demand shocks are observed through sales. Higher level of uncertainty, e.g. during the crisis period, on average weakens firm response to the demand shock.

Equation (8) shows the baseline model, which is augmented with role of financial constraints and other relevant firm specific factors:

$$\frac{I_{it}}{K_{it-1}} = \beta_0 + \beta_5 GFC + \beta_2 \Delta \log Y_{it} + \beta_2 (\Delta \log Y_{it})^2 + \beta_4 \Delta \log Y_{it} \times GFC + \beta_5 (\log Y_{it-1} - \log K_{it-1}) + \beta_6 \mathbf{X}_{it-1} + \delta_i + \gamma_j + \theta_t + \varepsilon_{it}, \quad (3)$$

where I_{it}/K_{it-1} refers to individual firm's investment rate. It is defined as either net or gross investment to its lagged capital stock ratio, where net investment is measured by the annual change in capital stock, while the gross investment also includes depreciation. $\Delta \log Y_{it}$ represents a firm sales growth. A positive coefficient on the second order term of sales growth ($\Delta \log Y_{it}^2$) would confirm the implication of non-linearity of the short run investment response to a demand shock (Bloom, Bond and Van Reenen, 2007). To capture the effect of the global financial crisis we add a dummy variable GFC that captures the 2009-2015 period¹⁰, while the interaction between this indicator and sales growth ($\Delta \log Y_{it} \times GFC$) enables us to test whether the impact of demand shocks differs during the period of GFC. Term $(\log Y_{it-1} - \log K_{it-1})$, i.e. $\ln Sales - \ln K (-I)$, represents error correction term, while X_{it-1} is the vector of firm-level control variables. The specification also includes firm (δ_i), industry (γ_i), and time (θ_t) fixed effects where latter capture the dynamics of investment factors common to all firms operating in Slovenia each year.

Among the firm-level explanatory variables, we have tested a wide array of financial and non-financial performance indicators. Corporate debt occupies a central role in the empirical literature on firm investment, i.e. adding debt capacity variables to a standard investment model improves the model fit as shown by Whited (1992) and Bond and Meghir (1994), which overwhelmingly finds a negative relationship between firm financial leverage and investment. Among debt, liquidity and solvency indicators, the following ratios have been tested in explaining firm investment behaviour of Slovenian firms: (i) debt to assets ratio (*Debt/assets*) which measures the amount of firm assets financed by debt, (ii) current ratio defined as current assets to current liabilities ratio (*current ratio*) that captures firm's ability to pay its short-term obligations (liquidity), and (iii) cash flow to costs ratio (*CF/cost*), where costs comprise operating expenses (corrected for the change in inventories), financial expenses and other expenses.

Usually, authors relate financial constraints to firm liquidity problems (i.e., not being able to pay debts due to high leverage levels, see for instance Lemmon et al. 2009; Platt and Platt 2006). Yet empirical studies also suggest that other performance indicators, such as profitability, size, etc. are also important. Namely, unprofitable firms may have difficulties obtaining new debt financing even at the lowest financing costs based on the analysis performed by financial analysts (debtors, usually banks in a Continental European setting). Ferrando and Mulier's (2013) results show that various measures related to the firm's profitability are more significant and robust in predicting the actual financing constraints encountered by firms than liquidity or leverage ratios. Therefore, we expect that, besides financial conditions (e.g., liquidity and leverage), other more operational aspects of performance underlie a firm's financial constraints. To account for operational profitability, we include profit to assets ratio (*ROA*) indicating a firm's ability to generate profits relative to assets.

We further include standard, firm-specific factors for explaining firm performance: a firm's age, size, and its productivity. Productivity is measured in terms of labour productivity (defined as value added per employee – $VA/Empl$), firm size (*Size*) is measured by the number of employees, while firm age (*Age*) is counted from the year of formation according to the Business Register of the Republic of Slovenia. They all enter the right-hand side of the equation as 1-year lagged values in a logarithmic form. Additionally, we include average firm wage relative to respective 3-digit NACE industry average (*rel. wage*) to proxy for relative skill-intensity of the firm. Finally, exporting firms, especially those with higher geographical diversification of exports (imports) and more diverse export product mix are

¹⁰ We test the robustness of the results in Table B1 in Appendix B to alternative definitions of GFC dummy in terms of the lengths of the crisis period.

expected to be in superior position for combating the sagging domestic demand during the crisis period. We control for the exporting status of a firm with dummy variable (*exporter*) which identifies firms with positive sales on foreign markets, either in other EU MS and/or in the third countries.

In addition to industry fixed effects, we control for differences in firm demography and market structure across industries and years. The former is accounted by inclusion of the firm exit rate defined at 3-digit NACE industry level (*Firm exit rate (nace3)*), while the latter with market concentration measure using Herfindahl-Hirschman Index (HHI) within 3-digit NACE industries.

5.1.2 Exploring heterogeneity in investment factors

To explore to what extent firm heterogeneity beyond the above-mentioned core factors matters in explaining corporate investment we continue with investigating various augmented versions of our baseline specification (8). To this end, we will also explore decompositions as well as split the data into various dimensions (such as according to asset types and firm size classes) to analyse further how micro-level investment can allow us to infer about the investment dynamics at the aggregate level.

We next discuss which dimensions of firm heterogeneity we seek to exploit further.

5.1.2.1. Investment function estimates by asset type

The initial inspection of the investment data suggests that developments in aggregate firm-level investment hide considerable differences in the volatility and trend movements across different asset types. To account for the heterogeneity of investment of Slovenian firms across asset types we estimate the investment function both for the total firm investment and separately for firm investment by asset type. We use two definitions of total investments. The broader definition considers investment in total long-term assets, while the narrower one takes investment in fixed assets as the sum of tangible fixed assets and intangible assets.

For the subcategories of investment, we consider the following asset types:

- **Investments in intangible assets** (Long-term property rights, Goodwill, Long-term deferred development costs)
- **Investment in tangible fixed assets** (Land, Buildings, Production machinery and equipment, Other devices and equipment, small tools and other property, plant & equipment, Biological assets, Property, plant and equipment under construction or in production, Advances for acquisition of property, plant and equipment)
- **Investment property**
- **Long-term financial investments.**

5.1.2.2. Investigating granularity

Since our macro analysis shows strong granularity in the investment aggregates, we aim to account for the differences in the investment determinants across different firm size classes and different positions in investment distribution. We start with estimating the investment function by firm size classes. The firm-size categorisation is based on the EU definition from the EU Commission Recommendation 2003/361/ES, considering two criteria, the first one is the number of employees and the second is either turnover or balance sheet total. We split the sample and estimate the model for the following firm groups according to their size:

- **Micro firms** (number of employees less than 10 and turnover less than EUR 2 million or balance sheet total less than EUR 2 million)
- **Small firms** (number of employees less than 50 and turnover less than EUR 10 million or balance sheet total less than EUR 10 million)
- **Medium-sized firms** (number of employees less than 250 and turnover less than EUR 50 million or balance sheet total less than EUR 43 million)
- **Large firms.**

To address the granularity more directly we further consider the distribution of average annual gross investment in fixed assets in the pre-crisis period, i.e. in a 2000-2008 period, and identify firms that account for the overwhelming part of the aggregate gross investment of Slovenian corporate sector prior to the escalation of the GFC. We then trace their contribution to aggregate investment in the period of and after the GFC crisis. We estimate the investment rate function across the following percentile ranges of the pre-crisis distribution of gross investment in fixed assets: 0-95, 95-99 and 99-100. For comparison we estimate the same specification on the subsample of firms that enter the market after the start of GFC in 2008.

5.1.2.3. Exploring further structural factors

We augment the baseline specification with several indicators of firm financial health, ownership structure and internationalisation activity.

a) *Financial factors*

As shown in the macroeconomic analysis, since deleveraging of firms during the period of GFC contributed noticeably to the sluggish investment activity, we explore further the role of financial factors for firm investment decisions. Previous studies on firm investment in Slovenia (e.g. Damijan (2016, 2018) and Lenarčič & Papadopoulos (2020)) confirmed the key role played by the corporate leverage and “debt overhang”¹¹. Myers (1977) showed that debt overhang leads to underinvestment by firms due to the difficulties in raising capital for new investment, given that the profits would benefit existing debt holders, instead of the new investors. Recently, Kalemlı-Ozcan, Laeven & Moreno (2020) confirmed that European firms with higher debt levels reduce their investment more after the 2008 GFC. This negative effect is stronger for firms holding short-term debt in countries with sovereign stress. They could explain as much as 40 % of the cumulative decline in aggregate investment over four years after the crisis through the corporate leverage channel. Hence, we aim to explore this further by accounting for the debt overhang (*debt overhang*) in our specifications which we define based on the net debt to EBITDA ratio, i.e. if net debt exceeds EBITDA multiple of 4. Furthermore, we differentiate between financial liabilities to banks (*fin. liab_banks/assets*) and to the related units within the firm group (*fin. liab_group/assets*), expressed as a ratio to assets. We consider both total and long-term liabilities and assets (*LTfin. liab_banks/assets* and *LTfin. liab_group/assets*), respectively.

b) *Ownership structure*

In the context of the agency theory, ownership concentration is an efficient internal corporate governance mechanism (Nguyen et al. 2015), used to mitigate agency problems raised by the separation of ownership and control (Jensen and Meckling 1976; Shleifer and Vishny 1986). Several studies have shown a consistent, direct and positive relationship between ownership concentration and firm performance (Kim

¹¹ Debt overhang refers to an excessive debt burden preventing a firm to take on additional debt to finance future projects.

and Lu 2011; Morck et al. 1988; Thomsen and Pedersen 2000). Peljhan, Zajc Kejžar and Ponikvar (2020) provided support for the predictions of agency theory in the case of Slovenian firms in the 2006–2012 period. Ownership concentration, the share of the largest owner, and the difference in shares between the two largest owners were all found to increase the likelihood of firm survival. Primary ownership concentration is measured by Herfindahl-Hirschman index (*hhi_founders*) that accounts for ownership shares of all founders by summing up square values of their respective shares.

Further, not only ownership structure but also type of ownership may matter for the firm investment activity. We account for firm ownership types discriminating between (i) private and state-owned and (ii) domestic- and foreign-owned firms. State-owned firms may behave differently than private firms with respect to the investment decision. According to Alesina (2005), state-owned firms could have acted as heavy investors and overinvested either because of the political mandate imposed on them or because their managers' incentives might be tied to the overall size of the organisation. With respect to foreign ownership, Alfaro & Chen (2012) confirmed that, on average, multinational subsidiaries outperformed local counterparts during the crisis. In particular, establishments sharing stronger vertical production and financial linkages with parents were found to exhibit greater resilience during the crisis period. This is also shown by Damijan (2016, 2018), demonstrating that foreign-owned firms are more resilient to financial crises as they benefit from their access to internal credit markets within large multinational companies. Both types of ownership, i.e. *state vs. private (state)* and *domestic vs. foreign (fdi)*, will be controlled by sets of dummy variables.

c) Firm export structure and its engagement in the GVCs

Firms with higher geographical diversification of exports (imports) and a more diverse export product mix are expected to be in a superior position for combating the sagging domestic demand during the crisis period. On the other hand, firms involved in supply chain trade and global production networks may be more exposed to global shocks. This is more likely the case in wake of the current, COVID-19 crisis that involves economies' lockdown and results in major GVC disruptions. Hence, trade is likely to fall more steeply in sectors characterised by complex value chain linkages, particularly in electronics and automotive products. Despite the higher volatility, GVC relations and GVC-related trade proved to be relatively persistent and resilient (Kostevc and Zajc Kejžar, 2020) confirmed longer export duration of vertical-MNE trade for Slovenian exporter), at least up until the current crisis. On the other hand, firms that are dependent on supplying components and intermediate products within a supply chain may be less inclined to invest once they have established a production capacity to supply their long-term buyers.

The following indicators of international activities of Slovenian firms are tested to highlight the role of firm internationalisation and to detect eventual differences in investment decision between domestic firms and different categories of internationally oriented firms.

- Export status and export orientation (share of sales revenues in foreign markets in total revenues) Share of high-tech exports (imports) where high-tech products are defined based on the SITC classification
- Share of intermediate and capital goods in exports (imports)
- Inward and outward vertical integration in global production networks based on inward and outward FDI data

d) *Skill intensity*

Since we have on disposal matched employer-employee data, we can account also for the firm skill structure in the investment decisions. Skill intensity will be defined as the share of employees with attained tertiary level of education (*Share of high_edu workers*) and average gross wage. We also consider share of migrant workers originating from other EU member states to proxy the extent of EU wide pooling of workers and the (*Share of EU migrant workers*). Giroud and Mueller (2017) confirmed that highly leveraged firms experienced significantly larger employment losses in response to declines in local consumer demand. Financial constraints namely impair firms' ability to engage in labour hoarding that postulates that firms facing a temporary drop in demand choose to retain more workers than would be technically necessary to economise on the costs of firing, hiring, and training workers. Was potential labour hoarding in Slovenian firms skill-neutral in the wake of GFC? If not, how did this affect the investment activity of firms? In addition, firms often cite lack of personnel (lack of qualified personnel) as one of the key issues behind postponing investment decisions.

5.1.3 Methodological issues

The firm investment function will be estimated using standard panel data regression techniques, among others:

- Fixed and random effects model for a static investment model;
- Two-step Generalised Method of Moments (GMM) estimator derived by Arellano and Bond (1991) and modified by Blundell and Bond (1998) for a dynamic investment model. GMM approach will allow us to account for the persistency in investment activity and the endogeneity of certain regressors in our specifications

The firm investment rate model is estimated first by using a panel regression analysis to control for time-invariant unobserved firm characteristics that can be correlated with the observed independent variables. The Hausman test is used to select between fixed and random effects estimator. Further, due to the possibility of time persistence in firm investment rate, we additionally apply the dynamic panel data technique, which allows the inclusion of the lagged dependent variables among regressors but at the same time efficiently overcomes the issue of autocorrelation and the presence of individual effects characterising the heterogeneity among individual firms (Baltagi, 2001, p. 129), especially for a panel containing many firms and a small number of time periods.

We use the system GMM estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998) that uses additional moment conditions compared to the estimator proposed by Arellano and Bond (1991). The applied estimator also controls for the possibility of the simultaneous bias, that is, joint determination of firm investment and some firm-level characteristics, such as financial leverage, firm size, its capital intensity, return on sales, etc.. The system GMM estimator uses equations in first-differences, from which the firm-specific effects are eliminated by the transformation, and for which endogenous lagged variables for two or more periods will be valid instruments, provided there is no serial correlation in the time-varying component of the error term. Estimator's consistency therefore hinges heavily upon the assumption that there is no second-order serial correlation for the disturbances of the first-differenced equation. The assumption of no second-order serial correlation for the disturbances of the first-differenced equation is tested with the test statistic AR(2) for the second-order serial correlation based on residuals from the first-differenced equation. We use the two-step procedure to compute the variance-covariance matrix based on Windmeijer robust errors due to the presence of

heteroscedasticity in our model. Finally, a Sargan test (Sargan, 1958) is used to assess the adequacy of instruments in an over-identified context.

The Investment rate function proved to be sensitive to outliers given some extreme values of investment rate. We tested how sensitive regression results are to different thresholds and different methods for identification of the outliers (e.g. Cook's distance, MM-estimator of regression). Finally, we set the 95th percentile threshold for the total investment rate function and 98th percentile for the investment subcategories. We also tested the robustness of such data cleaning by estimating the same specification but replacing dependent variable expressed as investment rate with the logarithm value of fixed assets which is much less sensitive to outliers. The results of both sets of specifications were robust with respect to significance and the signs of the regressors.

5.2 DATASETS, DECOMPOSITIONS AND STYLISED FACTS

5.2.1 Micro datasets and descriptive statistics

The firm-level analysis will be based on the comprehensive matched employer-employee database of the population of Slovenian firms with detailed accounting data combined with firm-level trade and FDI transaction data covering the entire population of firms registered in Slovenia. The database is comprised of the following distinct micro-level datasets which will be all merged together by the unique firm and worker identifiers:

- The core database is the detailed database of Slovenian firms' financial statements collected by the Agency of the Republic of Slovenia for Public Legal Records and Related Services. Thus, the database is available from the early years of transition (1994) till 2019 included. This database covers the total population of firms registered in Slovenia. The balance sheet data will be supplemented with information from:
 - **Business Register of the Republic of Slovenia** collected by the Agency of the Republic of Slovenia for Public Legal Records and Related Services. This database contains information on firm a foundation, ownership and termination of operations.
 - **Investment survey data**. It is a survey of a subset of firms conducted annually with a specific focus on types of investments (different types of real estate, buildings, types of equipment, intangible assets etc.) and some additional information regarding firms' investment decisions. This data can make a shift in trends become apparent, but it does not give exact information on the population of firms. Similar information can be collected from the balance sheet data, but with less detail.

While the other micro databases are available from the 2006-2019 period:

- a **matched employer-employee database** obtained from the Statistical Office of the Republic of Slovenia (hereafter SORS)
 - providing information on the economically active population, among other things, data on a person's employer, her/his education level, occupation, age and nationality;
- **matched employer-employee wage and earnings database** provided by SORS;
- detailed **transaction-level trade data** at the 8-digit CN code provided by the SORS;
- **inward and outward foreign direct investment database** provided by the Bank of Slovenia. This database is only available for 2006-2016 period.

All databases are merged using unique individual and firm identifiers. The fully merged database contains almost 900,000 firm-level observations over 1994-2019 period with 133,807 different firms. In Table 7 we report number of firms by size classes over a 1994-2019 period. The share of large firms has been in general decreasing and below 1% ever since 1996, with the lowest share of large firms recorded in 2014-2016 period. The share of micro firms ranged between 86 and 90% of all firms throughout the studied period.

Table 7. Number of firms by firm size classes, 1994-2019

	Micro firms	Small firms	Medium-sized firms	Large firms	Total number firms
1994	27419	1924	1197	395	30935
1995	29668	2331	1200	368	33567
1996	31686	2616	1125	348	35775
1997	32450	2798	1137	332	36717
1998	33110	3001	1151	323	37585
1999	32836	3217	1182	318	37553
2000	32593	3500	1174	318	37585
2001	32015	3704	1174	317	37210
2002	32806	3732	1163	315	38016
2003	34422	3876	1145	303	39746
2004	36536	4009	1181	304	42030
2005	37996	4230	1182	303	43711
2006	39417	4401	1226	286	45330
2007	42410	4768	1299	304	48781
2008	45215	5139	1332	311	51997
2009	47357	5011	1259	270	53897
2010	49361	4868	1240	265	55734
2011	51645	4688	1207	258	57798
2012	53718	4592	1151	265	59726
2013	55415	4523	1120	254	61312
2014	57497	4716	1134	243	63590
2015	58910	4922	1139	243	65214
2016	59108	5072	1169	254	65603
2017	59600	5363	1221	270	66454
2018	59498	5689	1283	279	66749
2019	59514	6032	1352	280	67178

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, 2020.

In Table 8 we summarise descriptive statistics for firms during the time period 1994 – 2019. On average, large firms had the lowest gross investment rate and small firms the largest one, while the net investment rate was lowest for micro firms. An average micro firm experienced negative sales growth, making them the only firm class size with a negative mean sales growth. Size also matters for return on assets, as both micro and small firms saw negative average ROA, with medium and large firms having a positive number during the same period. Employees on average earned the highest compensation in small firms, with employees in micro firms receiving the lowest compensation. Export propensity, as well as exporter status, increased with firm size, with 88.9% of large firm observations generating a positive revenue

from exporting, compared to merely 36.6% of micro firms. Using debt over assets as leverage ratio, large firms appeared to be the least leveraged ones on average. Among other financial measures summarised in the table below are current ratio, financial liabilities to banks, financial liabilities to a group, debt in excess of EBITDA for multiple of 4 and cash flow over costs. As expected, larger firms were able to amass relatively greater liabilities to banks in form of loans as opposed to smaller firms. It still is a common occurrence, that smaller firms, some of which are still in their growth phase, have a much harder time securing financing through bank loans as banks are sceptical about eventually collecting the loaned amount. Effective tax rates varied over different size classes, with large firms having the lowest (10.8%) effective tax rate, followed by medium-sized firms (12.5%), micro firms (14.4%) and small firms (17%). Given the results, we can conclude that state as an owner is mostly present in large firms. On the topic of ownership, results suggest that there is greater primary owner concentration present in large and micro firms contrary to the small and medium-sized firms when there are on average more owners.

Table 8. Descriptive statistics by firm size classes, 1994-2019

Variable	All firms		Micro firms	Small firms	Medium-sized firms	Large firms
	Mean	Std. Dev.	Mean	Mean	Mean	Mean
Gross inv. rate in FA	0.341	0.697	0.345	0.352	0.275	0.229
Net inv. rate in FA	0.045	0.629	0.024	0.135	0.110	0.088
Sales growth	-0.002	0.625	-0.023	0.083	0.075	0.076
Error correction term	1.879	1.723	1.960	1.670	1.317	1.021
Age	12.630	7.922	12.013	14.150	16.559	19.382
Firm size (No. of empl.)	16.897	119.877	2.753	19.804	101.844	667.278
Return on assets	-0.396	143.609	-0.365	-0.711	0.017	0.015
Value Added per empl.	30050.62	243427.6	27468.38	37934.69	44555.24	47827.79
Average wage	17073.83	12887.44	16237.19	20432.23	19699.21	20181.02
Export propensity	0.121	0.264	0.098	0.177	0.294	0.398
Exporter status	0.428	0.495	0.366	0.630	0.761	0.889
Debt/assets	1.793	537.440	1.932	1.501	0.557	0.469
Current ratio	3.919	266.437	4.414	2.038	1.826	1.634
Fin. liab. to banks/assets	0.096	0.474	0.083	0.139	0.153	0.174
Fin. liab.to group/assets	0.017	1.538	0.016	0.019	0.034	0.042
Debt over EBITDA >4	0.182	0.386	0.178	0.196	0.208	0.245
Effective tax rate	0.147	2.315	0.144	0.170	0.125	0.108
Cash flow over costs	0.096	1.439	0.096	0.095	0.087	0.096
Foreign direct investment	0.079	0.269	0.062	0.122	0.192	0.280
State ownership	0.010	0.099	0.002	0.020	0.090	0.172
Number of owners	2.072	3.921	1.794	3.074	3.641	1.652
Herfindahl-Hirschman index	0.763	0.270	0.778	0.696	0.720	0.827
No. of observations	633,229	633,229	505,196	93,682	27,356	6,995

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

In the next subsections we focus on firm investment statistics, first we provide decomposition of aggregate investment rate, followed by investment activity across different types of firms.

5.2.2 Decomposition of changes in investment rate

We propose a decomposition of aggregate investment rate in the spirit of Lewrick et al (2014) productivity decomposition. We start by noting that the aggregate investment rate can be written as a weighted average of investment rates of all firms:

$$I_t = \sum_{j=1}^J \sum_{i=1}^{N_{jt}} s_{ijt} I_{ijt} \quad (4)$$

where we sum over all active firms N_{jt} over all industries j at time t . The term I_{ijt} represents firm i 's productivity (firm belongs to industry j) at time t and s_{ijt} the firm's share of fixed assets in the economy. The shares of all firms in an industry sum up to $S_{jt} = \sum_i s_{ijt}$ and industry shares S_{jt} sum to unity.

As shown for aggregate productivity decomposition by Olley and Pakes (1996), (4) can be expressed in terms of weighted industry means and deviations. We follow Lewrick et al (2014) in extending the dimensionality of the decomposition to account for industry shares.

$$I_t = \sum_j \sum_i S_{jt} (\bar{s}_{jt} + \Delta s_{ijt}) (\bar{I}_{jt} + \Delta I_{ijt}) \quad (5)$$

where \bar{s}_{jt} and \bar{I}_{jt} stand for unweighted mean share of fixed assets and \bar{I}_{jt} industry j 's unweighted mean investment. Δs_{ijt} measures the difference between each firm's share of fixed assets share within its industry and the unweighted mean fixed asset share in the same industry. Similarly, ΔI_{ijt} equals the deviation of the firms' investment from the unweighted means of the corresponding industry. Multiplying out and eliminating terms that are equal to 0 yields the following

$$I_t = \sum_j S_{jt} \bar{I}_{jt} + \sum_j \sum_i S_{jt} \Delta s_{ijt} \Delta I_{ijt} \quad (6)$$

Where $\Delta s_{ijt} = (s_{ijt}/S_{jt}) - \bar{s}_{jt}$ and $\Delta I_{ijt} = I_{ijt} - \bar{I}_{jt}$.

Aggregate investment rate is the sum of two elements. First, a measure of overall investment rate measured as a weighted average of industry mean investment rates. Second, a measure of allocative efficiency of fixed assets with respect to investment intensity. This term yields a positive sign whenever a firm with (below-) above-average investment rate accounts for (a below-) an above-average FA market share as compared with the industry's mean.

5.2.2.1. Decomposing the pre- and post-GFC investment rate differences

Next, we focus on changes in investment rate pre and post global financial crisis. Adapting from Lewrick et al (2014), the change in aggregate investment rate is

$$I_t - I_0 = \sum_j (S_{jt} - S_{j0}) \left[\left(\sum_i \Delta s_{ijt} \Delta I_{ijt} \right) + \bar{I}_{jt} \right] + \sum_j S_{j0} (\bar{I}_{jt} - \bar{I}_{j0}) + \sum_j S_{j0} \left(\sum_i \Delta s_{ijt} \Delta I_{ijt} - \sum_i \Delta s_{ij0} \Delta I_{ij0} \right) \quad (7)$$

The first term on the right-hand side measures changes in aggregate investment rate due to changes in inter-industry specialisation over time using current firms' shares of fixed assets and investment rates. The second term captures changes in average industry investment rates weighted by initial industry structure. The third term denotes changes in firms shares of fixed assets and investment rate within industries.

Finally, we also distinguish between continuing firms (letter C), existing firms (X) and new entrants I . This allows us to estimate the impact of firm entry and exit as well as reallocations among continuing firms within industries. Additionally, we are able to assess changes in investment intensity abstracting from structural and other changes. Investment rate averages are defined for each of the three firm types

(C, X, and E), so that, for example \bar{I}_{jt}^C represents the unweighted average of investment rates of continuing firms in sector j at time t .

Then, based on equation (7), we decompose the change in aggregate productivity into an inter-industry effect, a technology effect and an intra-industry effect. The intra-industry effect itself is an aggregate of our effects that capture the industry dynamics of the three types of firms – continuing, entering and exiting ones:

$$\begin{aligned}
I_t - I_0 = & \underbrace{\sum_j (S_{jt} - S_{j0}) \Delta I_{jt}}_{\text{inter-industry effect}} + \underbrace{\sum_j S_{j0} (\bar{I}_{jt}^C - \bar{I}_{j0}^C)}_{\text{investment-intensity effect}} \\
& + \underbrace{\sum_j \sum_{i \in C} S_{j0} \Delta s_{ijt} (\Delta I_{ijt} - \Delta I_{ij0})}_{\text{within-firm investment effect}} + \underbrace{\sum_j \sum_{i \in C} S_{j0} \Delta I_{ij0} (\Delta s_{ijt} - \Delta s_{ij0})}_{\text{within-firm share effect}} \\
& + \underbrace{\sum_j S_{j0} S_{jt}^E (\bar{I}_{jt}^E - \bar{I}_{jt}^C)}_{\text{firm-entry effect}} + \sum_j \sum_{i \in E} S_{j0} \Delta s_{ijt} \Delta I_{ijt} \\
& - \underbrace{\sum_j S_{j0} S_{j0}^X (\bar{I}_{j0}^X - \bar{I}_{j0}^C)}_{\text{firm-exit effect}} - \sum_j \sum_{i \in X} S_{j0} \Delta s_{ij0} \Delta I_{ij0}.
\end{aligned} \tag{8}$$

The inter-industry effect has two elements. The first one, $S_{jt} - S_{j0}$, is a measure of the share of industry fixed effects that has been shifted to or away from an industry since $t = 0$. The second one, ΔI_{jt} , indicates whether this shift has been to an industry with above- or below-average investment intensity as compared with the industries' average. The inter-industry effect will thus turn positive, whenever the country's manufacturing sector has, on average, shifted resources towards more investment intensive industries.

The investment-intensity effect captures the overall trend in industry-level investment rate, abstracting from firm size and excluding the impact of market entry and exit by including continuing firms only. It serves as an indicator of broad-based investment intensity for all firms in an industry. Changes in the manufacturing sector's mean investment intensity are controlled for shifts across industries by weighting averages at each industry's original market share, S_{j0} .

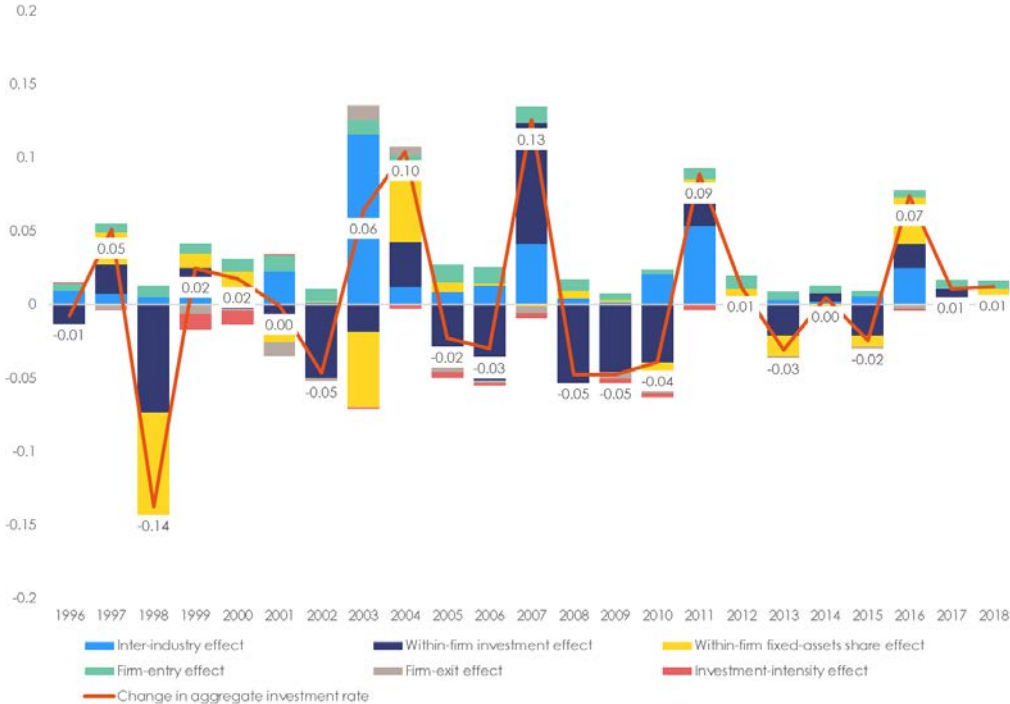
The intra-industry effect is composed of the remaining four effects highlighted in equation (8). The within-firm investment effect accounts for the improvement in allocative efficiency resulting from relatively large (small) firms, in terms of the share of fixed assets, raising their investment rate by more (less) than the average firm in the industry. The within-firm share effect measures change in allocative efficiency that is due to are allocation of fixed asset shares at the firm level for a given investment rate.

The firm-entry effect and firm-exit effect assess the impact of market entry and exit on aggregate productivity developments, respectively. Both effects have two components. The first one benchmarks the average productivity of entering (exiting) firms against that of (and only of) continuing firms. The second component, the covariance term, captures the impact of entering (exiting) firms on the allocative efficiency of the industry: if relatively large and productive firms enter (exit), overall productivity rises (falls). This component complements the assessment of firm entry and exit proposed in earlier studies by taking account of the effect of changes in the composition of active firms.

5.2.2.2. Decomposition of the annual changes in the Slovene aggregate investment rate

Following equation 8, we decompose Slovene aggregate investment rate for the period between 1996 and 2018¹². Results of the decomposition are presented in Figure 31. For the majority of the period of observations, the two primary drivers of changes in the aggregate investment rate appear to be investment intensity of individual firms and the within-firm investment effect, with the former clearly dominating in terms of size and dynamics. The primary contributing factor to the aggregate investment rate changes are changes in investment intensity of continuing firms even after holding their share of fixed assets constant. With the notable exception of the period between 2006 to 2010, the within-firm investment effect also strongly impacted the changes in aggregate investment rate. This indicates that changes in the composition of firms (firm share of industry and aggregate fixed assets), with larger firms investing more (or divesting more) and smaller firms investing less also strongly affected the aggregate dynamics, also strongly affected the aggregate dynamics. Of the other remaining components, the inter-industry effect, i.e. changes in relative shares of industries, remained positive contributor to the overall changes in investment rate. The effect diminished from very significant, especially in years 2003, 2007 and 2011, to minor after 2011. This could be an indication of the structural changes in the economy following global economic downturns in 2001 and 2009 and the expansion of 2007.

Figure 31. Decomposition of annual changes in aggregate investment rate in Slovenia (1996-2018)



Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, 2020.

The above findings fully validate the assumption that firm heterogeneity is the key factor in the determination of aggregate investment dynamics in Slovenia. While the industry composition (inter-industry effect) did have a strong positive effect on aggregate investment rate dynamics in several years before 2008, it completely fails to explain the fluctuation in the investment rate in the period after 2011.

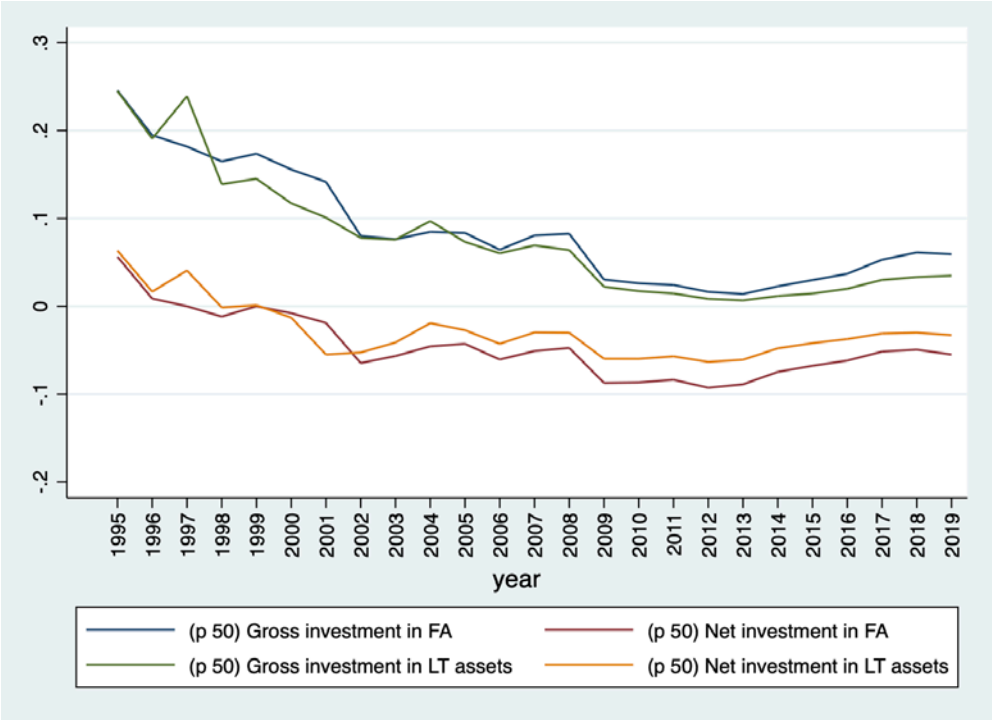
¹² The decomposition algorithm leads to the “loss” of observations for years 1994,1995 and 2019 either because of leads and lags or because the inability to determine entrant/exiting firms.

5.2.3 Stylised facts on Slovenian firm level investment

5.2.3.1. Heterogeneity across asset types

We look first at the developments of total investments considering both the broader and narrower definitions, i.e. investment in total long-term assets and investment in fixed assets, respectively. As shown in Figure 32, both in gross and net terms, median values of investment rates in total long-term and fixed assets overall exhibit a decreasing trend over the last 25 years, with negative net investment rates since 1998. The post-GFC period has been characterised by a noticeable drop in the investment rates and the lowest median value of investment rate throughout the observed period was reached in 2013. Despite the increasing trend thereafter, the pre-crisis level of investment rates, especially gross, has not been achieved yet.

Figure 32. Median gross and net investment rate in long-term and fixed assets for a population of firms in Slovenia, 1995-2019

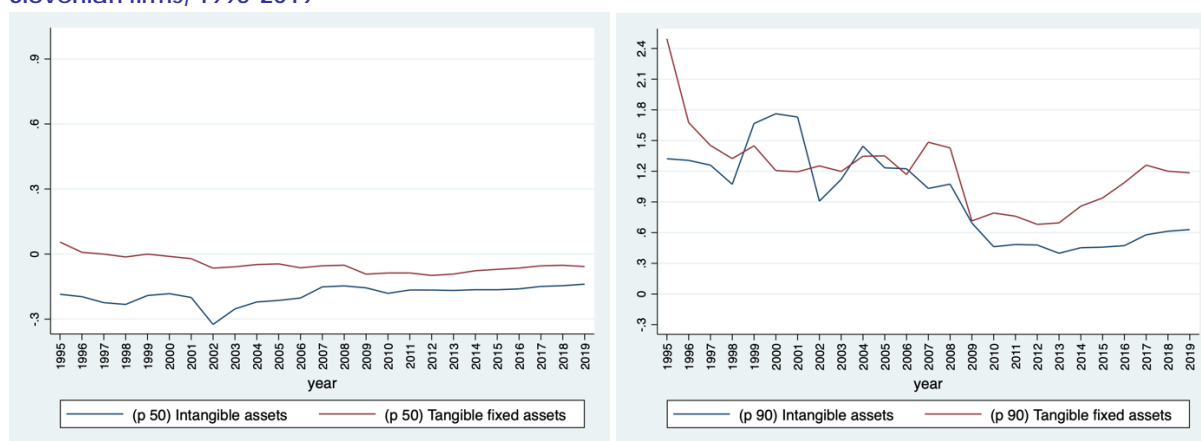


Note: Net investment is defined as the annual change in capital stock, while gross investment as the annual change in capital stock plus depreciation.

Source: Calculations based on Agency of the RS for Public Legal Records and Related Services' database.

The left panel in Figure 33 depicts the evolution of the median value of net investment rate in intangible and tangible fixed assets, while the right panel presents the investment rates for the 90th percentile in the population of the Slovenian firms. Based on median values, we can observe a divergent trend in the net investment rate of intangible and tangible fixed assets contributing to a closing of the gap between the two asset types after the Slovenian accession to the EU. Moreover, net investment in intangible assets remained relatively stable throughout the crisis period, while the slowdown in investment in tangible fixed assets was more apparent. On the other hand, the drop in the investment rates in the aftermath of the GFC was much more pronounced for the top performing firms (i.e. for the 90th percentile) compared to median ones, and interestingly, more so for the investment in intangible assets which had not started raising till 2016.

Figure 33. Net investment rate for intangible and tangible fixed assets, median and p90 value for Slovenian firms, 1995-2019

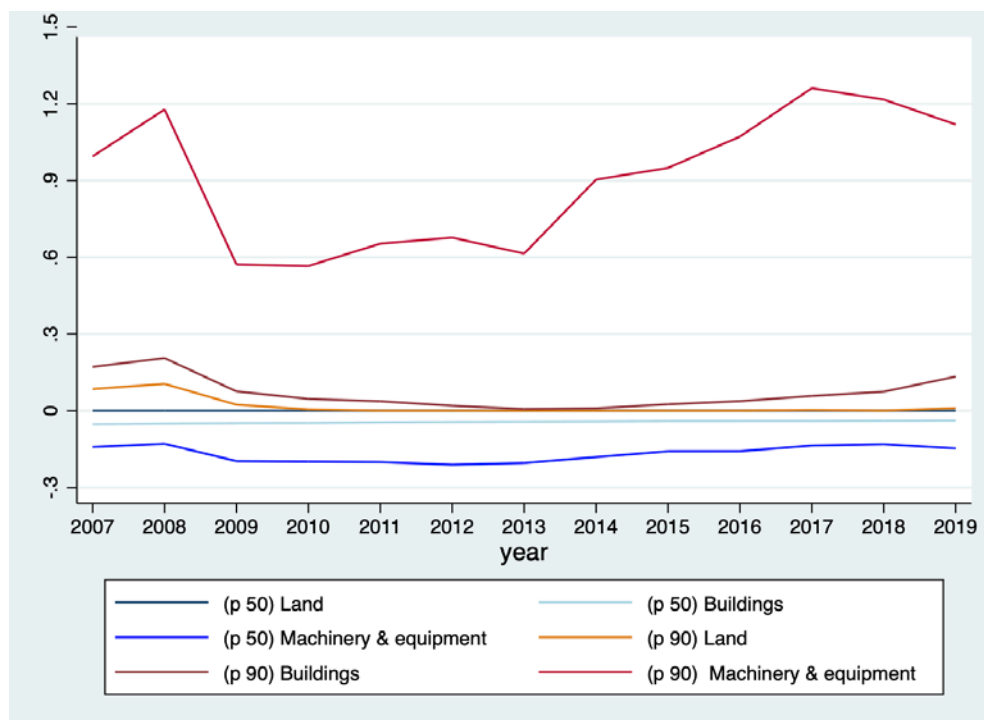


Note: Net investment is defined as the annual change in capital stock.

Source: Calculations based on Agency of the RS for Public Legal Records and Related Services' database.

Figure 34 further splits tangible fixed assets into subcategories and plots median and p90 values of net investment rates. Investments in production machinery and equipment seem to be the most heterogenous category of tangible investments as indicated by the largest gap between median and p90 value of net investment rates. Moreover, this investment category also exhibits the highest volatility especially in comparison to investments in land. Furthermore, the drop in machinery and equipment investment best reflects the overall dynamics of tangible investment since 2008. Divergent trends in firm investments across different asset types indicate the need for the analysis at the disaggregated level.

Figure 34. Net investment rate for categories of tangible fixed assets, median and p90 value for Slovenian firms, 2007-2019



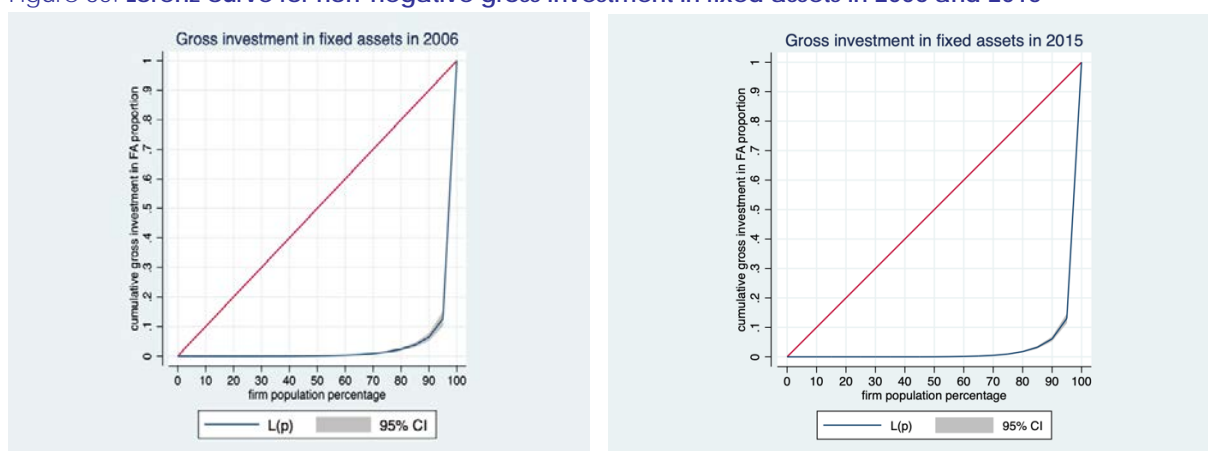
Note: Net investment is defined as the annual change in capital stock.

Source: Calculations based on Agency of the RS for Public Legal Records and Related Services' database.

5.2.3.2. Granularity in investment

Lorenz curves presented in Figure 35 indicate strong concentration in a gross investment of the Slovenian corporate sector. Considering only firms with non-negative gross investment, top 5 % of the firms in terms of gross investment account for around 87% of all investment activity in fixed assets both before and after the GFC. In order to gain better insight into the impact of granularity on aggregate investment, we identify the top investing firms in the pre-crisis period, i.e. in a 2000-2008 period, and trace their contribution to aggregate investment during and after the GFC. We do that by using a distribution of firms based on their average (non-negative) gross investments in 2000-2008 and further classify them into cohorts based on their position in that distribution. Table 9 presents the evolution of shares in total gross investments given firms' pre-crisis relative position. We keep the pre-crisis cohorts fixed, meaning that firms assigned to a certain percentile will have their contribution measured as a part of the assigned cohort irrespective of the size of their investments in all subsequent years. The rightmost column shows a share of the pre-crisis cohort of firms in total gross investments. We obtain the share of firms that entered after 2008 by subtracting the "Total for pre-crisis cohort" number from 100 (e.g. firms that entered after the year 2008 accounted for a 22% share of total gross investments in 2019). Table 9 reveals that the top 1 percent of the investing firms contributed almost two-thirds of total gross investments, signifying both the importance of top investors as well as a very high level of investment concentration in Slovenia. During and after the GFC, the relative share of top firms' investments fell sharply from 66.03% in 2008 to 41.99% in 2019, part of which can be explained by entry of new firms. Furthermore, the relative share in total gross investment in fixed assets of the 99th percentile fell compared to other firms within the pre-crisis cohorts, from 66.03% to 53.8%. We obtain the later number by dividing the investment share of the top 1 percent (41.99%) with the total share of the two top pre-crisis cohorts (78%). Additionally, during the 2008–2010 period, the share of the top 1 percent investing firms contracted significantly, which aligns with the fall in total investments. It is, therefore, reasonable to assume that the investment decisions of the top percent firms heavily impacted the fall in total investments. Extending the cohort to the 95th percentile, we find that the top 5 percent of investing firms were responsible for 85.76% of total gross investment in 2008 (again based on a sample of firms with non-negative gross investment). Their share had fallen throughout the period, but the fall was not due to the 95th – 99th percentile of firms, as their share of total gross investment decreased merely by 0.8 percentage points.

Figure 35. Lorenz curve for non-negative gross investment in fixed assets in 2006 and 2015



Source: Calculations based on Agency of the RS for Public Legal Records and Related Services' database.

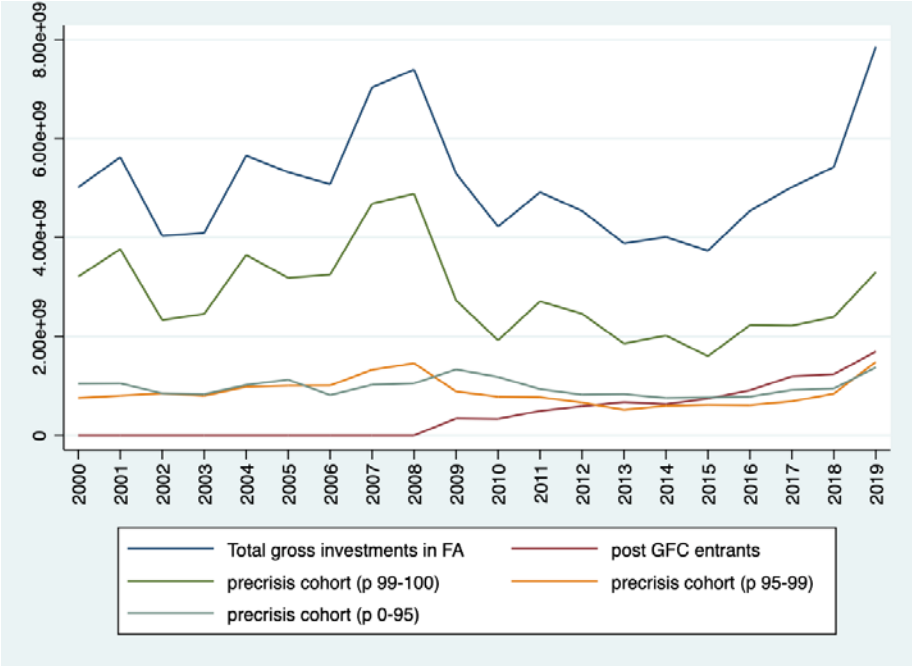
Table 9: Contributions in % to total gross investment in FA (considering non-negative firm gross investment) throughout 2000-2019 period for groups of firms defined based on pre-crisis (2000-2008) position in the distribution of gross investment in FA

	Up to 1 st percentile	1 to 5 th percentile	5 th to 25 th percentile	25 th to 50 th percentile	50 th to 75 th percentile	75 th to 95 th percentile	95 th to 99 th percentile	Above 99 th percentile	Total for pre- crisis cohorts
2000	4,47	1,54	0,38	0,43	2,68	11,40	15,11	63,99	100
2001	2,70	1,31	0,68	0,38	2,36	11,28	14,32	66,96	100
2002	1,80	0,94	0,13	0,46	3,08	14,71	21,11	57,77	100
2003	1,83	0,89	0,11	0,92	2,56	14,12	19,59	59,98	100
2004	1,39	1,07	0,41	0,68	1,91	12,60	17,42	64,51	100
2005	2,46	0,84	0,50	0,50	2,24	14,66	18,96	59,86	100
2006	0,36	0,17	0,09	0,43	1,94	13,10	19,91	64,01	100
2007	0,64	0,20	0,13	0,16	1,67	11,77	18,84	66,59	100
2008	0,63	0,14	0,02	0,12	1,42	11,92	19,73	66,03	100
2009	1,74	2,37	1,81	1,12	3,50	14,63	16,79	51,58	94
2010	2,63	0,88	2,99	1,09	4,97	15,43	18,59	45,53	92
2011	1,17	0,43	1,10	0,78	2,98	12,60	15,75	55,11	90
2012	1,11	0,59	0,77	0,76	2,53	12,42	14,62	54,20	87
2013	1,32	0,68	1,28	3,95	2,53	11,76	13,35	47,82	83
2014	1,25	0,49	1,01	1,27	2,30	12,59	14,96	50,38	84
2015	1,01	0,33	1,29	1,25	2,89	13,82	16,59	42,90	80
2016	0,85	0,37	1,14	0,92	2,37	11,66	13,48	49,09	80
2017	0,65	0,28	1,06	1,00	2,86	12,47	13,73	44,19	76
2018	0,54	0,33	0,95	1,00	2,69	11,99	15,56	44,13	77
2019	0,59	0,46	0,83	0,77	2,15	12,69	18,93	41,99	78

Source: Calculations based on Agency of the RS for Public Legal Records and Related Services' database.

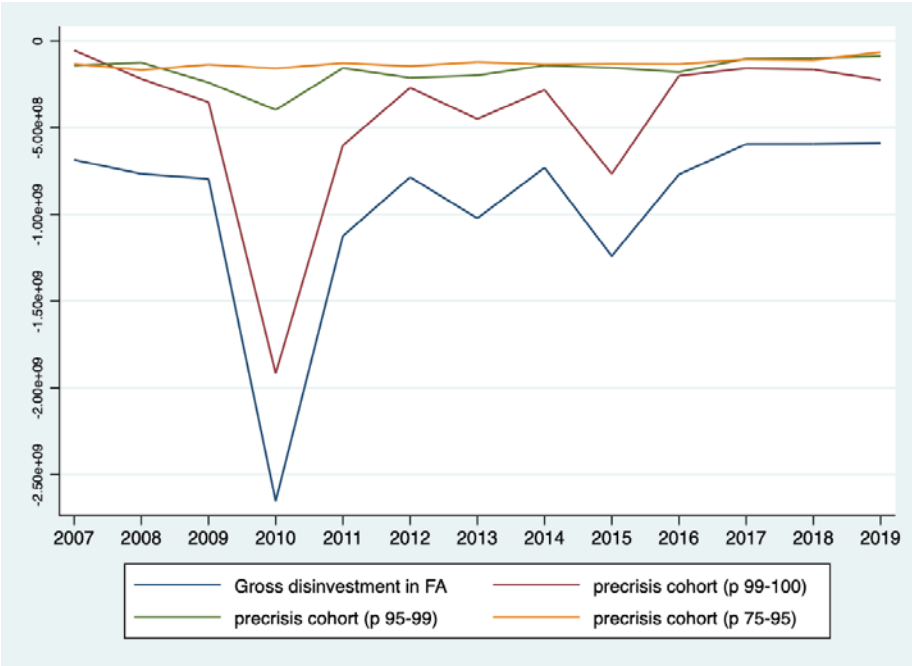
Figures 36 and 37 show gross investment and disinvestment developments, respectively, for pre-crisis cohorts of firms based on their pre-crisis (2000-2008) position in the distribution. These figures serve to further uncover the role of the individual cohorts and their relative importance. As can be seen in Figure 36, the top 1 percent of investing firms according to the pre-crisis cohort did in fact contribute predominantly first to the surge in investment up to 2008 and then to the fall in total gross investments after 2008. On top of that, the top 1 percent of investing firms also heavily contributed to the gross disinvestment dynamics (Figure 37). While the erstwhile top investors are still vital to investment dynamics, their role has diminished since the GFC. It was only in 2019 that total gross investments in fixed assets surpassed the 2008 level.

Figure 36. Total gross investment in Fixed Assets of firms with non-negative gross investment and contribution of different pre-crisis cohorts (in 2000 – 2019 period)



Source: Calculations based on Agency of the RS for Public Legal Records and Related Services' database.

Figure 37. Gross disinvestment in fixed assets of firms with negative gross investment and contribution of different pre-crisis cohorts (in 2000 – 2019 period)

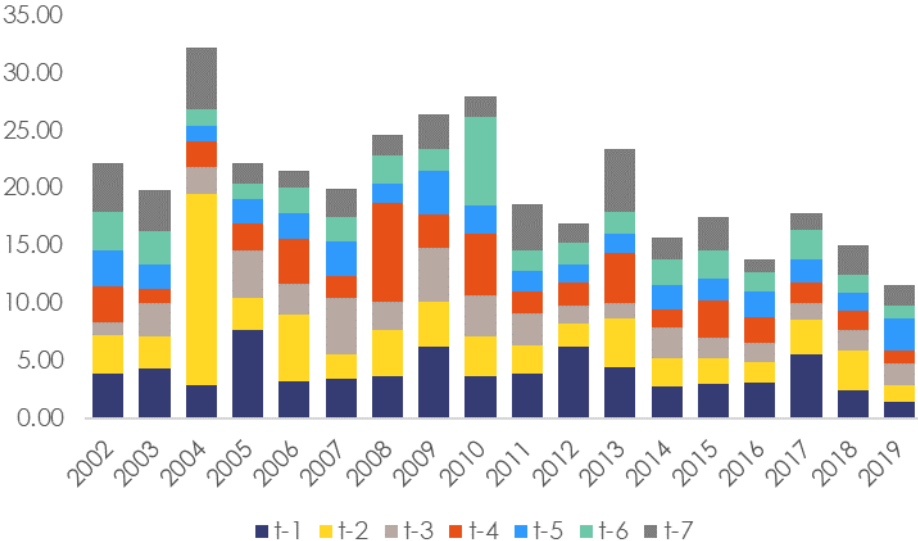


Source: Calculations based on Agency of the RS for Public Legal Records and Related Services' database.

In Figure 38 we delve further into the decomposition of the contribution within the top 5 percent of firms, this time based on each year's gross investment distribution. Investment contribution is measured on a scale from 1 to 100, where 100 represents the total gross investments in fixed assets of firms that are classified as top 5 percent largest investors in a given year. Time lags denote the age of the firm, where t-1 means a firm was founded one year prior to the observed period. The purpose of the figure

below is to examine the dynamics of younger firms as opposed to more established ones (meaning they were founded more than seven years prior to the observed year). Focusing on the period between before the GFC and 2019, we see a change within the top 5 percent of firms. In 2008, younger firms contributed 24.58% of total gross investments within the top 5 percent of biggest investors, while in 2019 their share fell to 11.6%. The share of newly established firms has been notably higher during the initial crisis period and in 2013 suggesting underinvestment of the older, pre-crisis large investors.

Figure 38. Contribution of firms towards total gross investment in fixed assets of top 5 percent of firms by age since incorporation in 2002 – 2019 period (100 = total gross investment of top 5 percent of firms)



Source: Calculations based on Agency of the RS for Public Legal Records and Related Services' database.

On the other hand, the share of young firms was at the lowest level in the two most recent years of observed period (2018-2019), suggesting younger firms were not investing as aggressively as they used to compared to older firms. It might be possible to attribute a portion of decreased investments to a change of dynamics that happened with younger firms. With fewer and fewer firms being founded, their share in investments is naturally going to fall. Going back to Table 9 and comparing the number of firms, we note that less firms were founded in period 2012 – 2019 compared to 2001 – 2008. The year of Slovenia's accession to the EU (2004) also stands out with by far the largest share of young firms' investment in top 5 %.

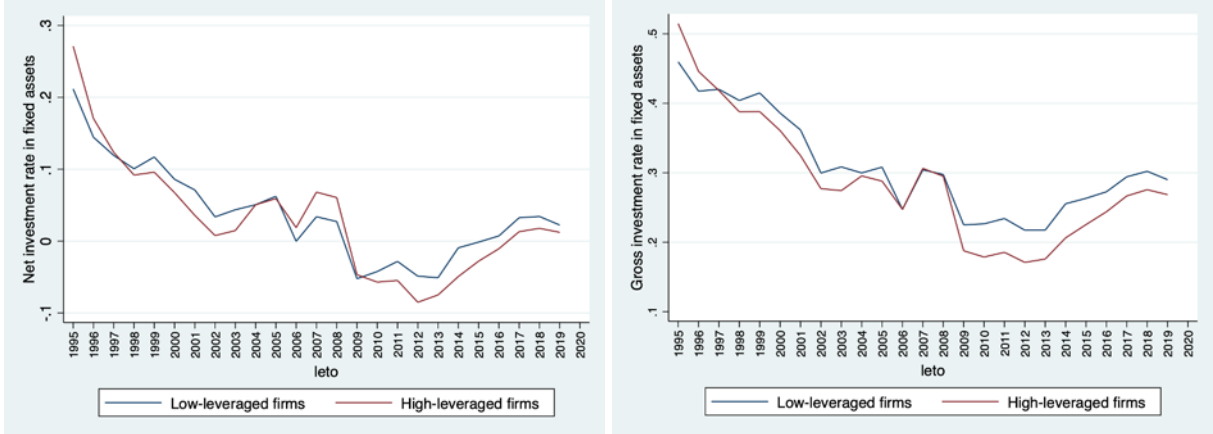
In the next step we run the empirical model (3) separately on subsamples of firms with respect to their precrisis position in the gross investment distribution to test whether investment drivers differ across the investment distribution. In particular, it is the group of firms at the top of the investment distribution (95th -100th percentile) that helps understanding the significant drop in investment level in the aftermath of the crisis. The regression results are reported in the next section.

5.2.3.4. Heterogeneity across different firm types and characteristics

In this section we compare average investment rates across different categories of firms. First, we divide firms based on their financial leverage, followed by debt overhang and their exporting status. The purpose of this step is to identify trends that may be specific to certain types of firms leading to a deeper insight into the causes of the investment decline (e.g. firms that export may behave differently when it comes to investing as opposed to firms that do not export and focus only on a local market).

Figure 39 shows development of average investment rates of firms divided into high and low leveraged ones based on median value of financial leverage. In the years leading up to the financial crisis (2006 and 2007) highly leveraged firms had a greater net investment rate while the gross investment rates were on par with less leveraged firms. With the onset of the GFC the investment rates decreased with those of highly leveraged firms ending up well below the levels of their less leveraged peers. This suggests that heavily leveraged firms held back investment when the financial situation deteriorated and that this may have played an important role in the sluggish post-crisis aggregate investment performance. Namely, a large proportion of Slovenian firms accumulated corporate debt during the boom years (2004-2008) forcing them to deleverage in the aftermath of the crisis and significantly slow down their investment activities while trying to reduce their relative debt amounts.

Figure 39. Average gross and net investment rates in fixed assets for low and high leveraged firms in Slovenia, 1995-2019

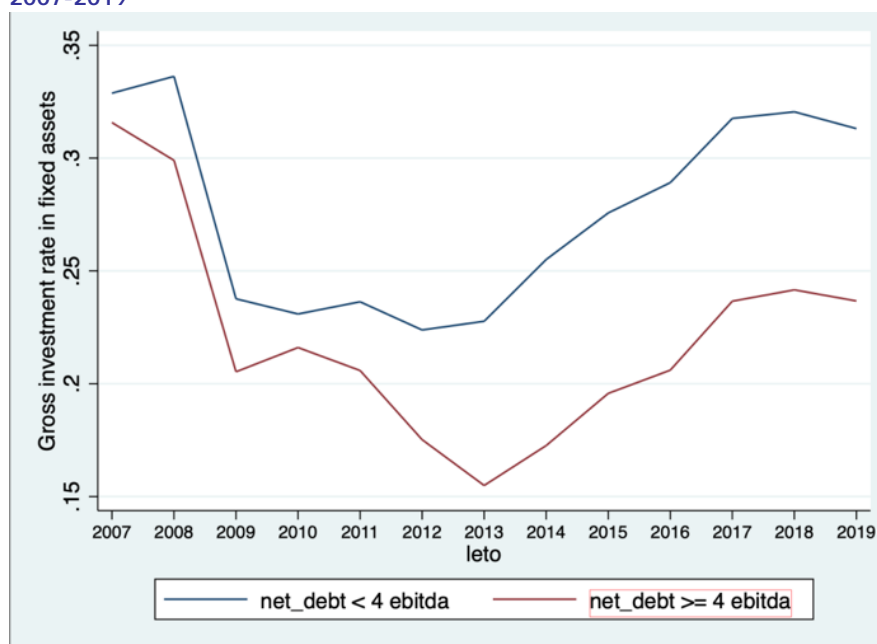


Note: Net investment is defined as the annual change in capital stock (sum of tangible and intangible assets). Gross investment is defined as the annual change in capital stock (sum of tangible and intangible assets) plus depreciation.

Source: Calculations based on Agency of the Republic of Slovenia for Public Legal Records and Related Services' database.

Differences in the gross investment rate developments between firms with and without debt overhang are further illustrated in the Figure 40, where firms are divided subject to whether their financial leverage (net debt to EBITDA) exceeds the high leverage threshold. Firms with debt overhang, i.e. where net debt exceeded EBITDA by a multiple of 4, underperformed compared to less leveraged firms throughout the entire observed, 2007-2019, period with the gap in average investment rate increasing after the crisis. Lower investment intensity of highly leveraged firms could be attributed to the process of deleveraging of outstanding while additional investment projects would benefit merely the existing debt holders. In addition to that, lenders are reluctant to offer funds to entities already facing financial distress as the risk may outweigh the projected return.

Figure 40. Average gross investment rate in fixed assets according to debt overhang of Slovenian firms, 2007-2019



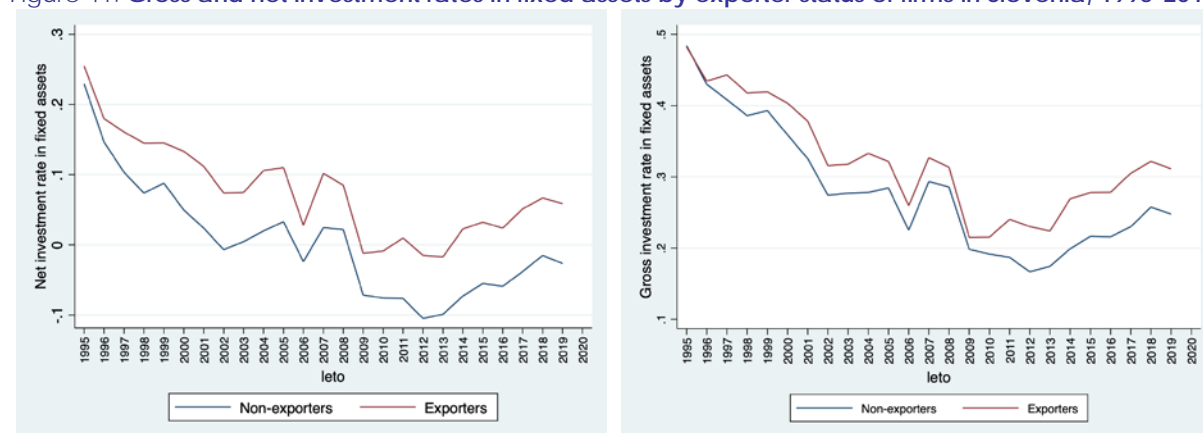
Note: Net investment is defined as the annual change in capital stock (sum of tangible and intangible assets).

Gross investment is defined as the annual change in capital stock (sum of tangible and intangible assets) plus depreciation.

Source: Calculations based on Agency of the Republic of Slovenia for Public Legal Records and Related Services' database.

Next, firms are divided into exporters and non-exporters, depending on whether they had non-zero export revenues in a given year. There is a clear distinction between the two groups, especially when looking at the net investment rates (see Figure 41). Exporting firms had higher investment rates throughout the period studied and rebounded to positive net investment rates quicker and much more forcibly than non-exporters after the GFC. Moreover, in post-crisis period the gap between exporters and non-exporters have been widening both with respect to net and gross investment in fixed assets.

Figure 41. Gross and net investment rates in fixed assets by exporter status of firms in Slovenia, 1995-2019



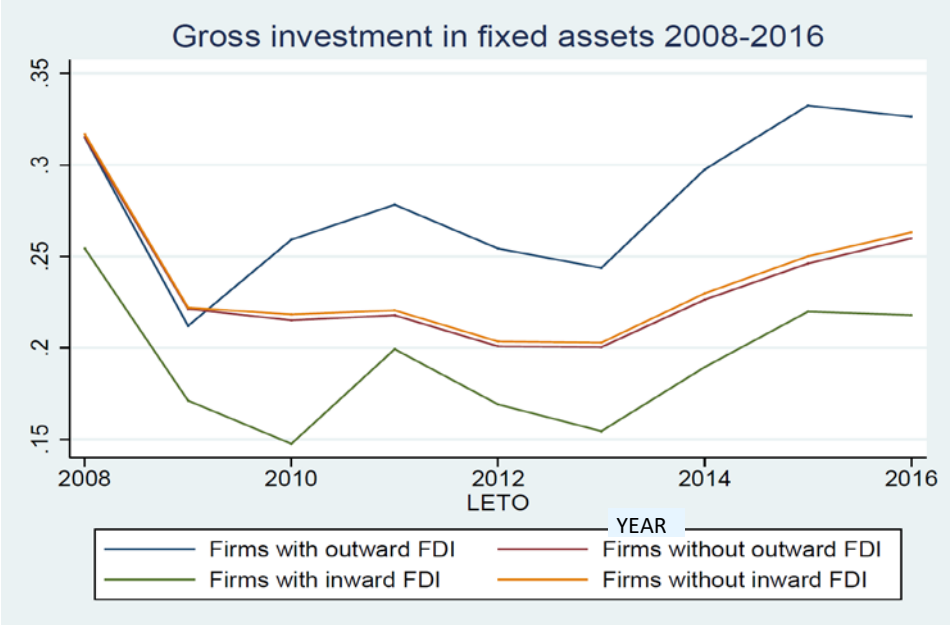
Note: Net investment is defined as the annual change in capital stock (sum of tangible and intangible assets).

Gross investment is defined as the annual change in capital stock (sum of tangible and intangible assets) plus depreciation.

Source: Calculations based on Agency of the Republic of Slovenia for Public Legal Records and Related Services' database.

Other factors considered to have impacted the investment performance of Slovene firms during and after the GFC are foreign ownership (both Slovene firms being foreign owned or Slovene firms with ownership of foreign entities), involvement with international production networks and high-tech export intensity. Figure 42 presents a comparison of firm investment-rate dynamics for foreign-owned and locally-owned firms and firms with and without foreign ownership of foreign assets.

Figure 42. Gross investment rates in fixed assets by foreign ownership in Slovenia, 2008-2016



Note: Net investment is defined as the annual change in capital stock (sum of tangible and intangible assets).

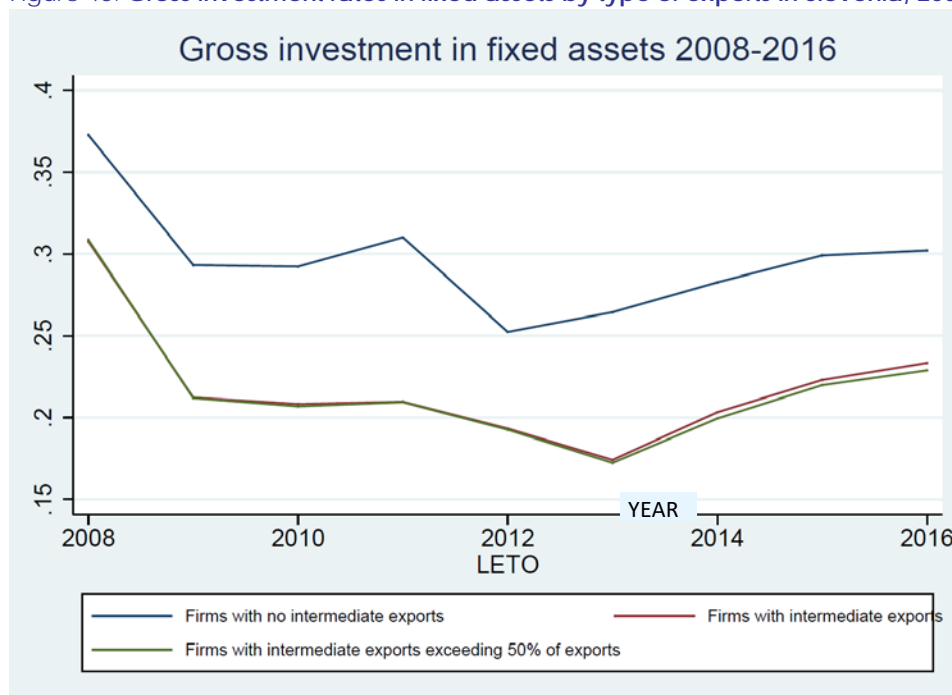
Gross investment is defined as the annual change in capital stock (sum of tangible and intangible assets) plus depreciation.

Source: Calculations based on Bank of Slovenia’s database and Agency of the Republic of Slovenia for Public Legal Records and Related Services’ database at the Statistical office’s safe room.

The above figure shows that firms with outward FDI (owners of foreign-firm assets) consistently outperformed the other three firm types in terms of the rate of investment with the exception of the pre-crisis divestment surge (2008-2009) where firms with neither inward nor outward FDI display marginally higher investment rates. Firms with outward FDI recovered quicker than other firm types after the crisis and even widened the investment-rate gap towards the end of the period of observation (2016). FDI recipient firms, on the other hand, display very low rates of investment throughout the period while mimicking other firm types in terms of temporal dynamics.

Our focus shifts to another structural feature of investing firms in Figure 43, where we concentrate on firms with exports of intermediate goods as an indicator of their involvement in global value chains. Alternatively, existence of intermediate good exports could serve as evidence of less technologically advanced firms and firms with longer investment cycles.

Figure 43. Gross investment rates in fixed assets by type of exports in Slovenia, 2008-2016



Note: Net investment is defined as the annual change in capital stock (sum of tangible and intangible assets).

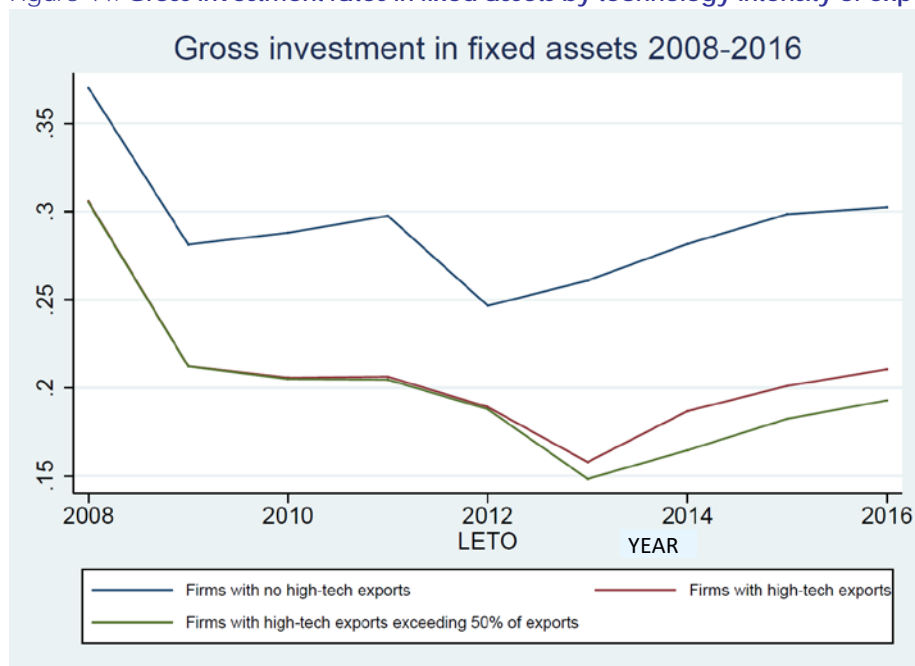
Gross investment is defined as the annual change in capital stock (sum of tangible and intangible assets) plus depreciation.

Source: Calculations based on Bank of Slovenia's database and Agency of the Republic of Slovenia for Public Legal Records and Related Services' database at the Statistical office's safe room.

The figure indicates that firms exporting intermediate goods displayed considerably lower investment rates than those exporting consumer products or capital goods which could indicate that intermediate goods exporters face less opportunities to invest or simply have lower investment requirements compared to other firm types. The proportion of intermediate goods in total exports does not appear to be an important contributing factor as there is no appreciable difference for firms exporting more than half of the value of their exports in intermediate goods.

Finally, we look at the firms exporting high-tech products according to OECD's definition of technology intensity and classification of high-technology, medium-high-technology, medium-low-technology and low technology firms. Figure 44 presents a comparison of investment rates between firms with and without high-tech exports.

Figure 44. Gross investment rates in fixed assets by technology intensity of exports in Slovenia, 2008-2016



Note: Net investment is defined as the annual change in capital stock (sum of tangible and intangible assets).

Gross investment is defined as the annual change in capital stock (sum of tangible and intangible assets) plus depreciation.

Source: Calculations based on Bank of Slovenia's database and Agency of the Republic of Slovenia for Public Legal Records and Related Services' database at the Statistical office's safe room.

Perhaps surprisingly, firms that export high-tech products consistently underperform in terms of investment intensity compared with firms with no high-tech exports. Furthermore, the investment-rate difference between the two cohorts has even increased over time. This may indicate that there are other structural factors correlated with high-tech exports such as foreign ownership or participation in production networks that play a part in the above results.

5.3 ECONOMETRIC RESULTS

5.3.1 Baseline estimates and their robustness checks

In this section, we present results of the baseline estimations of the model (3) presented in the section 5.1.1. In the following tables, fixed assets refer to the sum of tangible fixed assets and intangible (fixed) assets. We start with simple stepwise regressions to analyse the explanatory power of time, industry, and firm-specific effects for firm investment rate decision (Table 10). Columns 1-3 present the impact of year (1), year and industry (2) and year, industry, and year-industry indicators on the net investment rate. All three sets of dummy variables only explain 1.5% of the overall variation of net investment rate. Firm-fixed effects, on the other hand, add considerable explanatory power as R^2 increases from 1.5% to 21% with the inclusion of firm FE (Column 4). Addition of firm size dummies into the model does not improve the explanatory power (Column 5 for net and 6 for gross investment rate), yet we are able to deduce that firm size plays an important role with larger firms having a higher average net and gross investment rates during the observed period. When using the log value of assets (Column 7) instead of investment rate as a dependent variable, R^2 increases to 81%. Results suggest that for observing investment patterns, using firm-level data (micro analysis) is crucially important.

Table 10. Investment function for Slovenian firms in the 1994-2019 period, Fixed assets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	Net investment rate	Net investment rate	Net investment rate	Net investment rate	Net investment rate	Gross investment rate	In value of assets
	Fixed assets	Fixed assets	Fixed assets	Fixed assets	Fixed assets	Fixed assets	Fixed assets
Small firms					0.039*** [0.005]	0.001 [0.005]	0.926*** [0.010]
Medium firms					0.057*** [0.009]	0.032*** [0.011]	1.025*** [0.019]
Large firms					0.098*** [0.021]	0.103*** [0.024]	1.267*** [0.043]
Constant	0.214*** [0.004]	0.249*** [0.009]	0.188*** [0.037]	0.299*** [0.039]	0.301*** [0.039]	0.614*** [0.045]	9.778*** [0.083]
Year dummies	yes	yes	yes	yes	yes	yes	yes
Industry dummies	no	yes	yes	yes	yes	yes	yes
Industry-year dummies	no	no	yes	yes	yes	yes	yes
Firm fixed effects	no	no	no	yes	yes	yes	yes
Observations	877,250	850,091	850,091	850,091	850,091	850,064	820,246
R ²	0.011	0.013	0.015	0.210	0.210	0.204	0.810

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

Following that, we report results of baseline specification (3) applied on both investment in fixed assets in Table 11 and broader category of total long-term assets in Appendix B (Table B.2). Based on the outcome of the Hausman test we report fixed effects estimator results¹³. It has to be noted that the reported R² values in tables of results are obtained based on *xtreg, fe* procedure, hence the R² reported is obtained by only fitting a mean deviated model where the effects of the groups (i.e. firms in our case) are assumed to be fixed quantities, so their effects are removed from the model. Hence, the “true” value of coefficients of determination are higher than reported in our tables. For instance, R² for the specification in column (8) of Table 11 adjusted for firm-fixed effects is 0.35 indicating that 35% of the variance for gross investment rate in fixed assets is explained by independent variables in that specification. The R² values are comparable to coefficients of determination in firm investment rate function reported in other studies. For instance, Kalemli-Ozcan, Laeven & Moreno (2020) report R² for comparable firm-level specification of investment rate in range of 0.17 and 0.20. Namely, R² values are usually much lower in investment rate specifications than in those with absolute investment level as dependent variable (see the difference in R² between columns (6) and (7) in Table 10). Furthermore, the *F* test that all $u_i=0$ confirms the importance of the unobserved firm-level heterogeneity in specified regression models indicating that fixed effects estimator are a better fit to our data than pooled OLS.

Results (in both tables) confirm the fit of the Bloom, Bond and Van Reenen (2007) investment model in explaining Slovenian firm investment rate. We find that investment is driven by demand factors as captured by sales growth. Positive significance of the coefficient of sales growth squared which we use as a demand proxy (*Sales growth*²) implies non-linearity in firms’ investment response to demand induced shocks in the short run. The impact of both sales and sales squared is significantly reduced during the GFC as evidenced by the negative coefficients on interaction terms for both linear and

¹³ For specification reported in column (1) of Table 8, for instance, Hausman test statistic is $\chi^2(23) = 20860.8***$.

quadratic term of sales growth. This is in line with Bloom, Bond and Van Reenen (2007)' findings. Namely, assuming the GFC is associated with higher demand uncertainty the reduced effect of demand shocks on investment is expected. As suggested by Bloom, Bond and Van Reenen (2007)' uncertainty increases real option values making firms more cautious when investing or disinvesting. This implies the responsiveness of firms to any given policy stimulus may be much lower in periods of high uncertainty, such as after major shocks like GFC and Covid-19 pandemic¹⁴.

Table 11. Fixed effects estimation of the investment function in fixed assets for Slovenian firms in the 1994 (2006)-2019 period, Fixed assets

Variables	(1) Net invest. rate FA 1994- 2019	(2) Net invest. rate FA 1994- 2019	(3) Net invest. rate FA 1994- 2019	(4) Gross invest. rate FA 1994- 2019	(5) Gross invest. rate FA 1994- 2019	(6) Gross invest. rate FA 1994- 2019	(7) Gross invest. rate FA 2006- 2019	(8) Gross invest. rate FA 2006- 2019
GFC	-0.049*** [0.002]	0.098*** [0.024]	0.241*** [0.056]	-0.062*** [0.002]	0.099*** [0.027]	0.210*** [0.062]	-0.141*** [0.052]	-0.092 [0.061]
Sales growth	0.203*** [0.002]	0.221*** [0.002]	0.219*** [0.002]	0.259*** [0.002]	0.281*** [0.002]	0.283*** [0.002]	0.237*** [0.002]	0.256*** [0.003]
GFC x Sales growth		-0.059*** [0.003]	-0.058*** [0.003]		-0.070*** [0.004]	-0.070*** [0.004]		-0.035*** [0.004]
Sales growth ²	0.019*** [0.000]	0.022*** [0.001]	0.021*** [0.001]	0.025*** [0.001]	0.028*** [0.001]	0.029*** [0.001]	0.023*** [0.001]	0.024*** [0.001]
GFC x Sales growth ²		-0.008*** [0.001]	-0.007*** [0.001]		-0.009*** [0.001]	-0.009*** [0.001]		-0.004*** [0.001]
Error correction term	0.106*** [0.001]	0.114*** [0.001]	0.115*** [0.001]	0.224*** [0.001]	0.233*** [0.001]	0.235*** [0.001]	0.243*** [0.001]	0.250*** [0.001]
GFC x Error correction term		-0.023*** [0.001]	-0.025*** [0.001]		-0.029*** [0.001]	-0.032*** [0.001]		-0.015*** [0.001]
Debt /assets (-1)	-0.002*** [0.000]	-0.002*** [0.001]	-0.002*** [0.001]	-0.003*** [0.000]	-0.003*** [0.001]	-0.003*** [0.001]	-0.003*** [0.000]	-0.003*** [0.001]
GFC x Debt/assets(-1)		-0.001 [0.001]	-0.001 [0.001]		-0.000 [0.001]	-0.000 [0.001]		0.000 [0.001]
ROA (-1)	0.030*** [0.002]	0.028*** [0.002]	0.027*** [0.002]	0.024*** [0.002]	0.022*** [0.002]	0.021*** [0.002]	0.030*** [0.003]	0.028*** [0.004]
GFC x ROA(-1)		0.008** [0.004]	0.009** [0.004]		0.008** [0.004]	0.009** [0.004]		0.002 [0.005]
Current ratio (-1)	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000* [0.000]	0.000 [0.000]	0.000 [0.000]	0.000* [0.000]	0.000 [0.000]
GFC x Current ratio(-1)		-0.000 [0.000]	-0.000 [0.000]		-0.000 [0.000]	-0.000 [0.000]		-0.000 [0.000]
lnAge	-0.148*** [0.002]	-0.151*** [0.002]	-0.172*** [0.005]	-0.173*** [0.002]	-0.182*** [0.002]	-0.156*** [0.005]	-0.130*** [0.006]	-0.152*** [0.007]
GFC x lnAge		0.009*** [0.003]	0.003 [0.003]		0.027*** [0.003]	0.014*** [0.003]		0.018*** [0.004]
lnSize (-1)	-0.008*** [0.001]	-0.006*** [0.001]	-0.006*** [0.001]	-0.045*** [0.002]	-0.042*** [0.002]	-0.045*** [0.002]	-0.049*** [0.002]	-0.047*** [0.002]
GFC x lnSize(-1)		-0.007*** [0.001]	-0.003** [0.001]		-0.007*** [0.001]	-0.002 [0.002]		-0.005*** [0.002]
Exporter	0.003 [0.002]	0.016*** [0.004]	0.011*** [0.004]	-0.009*** [0.002]	0.008* [0.004]	0.005 [0.004]	-0.002 [0.003]	0.001 [0.004]
GFC(0) x exporter		-0.017*** [0.004]	-0.008** [0.004]		-0.022*** [0.004]	-0.012*** [0.004]		-0.004 [0.005]
lnVA/Empl (-1)	0.030***	0.034***	0.034***	0.010***	0.017***	0.018***	-0.006***	-0.003

¹⁴ In Appendix B, Table B.1 we provide robustness check for the definition of the GFC dummy. Since we do not have on disposal higher than annual frequency firm-level data to construct measure of firm-level uncertainty, we test the robustness of crisis dummy by considering different definitions in terms of the length of the crisis. We prolong gradually the crisis period from 2009-2011 to 2009-2015. The effect of the crisis is negative for all alternative definitions with increasing magnitude of GFC regression coefficient with prolonged crisis period. The impact of other investment drives is not affected by alternative definitions of crisis period. Hence, we proceed with our initial GFC definition considering 2009-2015 as a crisis period.

	[0.001]	[0.002]	[0.002]	[0.001]	[0.002]	[0.002]	[0.002]	[0.003]
GFC x lnVA/Emp(-1)		-0.013***	-0.013***		-0.019***	-0.020***		-0.008**
		[0.002]	[0.002]		[0.003]	[0.003]		[0.003]
Rel. wage (-1)	-0.008***	-0.009***	-0.007***	-0.012***	-0.014***	-0.009***	-0.007***	-0.014***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.002]	[0.003]
GFC x Rel. Wage(-1)		0.008**	0.007**		0.015***	0.012***		0.017***
		[0.003]	[0.003]		[0.003]	[0.003]		[0.004]
Firm exit rate (nace3)						-0.146***	-0.155**	-0.148**
						[0.047]	[0.064]	[0.064]
Market conc. (hhi)						0.000	0.007	0.006
						[0.017]	[0.025]	[0.025]
Constant	-0.126***	-0.173***	-0.209***	0.273***	0.214***	0.076	0.376***	0.381***
	[0.024]	[0.025]	[0.050]	[0.027]	[0.028]	[0.056]	[0.057]	[0.059]
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes
Year dummies	no	no	yes	no	no	yes	yes	yes
Industry-year dummies	no	no	yes	no	no	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
F test	F(24,5563 82) = 2311.9***	F(35,5563 71) = 1611.0***	F(333,556 073) = 173.7***	F(24,5571 21) = 4553.4***	F(35,5571 10) = 3161.6***	F(335,556 810) = 336.3***	F(192,331 831) = 274.1***	F(203,331 820) = 260.8***
F test that all $u_i=0$	F(76119, 556382) = 1.9***	F(76119, 556371) = 1.9***	F(76119, 556073) = 1.8***	F(76083, 557121) = 2.0***	F(76083, 557110) = 2.0***	F(76083, 556810) = 2.0***	F(61273, 331831) = 2.0***	F(61273, 331820) = 2.0***
Observations	632,526	632,526	632,526	633,229	633,229	633,229	393,297	393,297
Number of ms7	76,12	76,12	76,12	76,084	76,084	76,084	61,274	61,274
R ²	0.091	0.092	0.094	0.164	0.166	0.168	0.137	0.138

Note: Robust standard errors in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

Also, in line with the theory the error correction term is significantly positive during normal times reflecting the need of firms with capital below optimal level to adjust it upwardly and vice versa. As was the case with sales, the effect is diminished during the GFC but remains significantly positive. Interestingly, while more indebted firms invest less, the GFC did not have any significant impact on the correlation between firm investment and its debt-to-asset ratio. This may be a result of the fact that bank financing tightened up significantly during the GFC forcing firms to rely on own cash flow for financing investment. On the other hand, the positive effect of firm profitability is significantly strengthened during the GFC. While younger and smaller firms generally invest more, the GFC weakened the effect of age and strengthened the negative effect of size on investment activity. Similarly, the erstwhile positive effects of exporter status and productivity are less important during the GFC, while skill intensity (measured by relative wage) changes from being positively significant to being insignificantly related to investment during crisis.

Changing firm demography over the period 1994-2019 period is proxied with inclusion of the firm exit rate defined at 3-digit NACE industry level (*Firm exit rate (nace3)* in columns 6-8)). Increased exit rate contributes to lower investment rate as indicated by significantly negative regression coefficient, while the impact of the other factors is not significantly affected with this control variable. We find no evidence that market concentration measured by Herfindahl-Hirschman Index (HHI) within 3-digit NACE industries affects firm investment rate.

Shortening of the period considered, i.e. from 1994-2019 to 2006-2019 period (in columns 7 and 8 of Table 11), doesn't alter the results appreciably suggesting that the investment factors have been relatively stable since 1994. The notable exceptions are labour productivity and relative average wage.

While the negative effect of the latter disappears after 2006, the impact of labour productivity turns negative but only in post-GFC period.

We provide several robustness checks of these baseline specifications. First, in Appendix B, Table B1 we provide robustness check for the definition of the GFC dummy. Since we do not have on disposal firm-level data with higher than annual frequency to construct measure of firm-level uncertainty, we test the robustness of crisis dummy by considering different definitions in terms of the length of the crisis. We prolong gradually the crisis period from 2009-2011 to 2009-2015. The effect of the crisis is negative for all alternative definitions with increasing magnitude of GFC regression coefficient with prolonged crisis period. The impact of other investment drivers is not affected by alternative definitions of crisis period. Hence, we proceed with our initial GFC definition considering 2009-2015 as a crisis period.

Secondly, results based on alternative definition of total investment, i.e. investments in long-term assets (presented in Appendix B, Table B2), closely follow the benchmark estimates based on fixed assets (Table 10). As before, we find the investment rate closely associated with demand shocks in a non-linear fashion, with the correlation is markedly weakened during the crisis. Similarly, the crisis weakens the elasticity of investment with respect to size, productivity and exporting status, while strengthening the association with the return on assets (ROA).

Finally, as a further robustness check we account for potential investment persistence and eventual endogeneity of certain firm level regressors in a dynamic setting. The dynamic specification results where we include lagged dependent variable as one of the regressors are provided in Appendix B, Table B3. In our case, three to five lags of dependent variable were found to be negative and significant suggesting a lengthy downward adjustment of investment rates. The larger number of significant lagged terms indicate a slower adjustment to any of the possible exogenous shocks. In our case the regression coefficient on the first lag of the dependent variable range from -0.33 to -0.27, depending on the model specification. This could indicate the longer length of the investment cycle of the Slovene firms and also a period of increased investment volatility. Due to the lagged dependent variable among regressors, the consistency of the dynamic panel estimations hinges upon on there being no second-order serial correlation for the disturbances of the first differenced equation. This is confirmed with the test statistic AR(2) in all specifications from Table B3.¹⁵

Comparing static and dynamic gross investment rate model estimates, most of the investment drivers identified within a static model are confirmed in the dynamic setting as well. As in the static setting, financial leverage and firm age are negatively associated with investment rate, while profitability positively. Similarly, we find the investment rate closely associated with demand shocks, however the nonlinear relation is here found to be of inverted U-shape. Dynamic specifications further highlight the nature of the error correction term which in the dynamic setting turns to negative for one-year lagged values and becomes positive only for its second order lag. The effect of export status, skill intensity and labour productivity are not that robust across different specifications.

¹⁵ However, we cannot establish that moment conditions in the dynamic model are appropriate since the null hypothesis of the Sargan's test of over-identifying restrictions is rejected. A rejection of the null hypothesis casts some doubt on the suitability of the instrument set as one or more of the applied instruments may not be correlated with the disturbance process.

5.3.2 Accounting for different asset types

Estimates on investment rates by more detailed asset classes are shown in the Table 12 (and in more detail in Appendix B, Tab. B4)¹⁶. In line with the previous results, the non-linear impact of sales growth on the investment rate prevails for majority of the asset classes with some of them displaying a negative second-order coefficient (*Land* and *Buildings*). This highlights a different pattern compared to investments in equipment. While there is positive correlation between demand and investment in fixed assets in the long run, a degree of difference among the property, plant, and equipment (PP&E) assets is to be expected, in particular in the short run. Investment in land and buildings represents a bigger (longer) commitment as it is often followed by investment in equipment to increase production capabilities. The financial crisis had a significant impact on all of the classes of tangible-fixed-asset investment. Furthermore, investment rate in equipment appears far more responsive to changes in the log sales to fixed assets ratio (i.e. error correction term) and firm age than other tangible fixed asset types. At the same time, productivity does not seem to have a significant correlation with the investment rate in equipment and is even negatively correlated with investment rate in land.

Skill intensity, measured by firm average wage relative to the industry average, positively affects investment in the intangible assets but has a negative overall effect on investment in tangible fixed assets. We control for industry effects. Difference in determinants of investment in tangible and intangible assets had been previously studied by Thum-Thyssen et al. (2019) where they identified education and qualification to be key determinants for investments in intangible assets. Our findings confirm that skill intensity positively contributes to investments in intangibles. Given that many Slovenian firms during that period were embedded in the value chains of multinational corporations (such as the automotive industry), one of the appeals for foreign investors was relatively cheap skilled work force. Overall, the effect of relative wages (relative skill intensity) does not appear to be statistically robust while being quantitatively small compared to some of the other determinants. Long-term financial assets are the only asset type to respond significantly to changes in the current ratio although the association is quantitatively small. While investment rate of intangible assets is positively correlated with productivity, the opposite hold for property and long-term financial investments.

¹⁶ Hausman test, F test, and F test for all $u_i=0$ statistics are not reported in the tables presented in the remaining sections. Like for the specifications in Table 8, they are all in support of the correctness of fixed effects specifications that are reported in the tables.

Table 12. Fixed effects estimation of net investment function by asset type for Slovenian firms in the 1994-2019 period

Variables	Net investment rate	Net investment rate	Net investment rate	Net investment rate	Net investment rate	Net investment rate	Net investment rate	Net investment rate
	Tangible fixed assets	Tangible fixed assets	Tangible fixed assets	Tangible fixed assets	Tangible fixed assets	Intangible assets	Investment property	LT financial investment
	Total	Total	Land	Buildings	Equipment			
GFC	-0.051*** [0.002]	0.232*** [0.057]	0.016 [0.047]	-0.123*** [0.044]	0.400*** [0.153]	0.239* [0.133]	-0.170 [0.135]	-0.079 [0.150]
Sales growth	0.207*** [0.002]	0.223*** [0.002]	0.043*** [0.003]	0.055*** [0.003]	0.354*** [0.009]	0.089*** [0.004]	0.041*** [0.007]	0.064*** [0.008]
GFC x Sales growth		-0.056*** [0.003]	0.000 [0.005]	-0.014*** [0.004]	-0.047*** [0.012]	-0.018*** [0.007]	-0.006 [0.010]	0.022** [0.010]
Sales growth ²	0.019*** [0.001]	0.021*** [0.001]	-0.004*** [0.001]	-0.002*** [0.001]	0.037*** [0.003]	0.001 [0.001]	-0.009*** [0.003]	-0.001 [0.003]
GFC x Sales growth ²		-0.007*** [0.001]	0.004** [0.001]	-0.000 [0.001]	-0.003 [0.004]	0.001 [0.002]	0.009*** [0.003]	0.008*** [0.003]
Error correction term	0.105*** [0.001]	0.114*** [0.001]	0.056*** [0.002]	0.023*** [0.001]	0.293*** [0.004]	-0.006*** [0.001]	0.035*** [0.004]	0.119*** [0.003]
GFC x Error correction term		-0.025*** [0.001]	-0.003*** [0.001]	-0.001 [0.001]	-0.031*** [0.004]	-0.006*** [0.001]	0.010*** [0.003]	0.004* [0.002]
Debt/assets (-1)	-0.002*** [0.000]	-0.002*** [0.001]	-0.019*** [0.006]	0.002*** [0.001]	-0.014** [0.006]	-0.011*** [0.003]	-0.090*** [0.018]	-0.017* [0.009]
GFC x Debt/assets(-1)		-0.001 [0.001]	-0.002 [0.007]	-0.010*** [0.004]	0.005 [0.006]	0.001 [0.005]	0.017 [0.017]	0.020** [0.009]
ROA (-1)	0.031*** [0.002]	0.028*** [0.002]	0.037*** [0.014]	0.088*** [0.011]	0.035** [0.014]	0.026*** [0.007]	0.078** [0.040]	0.019 [0.016]
GFC x ROA(-1)		0.008** [0.004]	-0.040** [0.020]	-0.042*** [0.015]	0.099*** [0.023]	-0.014 [0.013]	-0.019 [0.049]	0.040* [0.024]
Current ratio (-1)	0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	0.000 [0.000]	0.001*** [0.000]
GFC x Curr. ratio(-1)		-0.000 [0.000]	0.000** [0.000]	-0.000 [0.000]	0.000 [0.001]	-0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]
InAge	-0.151*** [0.002]	-0.173*** [0.005]	-0.040*** [0.008]	-0.055*** [0.006]	-0.323*** [0.020]	-0.227*** [0.009]	-0.134*** [0.025]	-0.219*** [0.024]
GFC x InAge		0.001 [0.003]	-0.004 [0.004]	0.006* [0.003]	-0.024** [0.010]	-0.006 [0.006]	-0.005 [0.011]	-0.026** [0.010]
InSize (-1)	-0.006*** [0.001]	-0.004** [0.002]	-0.013*** [0.002]	0.010*** [0.002]	-0.041*** [0.006]	0.042*** [0.003]	-0.018*** [0.006]	-0.039*** [0.006]
GFC x InSize(-1)		-0.003* [0.001]	-0.001 [0.001]	-0.004*** [0.001]	0.003 [0.004]	-0.008*** [0.002]	-0.001 [0.004]	-0.002 [0.003]
Exporter	0.004* [0.002]	0.011*** [0.004]	0.004 [0.004]	0.003 [0.003]	0.016 [0.012]	0.009 [0.007]	-0.000 [0.010]	-0.012 [0.010]
GFC(0) x exporter		-0.006 [0.004]	0.001 [0.004]	-0.003 [0.004]	-0.025* [0.014]	0.002 [0.007]	-0.016 [0.011]	0.006 [0.012]
InVA/Emp1 (-1)	0.033*** [0.001]	0.037*** [0.002]	-0.005** [0.003]	0.010*** [0.002]	-0.003 [0.008]	0.027*** [0.003]	-0.022*** [0.006]	-0.026*** [0.006]
GFC x InVA/Emp1(-1)		-0.012*** [0.002]	-0.004 [0.003]	-0.003 [0.003]	-0.005 [0.009]	0.001 [0.005]	0.002 [0.006]	0.002 [0.007]
Rel. wage (-1)	-0.008*** [0.001]	-0.007*** [0.001]	-0.005 [0.003]	0.004* [0.002]	0.003 [0.007]	0.002 [0.002]	-0.004 [0.006]	0.009 [0.006]
GFC x Rel. Wage(-1)		0.009*** [0.003]	0.010** [0.004]	0.002 [0.003]	0.006 [0.012]	-0.009 [0.006]	0.004 [0.007]	-0.007 [0.008]
Constant	-0.156*** [0.025]	-0.245*** [0.051]	0.071 [0.045]	0.029 [0.042]	-0.109 [0.140]	-0.145 [0.126]	0.647*** [0.146]	0.672*** [0.156]
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes
Year dummies	no	yes	yes	yes	yes	yes	yes	yes
Industry-year dummies	no	yes	yes	yes	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Observations	628,54	628,54	90,324	175,27	128,369	226,433	26,989	91,313
Number of ms7	75,707	75,707	11,727	22,483	24,873	35,373	5,176	18,402
R ²	0.089	0.093	0.037	0.043	0.101	0.027	0.049	0.059

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

5.3.3 Accounting for granularity in identification of investment drivers

In order to account for granularity we start with regression estimates for different firm size cohorts of firms. Given the number of employees, assets and sales, firms are divided into four different categories that reflect their size (micro, small, medium-sized, and large firms). As shown in Table 13, there are differences among firm size classes. Large firms are more sensitive to demand shocks during business cycles compared to the relatively small companies. Moreover, the elasticity of the investment rate with respect to demand is growing with firm size. Similarly, large firms' investment rates appear to fall more with increased debt to assets, while liquidity is not a significant investment factor. Investment rate is also not responsive to changes in ROA for large firms, suggesting lower dependence of large firms on internal finance sources compared to SMEs. For micro firms, on the other hand labour productivity and profitability seem to be important drivers of investment activity, while average wage relative to industry average and exporting do not contribute positively to investment decisions.

Table 13. Fixed effects estimation of investment function in fixed assets by firm size classes for Slovenian firms in the 1994-2019 period

Variables	Gross investment rate Micro firms	Gross investment rate Micro firms	Gross investment rate Small firms	Gross investment rate Small firms	Gross investment rate Medium firms	Gross investment rate Medium firms	Gross investment rate Large firms	Gross investment rate Large firms
GFC	-0.057*** [0.003]	-0.115 [0.074]	-0.038*** [0.005]	-0.174 [0.142]	-0.045*** [0.009]	0.014 [0.222]	-0.019 [0.014]	0.058 [0.456]
Sales growth	0.241*** [0.002]	0.252*** [0.004]	0.366*** [0.007]	0.436*** [0.011]	0.352*** [0.016]	0.458*** [0.026]	0.403*** [0.033]	0.548*** [0.056]
GFC x Sales growth		-0.025*** [0.005]		-0.116*** [0.014]		-0.125*** [0.033]		-0.162** [0.069]
Sales growth ²	0.025*** [0.001]	0.027*** [0.001]	0.033*** [0.003]	0.013** [0.005]	0.012 [0.007]	0.005 [0.011]	0.050** [0.020]	0.022 [0.027]
GFC x Sales growth ²		-0.003 [0.002]		0.025*** [0.006]		0.006 [0.015]		-0.035 [0.043]
lnSal/lnFA(-1)	0.235*** [0.001]	0.241*** [0.002]	0.352*** [0.004]	0.367*** [0.004]	0.293*** [0.007]	0.348*** [0.008]	0.371*** [0.017]	0.397*** [0.018]
GFC x lnSal/lnFA(-1)		-0.013*** [0.001]		-0.026*** [0.003]		-0.030*** [0.006]		-0.006 [0.011]
Debt/assets(-1)	-0.003*** [0.000]	-0.003*** [0.001]	-0.109*** [0.013]	-0.101*** [0.017]	-0.019 [0.025]	-0.105*** [0.036]	-0.156** [0.068]	-0.173** [0.077]
GFC x Debt/assets(-1)		0.001 [0.001]		-0.019 [0.018]		0.029 [0.036]		-0.022 [0.077]
ROA (-1)	0.025*** [0.003]	0.021*** [0.005]	0.053*** [0.017]	0.090*** [0.027]	0.161*** [0.036]	0.144** [0.060]	0.083 [0.110]	0.061 [0.148]
GFC x ROA(-1)		0.005 [0.006]		-0.071** [0.033]		-0.011 [0.068]		-0.122 [0.178]
Current ratio (-1)	0.000* [0.000]	0.000 [0.000]	0.002*** [0.001]	0.002** [0.001]	0.015*** [0.003]	0.009** [0.004]	0.006 [0.007]	0.011 [0.008]
GFC x Curr. ratio(-1)		-0.000 [0.000]		0.002* [0.001]		0.006 [0.005]		-0.003 [0.010]
lnAge	-0.156*** [0.004]	-0.163*** [0.008]	-0.192*** [0.009]	-0.213*** [0.019]	-0.104*** [0.018]	-0.151*** [0.037]	-0.018 [0.032]	-0.035 [0.064]
GFC x lnAge		0.014*** [0.004]		0.020** [0.009]		0.047*** [0.016]		0.007 [0.027]
Exporter	-0.010*** [0.004]	-0.006 [0.005]	-0.004 [0.008]	-0.004 [0.010]	-0.026 [0.017]	-0.024 [0.021]	0.012 [0.033]	0.075* [0.041]
GFC x Exporter		-0.002 [0.006]		0.007 [0.011]		0.013 [0.024]		-0.091* [0.052]
lnVA/Emp(-1)	0.009*** [0.002]	0.011*** [0.003]	0.003 [0.007]	0.001 [0.009]	-0.006 [0.013]	0.001 [0.016]	-0.011 [0.023]	0.019 [0.026]
GFC x lnVA/Emp(-1)		-0.005 [0.004]		-0.000 [0.009]		-0.023 [0.015]		-0.020 [0.025]
Rel. wage (-1)	-0.004 [0.003]	-0.010*** [0.003]	0.004 [0.008]	-0.010 [0.009]	0.008 [0.013]	-0.012 [0.015]	-0.014 [0.020]	-0.007 [0.024]
GFC x rel. wage(-1)		0.018***		0.020*		-0.002		0.048*

		[0.005]		[0.010]		[0.018]		[0.028]
Constant	0.165*** [0.053]	0.207*** [0.071]	0.260** [0.109]	0.333** [0.142]	0.163 [0.195]	0.134 [0.240]	0.055 [0.299]	-0.402 [0.483]
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes
Year dummies	no	yes	no	yes	no	yes	no	yes
Industry-year dummies	no	yes	no	yes	no	yes	no	yes
Firm fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Observations	313,164	313,164	60,997	60,997	15,531	15,531	3,605	3,605
Number of ms7	55,226	55,226	11,301	11,301	2,519	2,519	473	473
R ²	0.127	0.129	0.194	0.202	0.165	0.214	0.180	0.297

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

In the next step we concentrate on firms that account for the bulk of aggregate investment in precrisis period to isolate their impact on aggregate investment. In order to do this, we first classify firms in different categories according to their position in distribution of gross investment levels, i.e. percentiles range 0-95, 95-99 and the top 1% of investors based on their average annual gross investment over 2000-2008 and then estimate the regression models separately for each cohort (results are reported in Table 14). In column 4 of Table 14 we add firms that start operating in the market after 2008. Most of differences between top investing firms and the rest of pre-crisis cohorts are in the strength of the impact of firm investment factors. In line with our earlier results, gross investment rates are more sensitive to demand shocks for the firms from the upper tail of investment distribution. This ordering is virtually overturned during the crisis period as the GFC interaction terms is largest negative (and significant) for the 99th percentile. Moreover, no difference with respect to the responsiveness to the demand shocks between periods of economic boom and crisis is evident for the post-GFC entrants. Further, the regression coefficients on error correction term suggest that convergence to the optimum capital level is stronger for the post-GFC established firms. Finally, the negative impact of the debt-to-assets ratio is especially high for the top 1% investors after the financial crisis (column 3).

Table 14. Fixed effects estimation of gross investment rate in fixed assets in the 2006-2019 period across gross FA investment distribution segments based on precrisis (2000-2008) period

	(1) Up to 95 th percentile	(2) 95 th to 99 th percentile	(3) Above 99 th percentile	(4) Post-GFC entrants
GFC	-0.028*** [0.004]	-0.012 [0.012]	0.000 [0.020]	-0.015 [0.015]
Sales growth	0.264*** [0.004]	0.321*** [0.011]	0.375*** [0.021]	0.296*** [0.007]
GFC x Sales growth	-0.043*** [0.005]	-0.129*** [0.015]	-0.206*** [0.032]	-0.002 [0.010]
Sales growth ²	0.028*** [0.001]	0.034*** [0.003]	0.042*** [0.007]	0.032*** [0.002]
GFC x Sales growth ²	-0.006*** [0.002]	-0.016*** [0.004]	-0.041*** [0.010]	-0.004 [0.003]
lnSal/lnFA(-1)	0.233*** [0.002]	0.248*** [0.005]	0.180*** [0.008]	0.334*** [0.004]
GFC x lnSal/lnFA(-1)	-0.015*** [0.001]	-0.017*** [0.005]	0.010 [0.007]	-0.023*** [0.004]

Debt/assets(-1)	-0.002*** [0.001]	-0.043*** [0.010]	0.018 [0.036]	-0.016*** [0.004]
GFC x Debt/assets(-1)	-0.000 [0.001]	-0.096*** [0.017]	-0.149*** [0.034]	0.001 [0.007]
ROA (-1)	0.028*** [0.003]	-0.026 [0.023]	0.117** [0.058]	0.012* [0.007]
lnAge	-0.141*** [0.004]	-0.250*** [0.011]	-0.202*** [0.020]	-0.180*** [0.012]
lnVA/EmPLY(-1)	0.009*** [0.002]	0.007 [0.006]	0.002 [0.011]	0.015*** [0.006]
Rel. wage (-1)	-0.009*** [0.003]	0.013 [0.008]	0.060*** [0.008]	0.003 [0.006]
Exporter	-0.011*** [0.004]	-0.043*** [0.012]	0.016 [0.020]	-0.005 [0.009]
Industry dummies	yes	yes	yes	yes
Year dummies	no	no	no	no
Firm fixed effects	yes	yes	yes	yes
Observations	277,454	21,07	5,434	73,738
Number of ms7	34,522	2,114	504	21,366
R-squared	0.131	0.212	0.236	0.149

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1 (constant not reported)

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

5.3.4 Exploring the role of structural factors

5.3.4.1. Exploring the role of financial factors further

We now turn our attention to the impact of different aspects of firm financing on the investment rate broken down by asset type. We present these results in Table 15 where for the sake of brevity we only report estimates on newly added regressors (full results are reported in Appendix in Table B5 and B6). Unsurprisingly, given the reliance of the Slovene economy on bank financing, we find a strong negative correlation between the ratio of bank liabilities to assets and the firm investment rate. Furthermore, during the global financial crisis net investment rates became even more strongly (negatively) correlated with the ratio of liabilities towards banks-to-assets. On the other hand, financial liabilities towards firms in the same ownership group are not significantly correlated with the investment rate unless, we focus solely on long-term liabilities, whereby the effect is quantitatively very small. Crucially, Slovene firms' investment rate is highly sensitive to excessive debt overhang, as firms with debt overhang above 4 have significantly lower investment rates. Cash flow to cost ratio only yields a statistically significant correlation with the investment rate in case of gross investment. On the other hand, the effective tax rate is not correlated with either new or gross investment rate.

Apart from investment property financial liabilities toward banks are negatively correlated with the investment rate. The effect appears to have gotten stronger during the GFC. The correlation of bank liabilities to the investment rate appears weaker for intangible assets. Additionally, the debt-overhang indicator is negatively correlated with the investment rate for all types of assets, but the coefficient is insignificant for investment property. The debt overhang indicator appears to have the strongest

association with the investment rate in case of investment in tangible fixed assets and long-term financial assets.

Table 15. Augmented specification of the investment function in fixed assets with financial factors for Slovenian firms in 2006-2019 period

	net invest. rate	net invest. rate	gross invest. rate	net invest. rate	net invest. rate	net invest. rate	net invest. rate
	Fixed assets	Fixed assets	Fixed assets	Tangible fixed assets	Intangible assets	Investment property	LT financial investment
GFC	-0.060*** [0.002]	-0.052 [0.056]	-0.092 [0.063]	-0.053 [0.058]	0.042 [0.102]	-0.193 [0.133]	-0.050 [0.148]
Fin. liab_banks/assets (-1)	-0.063*** [0.007]	-0.050*** [0.009]	-0.062*** [0.010]	-0.050*** [0.009]	-0.041* [0.021]	0.013 [0.033]	-0.061** [0.029]
GFC x Fin. liab_banks/assets (-1)		-0.025** [0.011]	-0.012 [0.013]	-0.026** [0.011]	0.026 [0.022]	-0.022 [0.031]	0.006 [0.032]
Fin. liab_group/assets (-1)	0.001 [0.004]	-0.009 [0.011]	-0.025** [0.012]	-0.004 [0.011]	-0.008 [0.030]	-0.044 [0.062]	-0.067 [0.049]
GFC x Fin. liab_group/assets (-1)		0.014 [0.012]	0.040*** [0.013]	0.010 [0.012]	0.001 [0.032]	0.012 [0.063]	-0.031 [0.058]
LT fin. liab_banks/assets (-1)		-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	0.006*** [0.002]	0.022 [0.014]	0.000 [0.001]
GFC x LT fin. liab_banks/assets (-1)		0.000 [0.000]	-0.000 [0.000]	0.000 [0.000]	-0.006*** [0.002]	-0.012 [0.014]	0.003 [0.005]
LT fin. liab_group/assets (-1)		-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	0.003 [0.002]	-0.020 [0.057]	-0.002 [0.007]
GFC x LT fin. liab_group/assets (-1)		0.000 [0.000]	-0.000 [0.000]	0.000 [0.000]	-0.005* [0.003]	0.044 [0.049]	0.002 [0.007]
Debt overhang (-1)	-0.026*** [0.003]	-0.035*** [0.004]	-0.044*** [0.005]	-0.035*** [0.004]	-0.006 [0.008]	-0.014 [0.009]	-0.037*** [0.011]
GFC x Debt overhang (-1)		0.018*** [0.005]	0.021*** [0.006]	0.017*** [0.006]	-0.005 [0.009]	0.011 [0.011]	0.027** [0.013]
Effect. tax rate (-1)	0.001 [0.001]	0.001 [0.001]	0.003* [0.001]	0.001 [0.001]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.001]
GFC x Effect. tax rate (-1)		-0.001 [0.001]	-0.002 [0.002]	-0.001 [0.002]	-0.000 [0.001]	-0.002** [0.001]	0.002 [0.002]
CF/costs (-1)	0.004 [0.002]	0.002 [0.003]	0.008** [0.004]	0.002 [0.003]	-0.006 [0.007]	0.007** [0.003]	-0.000 [0.004]
GFC x CF/costs (-1)		0.004 [0.004]	-0.001 [0.005]	0.006 [0.005]	0.004 [0.009]	-0.006 [0.006]	-0.003 [0.005]
Constant	0.044 [0.046]	0.034 [0.056]	0.361*** [0.063]	-0.020 [0.058]	-0.033 [0.104]	0.612*** [0.145]	0.665*** [0.156]
industry dummies	yes	yes	yes	yes	yes	yes	yes
year dummies	no	yes	yes	yes	yes	yes	yes

industry-year dummies	no	yes	yes	yes	yes	yes	yes
firm fixed effects	yes	yes	yes	yes	yes	yes	yes
Observations	367,573	367,573	367,434	364,122	135,56	26,942	91,226
Number of ms7	59,951	59,951	59,905	59,513	25,996	5,177	18,431
R-squared	0.069	0.071	0.135	0.070	0.033	0.049	0.059

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

5.3.4.2. Exploring the role of ownership

Firm investment dynamics are potentially also impacted by the type of principal owner. In Table 16 we summarise the regression results for the ownership-related explanatory variables, while the full specification results are reported in Appendix B in Tables B.7 and B.8. Here we focus on three important variables – ownership type (foreign and state) and Hirschman-Herfindahl index of founding ownership concentration (a measure of primary ownership concentration). It is important to distinguish between foreign and state ownership as firms could behave differently as far as investments and day-to-day operations go. As already discussed in previous chapters, state ownership may lead to unnecessary overinvestment in certain periods due to political pressures. Contrary to that, foreign ownership may lead to either above or below average investment, depending on the financial status of a parent company and the firm’s regional presence. By measuring ownership concentration with HHI, we analyse whether a more concentrated founders’ structure affects investment dynamics in line with agency theory.

Based on fixed effects results from Table 16 (columns 1-4) we find no evidence that either state or foreign ownership would significantly affect a firm’s investment rate. However during the crisis period both state and foreign owners tend to underinvest, especially in gross terms. Lesser investment rates from foreign-owned companies were likely driven by uncertainty and in some cases even divestment while state-owned firms’ investments might reflect policy changes and public spending decrease. When using the random effects model in columns 5-8, which needs to be interpreted with caution due to significant Hausman tests, we get a statistically significant negative effect of foreign ownership irrespective of crisis period suggesting firms with foreign ownership had a lower investment rate. Ownership concentration, however, does affect a firm’s investment rate in a nonlinear way. While first-order concentration has a positive effect on investment rate, the coefficient on the second order term is negative. These results suggest, that while ownership concentration can positively contribute to investment rates due to easier decision making on an executive level, concentration over certain threshold may lead to lesser average investment rates, as the owner may have a different focus.

Table 16. Augmented specification of the investment function in fixed assets with ownership factors for Slovenian firms in 2006-2019 period, fixed and random effects estimation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	net invest. rate	net invest. rate	gross invest. rate	gross invest. rate	net invest. rate	net invest. rate	gross invest. rate	gross invest. rate
	FE	FE	FE	FE	RE	RE	RE	RE
GFC	-0.060*** [0.002]	-0.039 [0.049]	-0.063*** [0.002]	-0.065 [0.055]	-0.086*** [0.003]	-0.128*** [0.046]	-0.092*** [0.003]	-0.088* [0.052]
Foreign ownership	-0.014 [0.011]	-0.011 [0.012]	-0.015 [0.012]	-0.004 [0.013]	-0.068*** [0.007]	-0.056*** [0.011]	-0.082*** [0.008]	-0.070*** [0.012]
GFC x Foreign ownership		-0.010 [0.008]		-0.022** [0.008]		-0.018 [0.012]		-0.018 [0.013]

State ownership	-0.025 [0.023]	-0.007 [0.026]	-0.031 [0.026]	-0.009 [0.029]	-0.031 [0.022]	-0.001 [0.032]	0.011 [0.025]	0.049 [0.036]
GFC x State ownership		-0.035* [0.021]		-0.044* [0.024]		-0.046 [0.035]		-0.062 [0.040]
HHI of founders					0.113** [0.050]	0.142** [0.071]	0.193*** [0.056]	0.252*** [0.081]
GFC x HHI of founders						-0.038 [0.074]		-0.080 [0.084]
HHI of founders ²					-0.099*** [0.036]	-0.113** [0.051]	-0.152*** [0.040]	-0.185*** [0.058]
GFC x HHI of founders ²						0.017 [0.053]		0.044 [0.060]
Constant	0.048 [0.046]	0.006 [0.053]	0.399*** [0.052]	0.302*** [0.060]	-0.322*** [0.036]	-0.404*** [0.050]	-0.024 [0.040]	-0.139** [0.057]
industry dummies	yes	yes	yes	yes	yes	yes	yes	yes
year dummies	no	yes	no	yes	no	yes	no	yes
industry-year dummies	no	yes	no	yes	no	yes	no	yes
firm fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Observations	364,203	364,203	364,107	364,107	151,051	151,051	151,163	151,163
Number of ms7	59,464	59,464	59,419	59,419	38,06	38,06	38,046	38,046
R-squared	0.069	0.071	0.132	0.134	0.0544	0.0577	0.132	0.134

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

5.3.4.3. Exploring the role of firm internationalisation process and skill intensity

In Tables 17 and 18 we summarise the regression results for additional explanatory variables on firm internationalisation status and employee characteristics, while the results on standard regressors from baseline specification are, again, not reported. They, however, are all in line with previously reported results.

Table 17. **Augmented specification of the gross investment rate function in fixed assets with internationalisation factors for Slovenian firms in 2006-2019 period, fixed effects estimation**

	(1)	(2)	(3)	(4)	(5)	(6)
	Gross investment rate	Gross investment rate	Gross investment rate	Gross investment rate	Gross investment rate	Gross investment rate
	FA	FA	FA	FA	FA	FA
GFC	-0.131*** [0.009]	0.028*** [0.009]	-0.134*** [0.009]	0.021*** [0.007]	-0.162*** [0.009]	-0.144*** [0.009]
High-tech export share	0.00004 [0.0001]	-0.00007 [0.0001]				
GFC x High-tech export share		0.0002 [0.0002]				
Intermediates export share	-0.0001** [0.0000]	-0.0001 [0.0001]				
GFC x Intermediates export share		-0.0002*** [0.0001]				
High-tech import share			3.3e-6	-0.00002		

	[0.0001]	[0.0001]		
GFC x High-tech import share		0.0001		
		[0.0001]		
Intermediates import share	0.0002***	-0.00001		
	[0.0001]	[0.0001]		
GFC x Intermediates import share		-0.0002***		
		[0.0001]		
Inward FDI			-0.034***	-0.027*
			[0.013]	[0.014]
GFC (0) x Inward FDI				-0.027
				[0.017]
Outward FDI			-0.024**	-0.019*
			[0.010]	[0.011]
GFC (0) x Outward FDI				-0.005
				[0.012]

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1, Source: SORS, own calculations.

Results in Table 17 indicate that involvement in GVCs (measure by share of intermediates in trade) led to lower average gross investment rates during the GFC. Firms that had been deeply embedded in GVCs were exposed to the effects of the financial crisis both domestically and directly or indirectly from abroad when shocks from other countries were transmitted in terms through lower demand for products (and thus intermediates). There is a difference in investment response between firms exporting and those importing intermediates as a higher share of intermediates in exports contributes to a lower gross investment rate suggesting less intensive investment activity of vertically integrated firms that rely to large extent on the exports of intermediates, while a higher share of foreign outsourcing is associated with higher gross investment rates.

Interestingly, both outward and inward foreign direct investment negatively impact gross investment rates. Despite that, we find no evidence to suggest this effect is applicable to or strengthened during the post-GFC period.

Results for skill intensity of workers and share of EU migrant workers are presented in Table 18. Surprisingly, higher share of skilled workers is on average associated with lower gross investment rates in fixed assets. However, this may reflect that firms with more skilled workers invest more in intangible assets and R&D. This negative correlation is weakened during the crisis as indicated by positive and significant interaction term with GFC dummy variable. Thus firms with more high skilled workers tend to do relatively better in the crisis. Very similar conclusion can be made for EU migrant workers as well. Based on this we find no evidence that the lack of qualified workers would lead to lower investment.

Table 18. Augmented specification of the gross investment rate function in fixed assets with skill intensity for Slovenian firms in 2006-2019 period, fixed effects estimation

	(1)	(2)	(3)	(4)
	Gross investment rate	Gross investment rate	Gross investment rate	Gross investment rate
	FA	FA	FA	FA
GFC	-0.034***	0.018***	-0.033***	-0.015***
	[0.002]	[0.006]	[0.002]	[0.003]

Share of high skilled workers	-0.050*** [0.007]	-0.066*** [0.012]		
GFC x Share of high skilled workers		0.035*** [0.009]		
Share of EU foreign workers			-0.086*** [0.023]	-0.107*** [0.027]
GFC x Share of EU foreign workers			0.044* [0.027]	

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

Source: SORS, own calculations.

5.3.5 SUMMARY

One of the more important aspects of this study is identifying why the investment rates of the Slovenian firms have not returned to their pre-crisis levels. Demand factors (measured by growth in sales) played a vital role on the investment decisions of firms as shown by the positive and most importantly significant coefficients. As investment decisions by firms in Slovenia are primarily demand driven, the accelerator model works well. After the global financial crisis, deleveraging contributed to decreased investment of highly leveraged of firms. This could be due either to overheating in the boom year prior to financial crisis or to policy inefficiencies in Slovenia.

Analysing investment at the granular firm level is important to take into account firm heterogeneity. Moreover, most of the variation in aggregate investment can be accounted for by the variation in firm level factors, rather than sector specific factors. The analysis at the firm level confirms our key results from the macro and sector analysis, in particular we find the following:

- (i) Investment decisions by firms in Slovenia are primarily demand driven. Demand factors (measured by growth in sales) played a vital role on the investment decisions of firms.
- (ii) We find that firm heterogeneity matters with different elasticities for small and large firms. In particular, large firms are more sensitive to demand shocks during business cycles compared to the relatively small companies. Moreover, the elasticity of the investment rate with respect to demand is growing with firm size.
- (iii) After the global financial crisis, deleveraging contributed to decreased investment of highly leveraged of firms. Large firms' investment rates appear to fall more with increased debt to assets, while liquidity is not a significant investment factor. The Investment rate is also not responsive to changes in ROA for large firms, suggesting lower dependence of large firms on internal finance sources compared to SMEs. For micro firms, on the other hand labour productivity and profitability seem to be important drivers of investment activity
- (iv) Gross investment rates are more sensitive to demand shocks for the firms from the upper tail of investment distribution. This ordering is virtually overturned during the crisis period as the GFC interaction terms is largest negative (and significant) for the 99th percentile. The negative impact of the debt-to-assets ratio is especially high for the top 1 % investors after the financial crisis.
- (v) There is no strong evidence that the nature of internationalisation of the firm (exporter, importer) nor the ownership of the firm (FDI, State, Domestic Private) mattered for explaining the investment pattern after the GFC.

6. POLICY RECOMMENDATIONS

This analysis revealed five major findings regarding the declining trend in the corporate investment rate:

1. Lower sensitivity of corporate investment to the business cycle after the GFC limiting the potential for investment,
2. Intensified deleveraging process of highly leveraged firms compared to other European countries putting constraints on financing of investment,
3. Investment is heavily concentrated as top 5 percent of investors is responsible for more than 85 percent of total investment indicating the role of a few large investors,
4. Investment rates are negatively correlated with exports of intermediate goods and positively correlated with exports of final goods,
5. Investment in intangible assets has proven itself considerably more resilient in face of the global financial crisis than investment tangible assets.

Policy recommendation #1: Timely bank restoration in case of financial crisis accompanied by timely corporate debt restructuring

Lower sensitivity of corporate investment to the business cycle after the GFC is predominantly a consequence of financially distressed large investors and their limited access to banking finance. As was shown in the EC report on macroeconomic imbalances for Slovenia (2014) the depth and length of the investment decline was aided by delays in the stabilisation of the banking sector. While the action taken to help capitalise the banks was decisive, almost 11 per cent of GDP was invested, it was certainly not timely as it happened a full five years after the onset of the financial crisis in Slovenia (December 2013). Policy action has included asset quality reviews, stress tests, recapitalisation of the state owned banks and the transfer of Non-Performing Loans (NPLs) to the Bank Asset Management Company (BAMC). Precious time was lost both in setting up the mechanisms for firm deleveraging as well as in transferring non-performing loans to the Bank Asset Management Company. The virtually inoperative banking sector and its slow recovery severely limited firm ability to finance investment coupled with falling values of collateralisable assets and stricter post-crisis lending requirements meant that even nominally healthy companies could finance investments.

In studying the effects of financial soundness on firm performance in the aftermath of the GFC, Damijan (2018) finds that, while less important during good times (pre-recession period) when access to corporate finance was ample, lack of firms' financial soundness during the period of financial distress becomes a critical factor constraining firm performance. The extent of financial leverage and ability to service outstanding debt were shown to inhibit firms' productivity growth as well as export dynamics, employment and investment. At the same time, short-term liquidity was shown to be a key determinant of firm survival. This implies that restructuring corporate debt and restoring financial soundness may significantly improve firms' performance.

These findings imply, first, that timely and decisive action in shoring up the financial sector is required to prevent failures of financial intermediaries, in particular as the Slovenian corporate sector is heavily reliant on banking finance. And second, comprehensive bank restoration needs to be accompanied by timely corporate debt restructuring in order to support an economic recovery and to start a new investment cycle. The experiences with major financial crises in East Asia and Latin America have demonstrated that comprehensive corporate debt restructuring strategies need to tackle the issue of

expediting the exit of non-viable firms (through more stringent bankruptcy laws and improved insolvency procedures), followed by a timely restructuring of viable firms. In Slovenia, the insolvency procedures are still too complex and inefficient as they are still determined on protecting rights of firm owners over the rights of major creditors. A legal reform introduced in late 2013 and later amendments did not significantly improve the efficiency of insolvency procedures and facilitate the exit of nonviable firms. An overhaul of insolvency legislation to focus on improving insolvency procedures and strengthening collective rights of majority creditors is needed.

Policy recommendation #2: Capital market deepening and promoting venture capital

As capital and venture capital markets in Slovenia are very underdeveloped, companies focus on loan financing. This contributes to lower resilience of firms in case of increased financial distress. Hence, it is essential to deepen the (traditionally shallow) capital market in Slovenia and promote creation of a market for alternative investment funds. This will increase opportunities for companies to get alternative funding and hence increase their resilience to economic shocks.

The key role in achieving this goal is given in the National Resilience and Recovery Plan (RRP). In the official assessment,¹⁷ the European Commission acknowledges that the Slovenian RRP *»further includes measures to improve access to capital for new and innovative companies, to support investment in research and innovation and to improve coordination between research institutes and companies and among researchers. With the creation of a market for alternative investment funds, Slovenia aims to channel more resources into research and innovation by start-ups and small and mid-sized companies.«*

Policy recommendation #3: Promoting diversification of investment

Though pronounced investment concentration can bring about positive externalities for other firms through supply and demand links, as this study shows, overexposure to large investors also creates fragility and undermines resilience of whole economy. It is hence of utmost importance to promote diversification of investment. The way to do this is to use the tools provided in the National RRP to promote investment on the green and digital transition, i.e. investment renewable energy sources, energy efficiency in public buildings, flood protection, rail transport, broadband, but also in digital skills and on research, development and innovation (see below Recommendation #5). By doing this, the investment spectrum will broaden, while investment will become more dispersed and hence, along with increased productivity, increase the resilience of the Slovenian economy to economic shocks.

Policy recommendation #4: Promote innovation and companies' upgrading of production structure towards high-end products

This study finds that corporate investment rates are negatively correlated with exports of intermediate goods and positively correlated with exports of final goods. This relationship is structural and has not been altered by the financial crisis and its aftermath. This indicates that the type of export specialisation, i.e. relying on production and exports of intermediate goods instead of final goods, can be problematic as it contributes to the long-run declining corporate investment rate trend in Slovenia.

It is hence essential to promote innovation and companies' upgrading of production structure towards high-end products. The government should adopt a modernised Research and Development Act to

¹⁷ European Commission (2021), Proposal for a Council Implementing Decision on the approval of the assessment of the recovery and resilience plan of Slovenia, https://ec.europa.eu/info/sites/default/files/com-2021-384_en.pdf. Council Implementing Decision adopted by the Council on July 20, 2021 (10612/21)

promote innovation, to support investment in research and innovation and to improve coordination between research institutes and companies and among researchers. The tools provided in the National RRP could be essential in achieving this goal in particular along the green-digital dimension of restructuring.

Policy recommendation #5: Promotion of Research and Development and investment into green and digital transition.

Our findings suggest that investment in intangible assets has shown remarkable resilience in face of the global financial crisis. While partially a reflection of global trends toward greater shares of intangible assets in gross investments of firms, it also betrays the lesser dependence of intangible investment on (physical) asset market valuation and collateral which crumbled during the economic downturn. Furthermore, investment in intangible assets represents the only reliable way of ensuring long-term productivity growth and competitiveness of Slovene firms. A growing number of studies (for instance Corrado et al., 2016; Dal Borgo et al., 2012), have shown that the greater share of labour-productivity growth in the US and EU countries is attributed to intangible capital rather than tangibles and that this share has been steadily increasing over time. Moreover, while investment in intangible assets has clear long-term benefits to the investing firms, it has also been shown to generate considerable positive horizontal and vertical spillovers. In addition, the promotion of R&D and investment into green and digital transformations is also the stated goal of the Slovene Recovery and Resilience Plan (RRP) within the Recovery and Resilience Facility of the EU. It states that Slovenia will achieve greater economic resilience "*... through the digital transformation of certain sectors of the economy and society, reduced administrative burdens and greater openness and flexibility of the Slovenian economy, and by strengthening the innovation potential of all relevant stakeholders. We will also invest in environmental, transport, energy, education, healthcare, social and other infrastructures which can make a significant contribution to economic growth in the coming years and that pursue the objective of climate neutrality by 2050*" (RRP Slovenia, 2021).

In the official assessment of Slovenian Resilience and Recovery Plan,¹⁸ the European Commission acknowledges that *»the plan is expected to contribute to front-loading mature public investment projects and promoting private investment to support the economic recovery. It focuses investment on the green and digital transition, in particular renewables, energy efficiency in public buildings, flood protection, rail transport, broadband and digital skills and on research, development and innovation. The plan also contributes to promoting digital capacities of businesses, e-commerce and e-health.* «In implementing the national RRP, it is expected the Slovenia's macroeconomic performance to improve,¹⁹ in particular through increasing the productivity of the economy and long-term growth, and the creation of innovative ecosystems of economic and business infrastructure.

¹⁸ European Commission (2021), Proposal for a Council Implementing Decision on the approval of the assessment of the recovery and resilience plan of Slovenia, Council Implementing Decision adopted by the Council on July 20, 2021 (10612/21).

¹⁹ GDP of Slovenia is expected to increase by between 1,1 % and 1,7 % by 2026. After 20 years, GDP could be 0,5 % higher (European Commission, 2021).

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8. APPENDIX

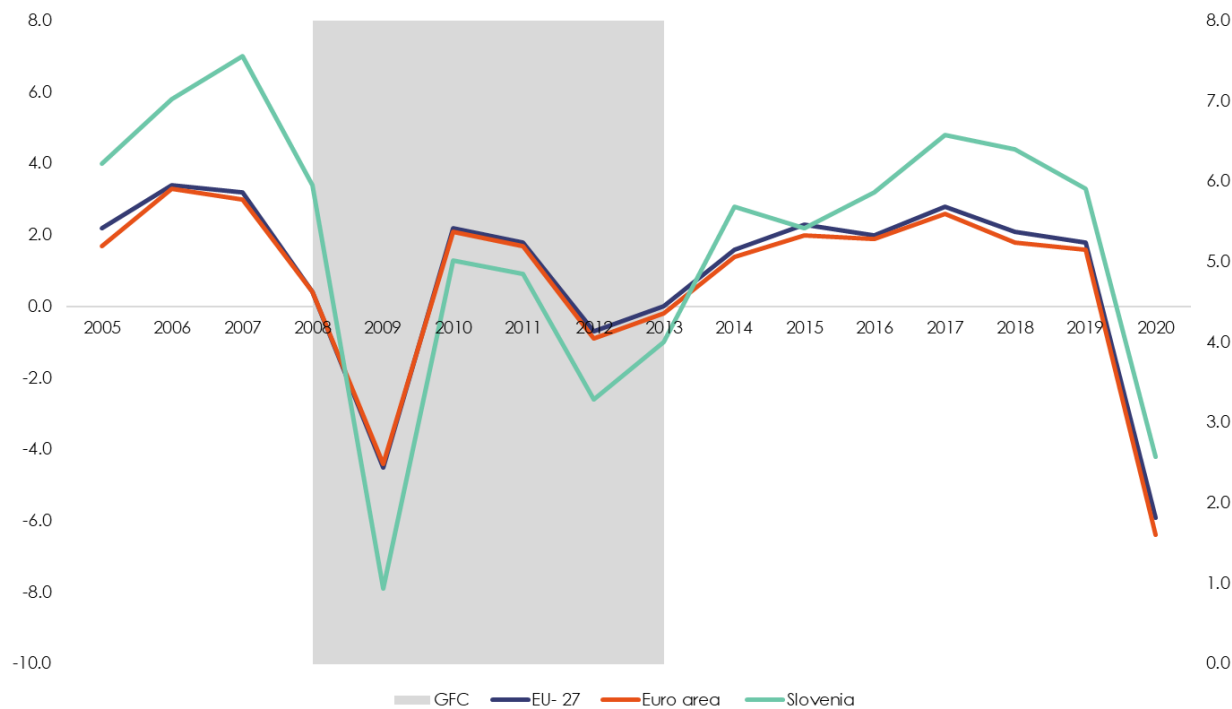
8.1 APPENDIX A

Table A.0. GDP growth rates by countries, 1995-2020 (%)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
EU-27 countries	1.9	3.5	3.1	0.6	-4.3	2.2	1.8	-0.7	0.0	1.6	2.3	2.0	2.8	2.1	1.6	-6.0
Euro area	1.6	3.1	2.9	0.4	-4.4	2.2	1.7	-0.9	-0.3	1.4	2.0	1.9	2.6	1.9	1.4	-6.4
Belgium	2.3	2.6	3.7	0.4	-2.0	2.9	1.7	0.7	0.5	1.6	2.0	1.3	1.6	1.8	1.8	-6.3
Bulgaria	7.2	6.8	6.6	6.1	-3.4	0.6	2.4	0.4	0.3	1.9	4.0	3.8	3.5	3.1	3.7	-4.2
Czechia	6.6	6.8	5.6	2.7	-4.7	2.4	1.8	-0.8	0.0	2.3	5.4	2.5	5.2	3.2	3.0	-5.8
Denmark	2.3	3.9	0.9	-0.5	-4.9	1.9	1.3	0.2	0.9	1.6	2.3	3.2	2.8	2.0	2.1	-2.1
Germany	0.7	3.8	3.0	1.0	-5.7	4.2	3.9	0.4	0.4	2.2	1.5	2.2	2.7	1.1	1.1	-4.6
Estonia	9.5	9.7	7.6	-5.1	-14.4	2.7	7.4	3.1	1.3	3.0	1.8	3.2	5.5	4.4	5.0	-2.9
Ireland	5.7	5.0	5.3	-4.5	-5.1	1.8	1.1	-0.1	1.3	8.7	25.2	2.0	8.9	9.0	4.9	5.9
Greece	0.6	5.7	3.3	-0.3	-4.3	-5.5	-10.1	-7.1	-2.7	0.7	-0.4	-0.5	1.3	1.6	1.9	-8.2
Spain	3.7	4.1	3.6	0.9	-3.8	0.2	-0.8	-3.0	-1.4	1.4	3.8	3.0	3.0	2.4	2.0	-10.8
France	1.7	2.4	2.4	0.3	-2.9	1.9	2.2	0.3	0.6	1.0	1.1	1.1	2.3	1.9	1.8	-7.9
Croatia	4.3	5.0	5.1	1.9	-7.3	-1.3	-0.2	-2.4	-0.4	-0.3	2.4	3.5	3.4	2.8	2.9	-8.0
Italy	0.8	1.8	1.5	-1.0	-5.3	1.7	0.7	-3.0	-1.8	0.0	0.8	1.3	1.7	0.9	0.3	-8.9
Cyprus	4.9	4.7	5.1	3.6	-2.0	2.0	0.4	-3.4	-6.6	-1.8	3.2	6.4	5.2	5.2	3.1	-5.1
Latvia	10.7	12.0	10.0	-3.3	-14.3	-4.4	6.5	4.3	2.3	1.1	4.0	2.4	3.3	4.0	2.0	-3.6
Lithuania	7.7	7.4	11.1	2.6	-14.8	1.7	6.0	3.8	3.6	3.5	2.0	2.5	4.3	3.9	4.3	-0.9
Luxembourg	3.2	5.2	8.4	-1.3	-4.4	4.9	2.5	-0.4	3.7	4.3	4.3	4.6	1.8	3.1	2.3	-1.3
Hungary	4.2	4.0	0.2	1.1	-6.7	1.1	1.9	-1.4	1.9	4.2	3.8	2.1	4.3	5.4	4.6	-5.0
Malta	3.4	2.5	4.8	3.8	-1.1	5.5	0.5	4.1	5.5	7.6	9.6	3.8	8.6	5.2	5.5	-7.8
Netherlands	2.1	3.5	3.8	2.2	-3.7	1.3	1.6	-1.0	-0.1	1.4	2.0	2.2	2.9	2.4	2.0	-3.8
Austria	2.2	3.5	3.7	1.5	-3.8	1.8	2.9	0.7	0.0	0.7	1.0	2.0	2.4	2.6	1.4	-6.3
Poland	3.5	6.1	7.1	4.2	2.8	3.7	4.8	1.3	1.1	3.4	4.2	3.1	4.8	5.4	4.7	-2.7
Portugal	0.8	1.6	2.5	0.3	-3.1	1.7	-1.7	-4.1	-0.9	0.8	1.8	2.0	3.5	2.8	2.5	-7.6
Romania	4.7	8.0	7.2	9.3	-5.5	-3.9	1.9	2.0	3.8	3.6	3.0	4.7	7.3	4.5	4.1	-3.9
Slovenia	3.8	5.7	7.0	3.5	-7.5	1.3	0.9	-2.6	-1.0	2.8	2.2	3.2	4.8	4.4	3.2	-5.5
Slovakia	6.6	8.5	10.8	5.6	-5.5	5.9	2.8	1.9	0.7	2.6	4.8	2.1	3.0	3.7	2.5	-4.8
Finland	2.8	4.0	5.3	0.8	-8.1	3.2	2.5	-1.4	-0.9	-0.4	0.5	2.8	3.2	1.1	1.3	-2.9
Sweden	2.9	4.7	3.4	-0.5	-4.3	6.0	3.2	-0.6	1.2	2.7	4.5	2.1	2.6	2.0	2.0	-2.8

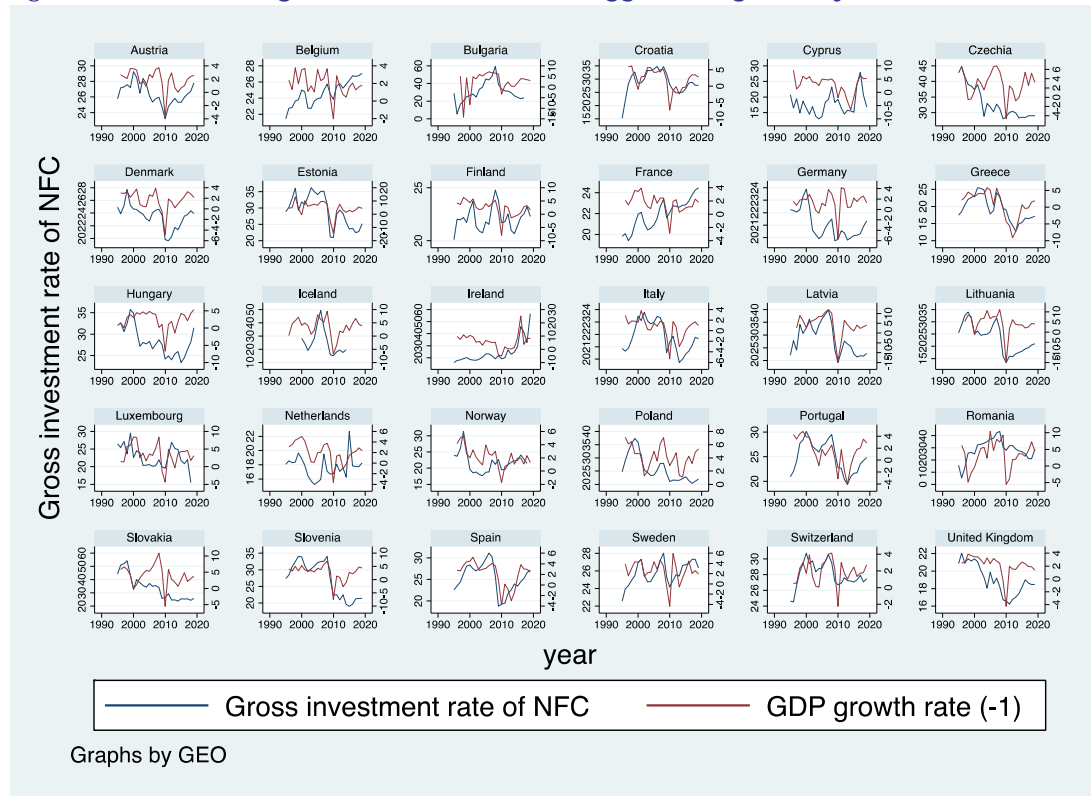
Source: Eurostat.

Figure A.0. GDP growth rates by countries, 1995-2020 (%)



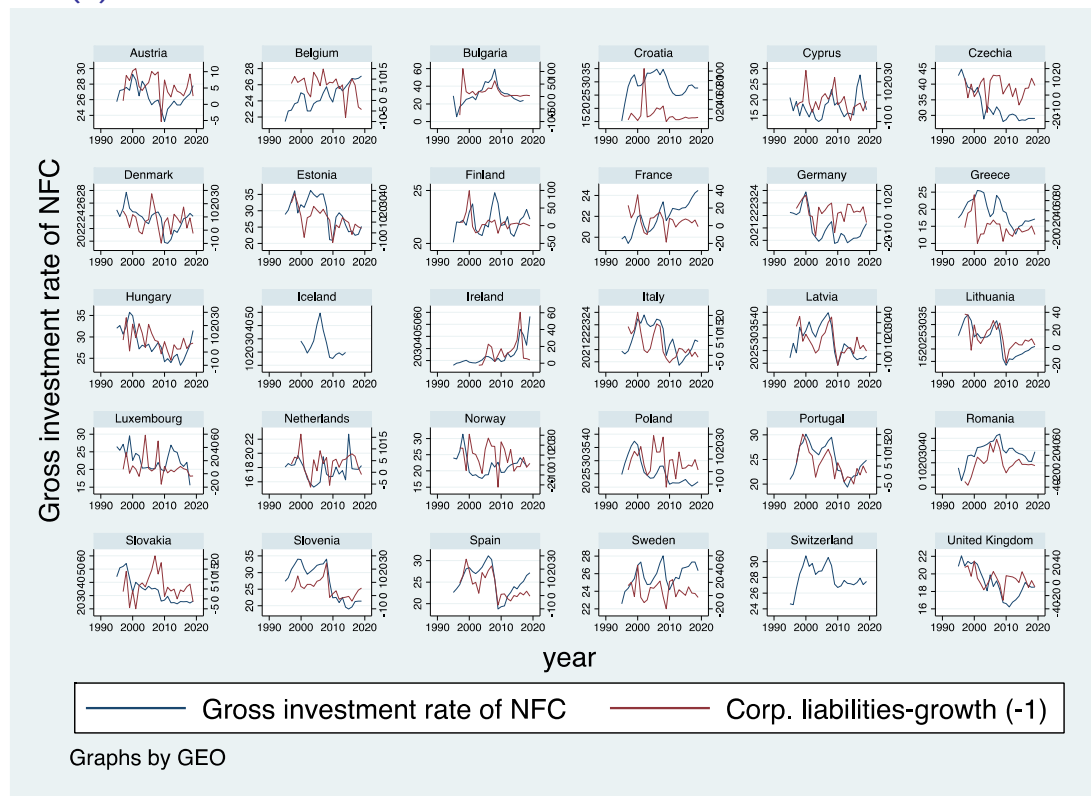
Source: Eurostat.

Figure A.1. Evolution of gross investment rate and lagged GDP growth by countries, 1995-2019 (%)



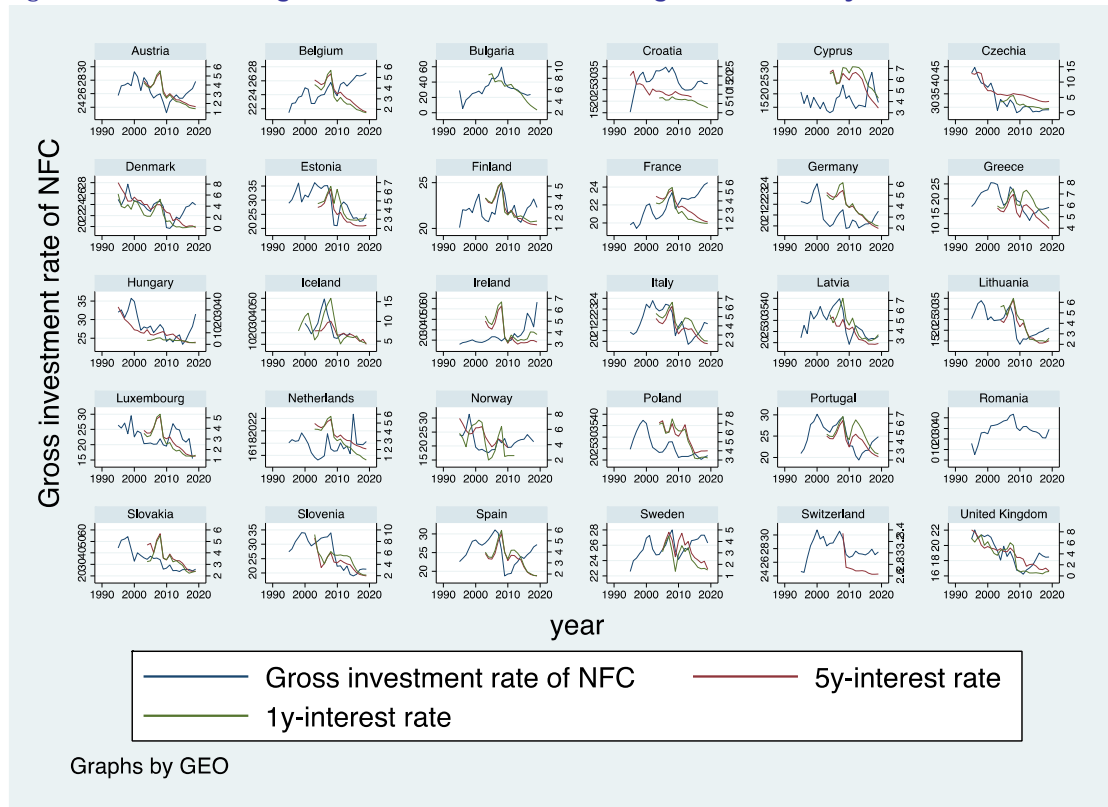
Source: Eurostat.

Figure A.2. Evolution of gross investment rate and lagged corporate liabilities growth by countries, 1995-2019 (%)



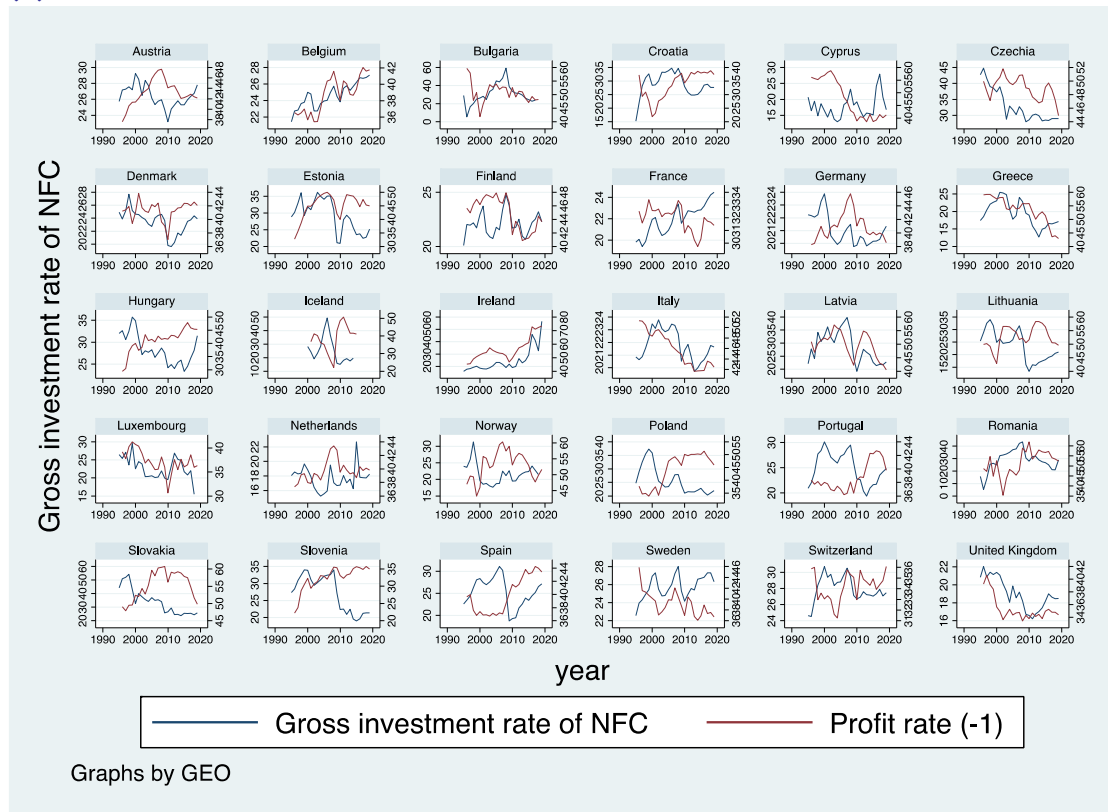
Source: Eurostat.

Figure A.3. Evolution of gross investment rate and lending interest rates by countries, 1995-2019 (%)



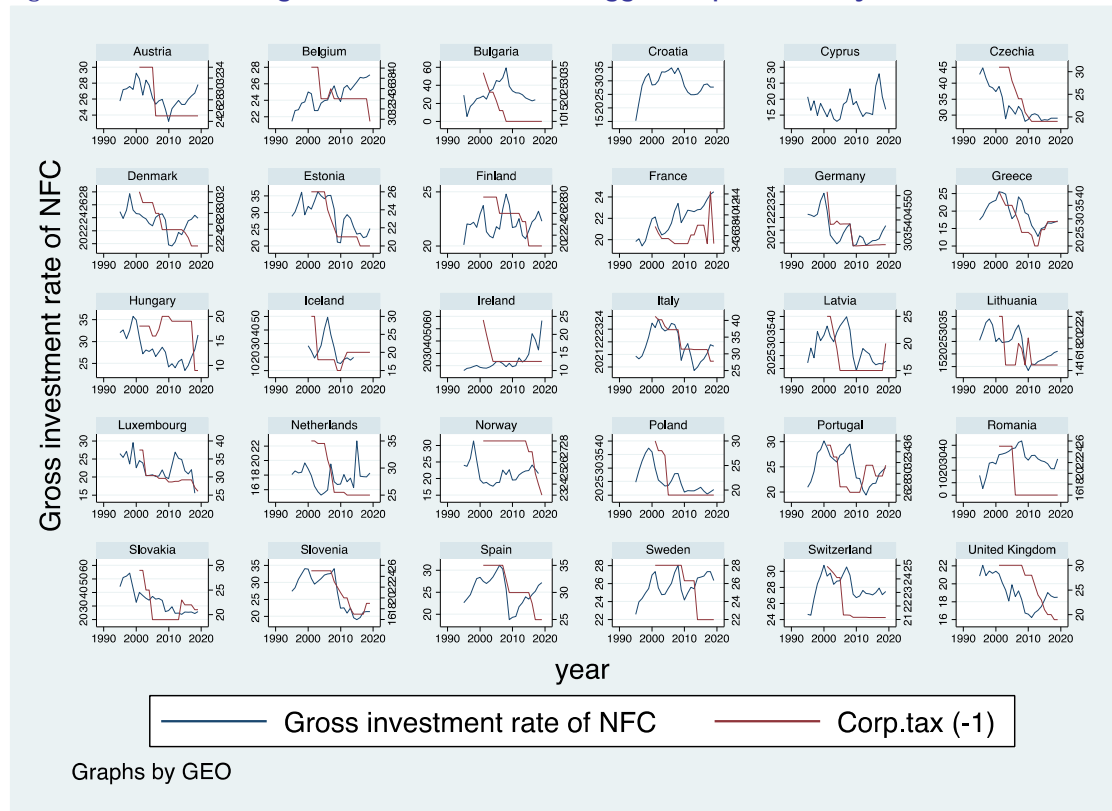
Source: Eurostat, ECB.

Figure A.4. Evolution of gross investment rate and lagged corporate profit share by countries, 1995-2019 (%)



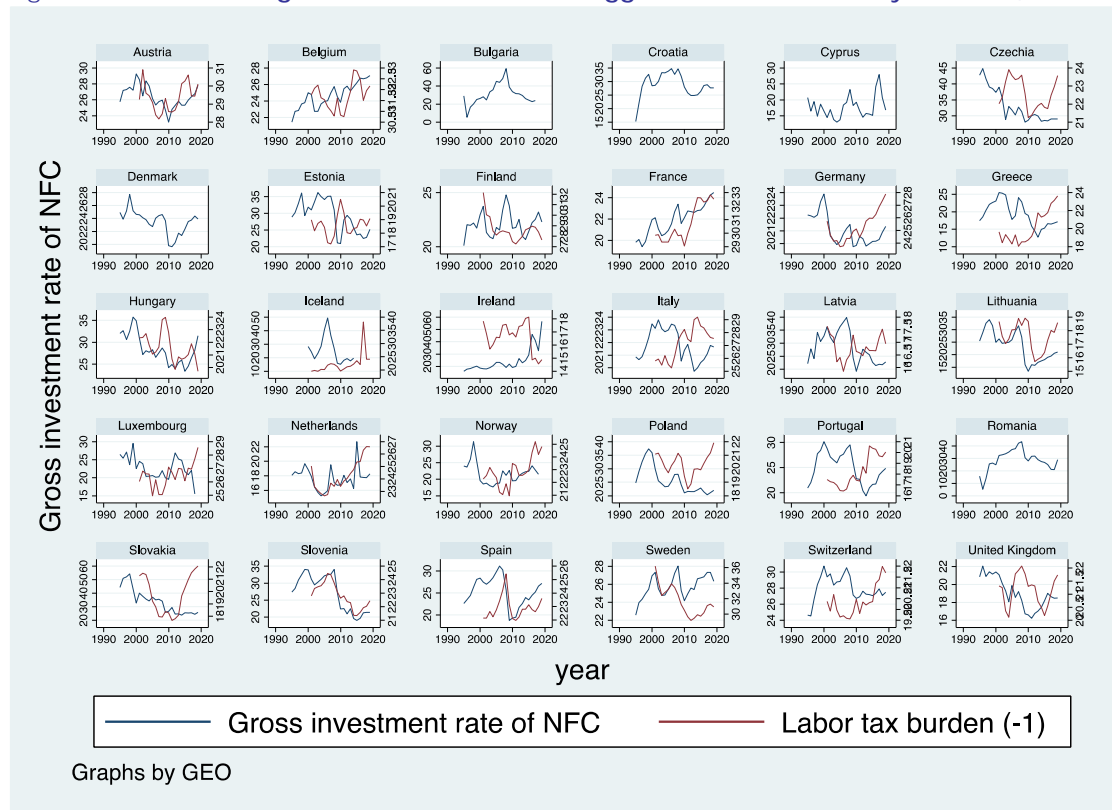
Source: Eurostat, ECB.

Figure A.5. Evolution of gross investment rate and lagged corporate tax by countries, 1995-2019 (%)



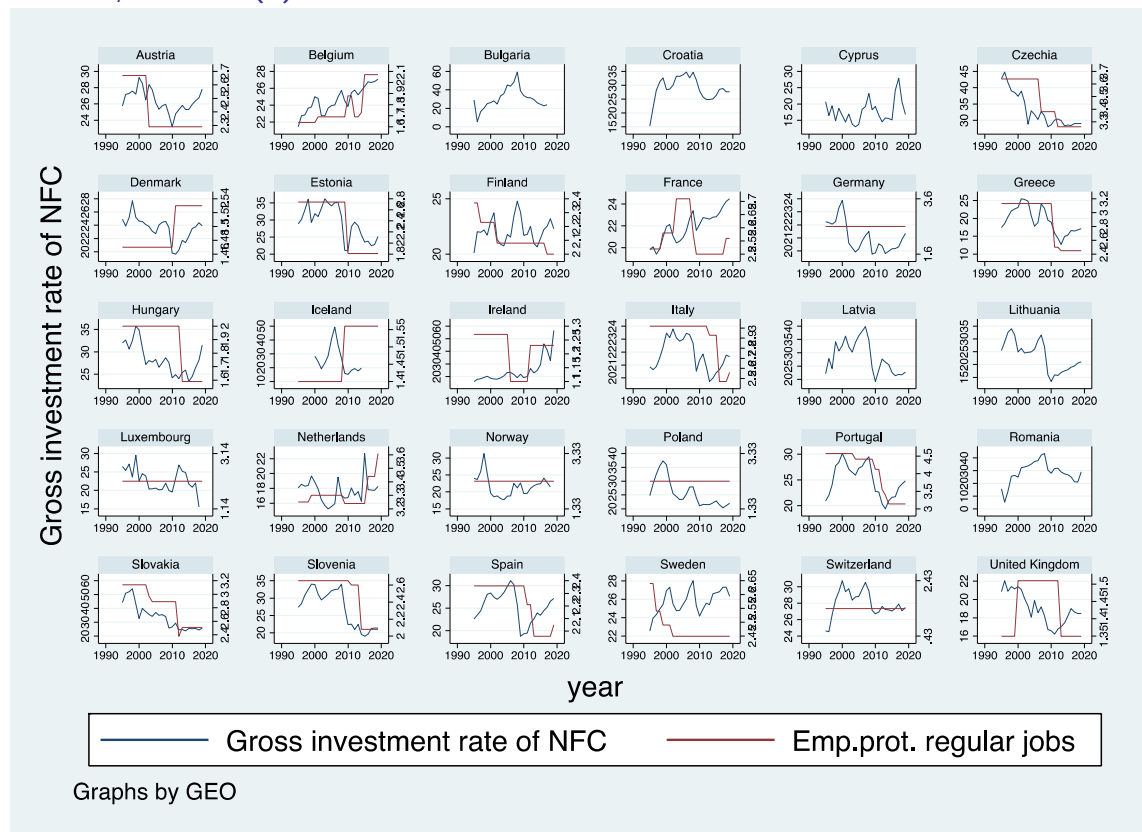
Source: Eurostat, OECD.

Figure A.6. Evolution of gross investment rate and lagged labor tax burden by countries, 1995-2019 (%)



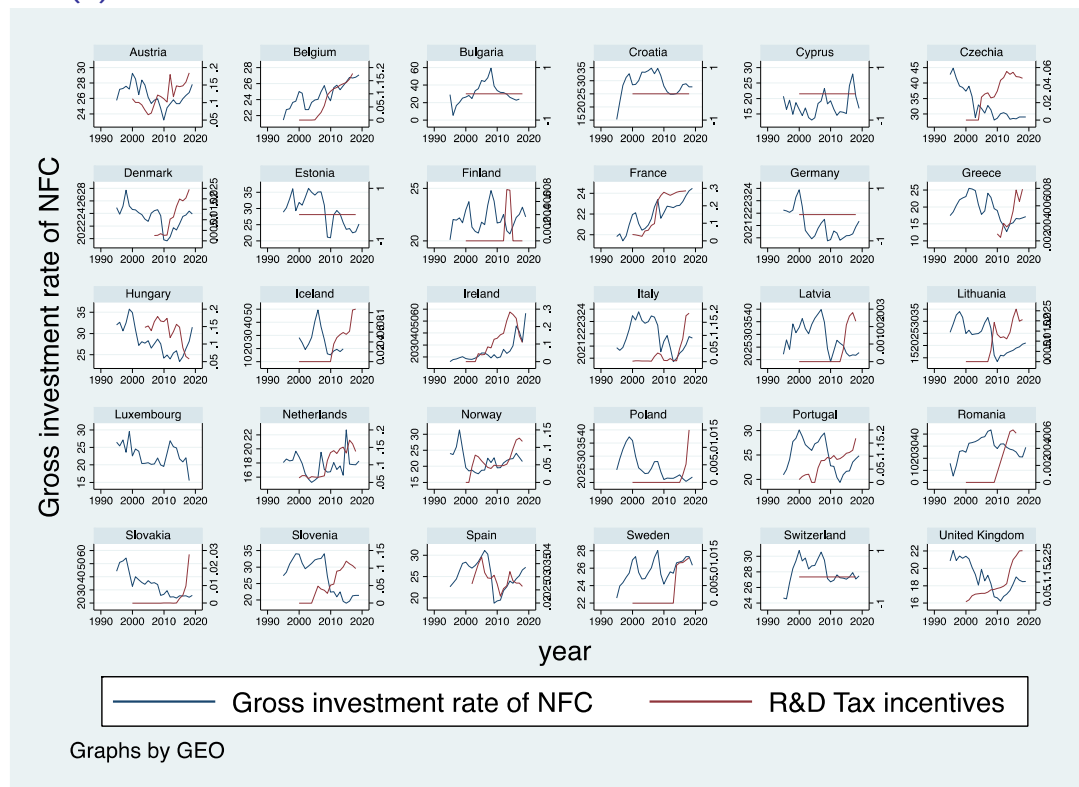
Source: Eurostat, OECD.

Figure A.7. Evolution of gross investment rate and employment protection index for regular jobs by countries, 1995-2019 (%)



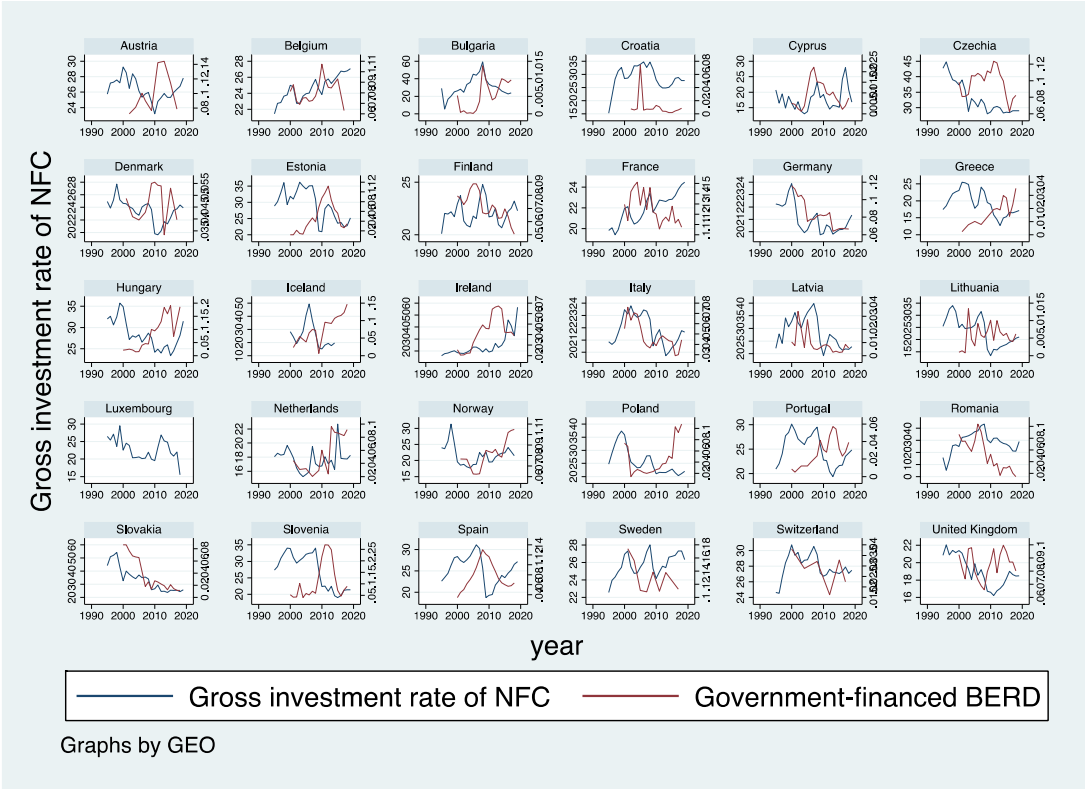
Source: Eurostat, ECB.

Figure A.8. Evolution of gross investment rate and government R&D tax incentives by countries, 1995-2019 (%)



Source: Eurostat, ECB.

Figure A.9. Evolution of gross investment rate and government financed BERD by countries, 1995-2019 (%)



Source: Eurostat, ECB.

8.2 APPENDIX B

Table B.1. Fixed effects estimation of the investment function in fixed assets for Slovenian firms for alternative definitions of GFC dummy, 2006-2019 period

	GFC 2009- 2011 Gross investment rate FA	GFC 2009- 2012 Gross investment rate FA	GFC 2009- 2013 Gross investment rate FA	GFC 2009- 2014 Gross investment rate FA	GFC 2009- 2015 Gross investment rate FA	after GFC 2009-2019 Gross investment rate FA
GFC	-0.031*** [0.003]	-0.042*** [0.002]	-0.053*** [0.002]	-0.057*** [0.002]	-0.058*** [0.002]	-0.072*** [0.003]
Sales growth	0.255*** [0.002]	0.253*** [0.002]	0.251*** [0.002]	0.251*** [0.002]	0.252*** [0.002]	0.255*** [0.002]
Sales growth ²	0.027*** [0.001]	0.026*** [0.001]	0.026*** [0.001]	0.026*** [0.001]	0.026*** [0.001]	0.027*** [0.001]
LnSal/lnFA(-1)	0.241*** [0.001]	0.241*** [0.001]	0.240*** [0.001]	0.240*** [0.001]	0.240*** [0.001]	0.241*** [0.001]
Debt/assets(-1)	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]
ROA(-1)	0.030*** [0.003]	0.029*** [0.003]	0.028*** [0.003]	0.028*** [0.003]	0.028*** [0.003]	0.028*** [0.003]
Current ratio (-1)	0.000* [0.000]	0.000** [0.000]	0.000** [0.000]	0.000** [0.000]	0.000** [0.000]	0.000** [0.000]
lnAge	-0.150*** [0.003]	-0.156*** [0.003]	-0.160*** [0.003]	-0.160*** [0.003]	-0.156*** [0.003]	-0.098*** [0.004]
Exporter	-0.001 [0.003]	-0.004 [0.003]	-0.007** [0.003]	-0.010*** [0.003]	-0.012*** [0.003]	-0.002 [0.003]
lnVA/Empl(-1)	0.009*** [0.002]	0.010*** [0.002]	0.010*** [0.002]	0.010*** [0.002]	0.011*** [0.002]	0.012*** [0.002]
Rel. wage (-1)	0.006** [0.002]	0.003 [0.002]	-0.000 [0.002]	-0.002 [0.002]	-0.003 [0.002]	-0.004 [0.002]
Constant	0.144*** [0.044]	0.158*** [0.044]	0.171*** [0.044]	0.175*** [0.044]	0.169*** [0.044]	0.036 [0.044]
Industry dummies	yes	yes	yes	yes	yes	yes
annual dummies	no	no	no	no	no	no
industry-year dummies	no	no	no	no	no	no
firm fixed effects	yes	yes	yes	yes	yes	yes
Observations	393,297	393,297	393,297	393,297	393,297	393,297
Number of ms7	61,274	61,274	61,274	61,274	61,274	61,274
R-squared	0.133	0.133	0.134	0.134	0.134	0.133

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

Table B.2. Fixed effects estimation of the investment function in long-term assets for Slovenian firms in the 1994-2019 period

Variables	Net investment rate Long-term assets	Net investment rate Long-term assets	Net investment rate Long-term assets	Net investment rate Long-term assets	Gross investment rate Long-term assets	Gross investment rate Long-term assets	Gross investment rate Long-term assets
GFC	-0.046*** [0.002]	-0.047*** [0.002]	0.148*** [0.026]	0.328*** [0.061]	-0.060*** [0.002]	0.159*** [0.028]	0.276*** [0.065]
Sales growth	0.171*** [0.001]	0.208*** [0.002]	0.226*** [0.002]	0.224*** [0.002]	0.249*** [0.002]	0.270*** [0.002]	0.272*** [0.002]
GFC x Sales growth			-0.057*** [0.003]	-0.055*** [0.003]		-0.067*** [0.004]	-0.066*** [0.004]
Sales growth ²	0.013*** [0.000]	0.022*** [0.001]	0.024*** [0.001]	0.024*** [0.001]	0.026*** [0.001]	0.028*** [0.001]	0.029*** [0.001]
GFC x Sales growth ²			-0.007*** [0.001]	-0.007*** [0.001]		-0.008*** [0.001]	-0.008*** [0.001]
Error correction term	0.133*** [0.001]	0.138*** [0.001]	0.147*** [0.001]	0.146*** [0.001]	0.234*** [0.001]	0.245*** [0.001]	0.246*** [0.001]
GFC x Error correction term			-0.027*** [0.001]	-0.029*** [0.001]		-0.033*** [0.001]	-0.036*** [0.001]
Debt/assets (-1)	-0.002*** [0.000]	-0.003*** [0.000]	-0.003*** [0.001]	-0.003*** [0.001]	-0.003*** [0.000]	-0.003*** [0.001]	-0.003*** [0.001]
GFC x Debt/assets(-1)			0.000 [0.001]	0.000 [0.001]		0.000 [0.001]	0.000 [0.001]
ROA (-1)	0.026*** [0.001]	0.031*** [0.002]	0.028*** [0.002]	0.027*** [0.002]	0.026*** [0.002]	0.023*** [0.002]	0.022*** [0.002]
GFC x ROA(-1)			0.009** [0.004]	0.010*** [0.004]		0.008** [0.004]	0.009** [0.004]
Current ratio (-1)	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000** [0.000]	0.000* [0.000]	0.000* [0.000]
GFC x Current ratio(-1)			-0.000 [0.000]	-0.000 [0.000]		-0.000 [0.000]	-0.000 [0.000]
lnAge	-0.130*** [0.002]	-0.131*** [0.002]	-0.136*** [0.002]	-0.157*** [0.005]	-0.165*** [0.002]	-0.174*** [0.002]	-0.136*** [0.005]
GFC x lnAge			0.012*** [0.003]	0.003 [0.003]		0.025*** [0.003]	0.008** [0.004]
lnSize (-1)	-0.034*** [0.001]	-0.024*** [0.002]	-0.021*** [0.002]	-0.020*** [0.002]	-0.050*** [0.002]	-0.047*** [0.002]	-0.048*** [0.002]
GFC x lnSize(-1)			-0.006*** [0.001]	-0.003* [0.001]		-0.008*** [0.002]	-0.003** [0.002]
Exporter	0.001 [0.002]	-0.003 [0.002]	0.013*** [0.004]	0.008** [0.004]	-0.012*** [0.003]	0.008* [0.004]	0.004 [0.004]
GFC(0) x Exporter			-0.021*** [0.004]	-0.014*** [0.004]		-0.026*** [0.004]	-0.016*** [0.005]
lnVA/Empl (-1)		0.022*** [0.001]	0.029*** [0.002]	0.029*** [0.002]	0.006*** [0.002]	0.014*** [0.002]	0.017*** [0.002]
GFC x lnVA/Empl(-1)			-0.019*** [0.003]	-0.019*** [0.003]		-0.024*** [0.003]	-0.025*** [0.003]
Rel. wage (-1)		-0.010*** [0.001]	-0.011*** [0.001]	-0.008*** [0.001]	-0.014*** [0.001]	-0.016*** [0.002]	-0.010*** [0.002]
GFC x Rel. Wage(-1)			0.010*** [0.003]	0.008** [0.003]		0.013*** [0.004]	0.010*** [0.004]
Constant	0.167*** [0.022]	-0.048* [0.027]	-0.110*** [0.027]	-0.179*** [0.055]	0.335*** [0.028]	0.261*** [0.029]	0.080 [0.059]
Industry dummies	yes	yes	yes	yes	yes	yes	yes
Year dummies	no	no	no	yes	no	no	yes
Industry-year dummies	no	no	no	yes	no	no	yes

Firm fixed effects	yes	yes	yes	yes	yes	yes	yes
Observations	669,799	640,2	640,2	640,2	640,208	640,208	640,208
Number of ms7	80,013	77,651	77,651	77,651	77,651	77,651	77,651
R ²	0.091	0.094	0.096	0.100	0.165	0.166	0.171

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

Table B.3. GMM estimation of gross investment rate in fixed assets for Slovenian firms in the 2006-2019 period

	xtdpdpsys Gross investment rate FA	xtdpdpsys Gross investment rate FA	xtabond2 Gross investment rate FA	xtabond2 Gross investment rate FA	xtabond2 Gross investment rate FA
GFC	-0.079*** [0.012]	-0.056*** [0.008]	-0.039*** [0.009]	-0.053*** [0.010]	-0.026** [0.011]
Gross inv. In FA (-1)	-0.325*** [0.034]	-0.272*** [0.034]	-0.272*** [0.036]	-0.310*** [0.045]	-0.006 [0.008]
Gross inv. In FA (-2)	-0.015*** [0.003]	-0.046*** [0.005]	-0.014*** [0.004]	-0.050*** [0.006]	-0.028*** [0.006]
Gross inv. In FA (-3)	-0.008*** [0.003]	-0.037*** [0.004]	-0.007** [0.003]	-0.043*** [0.006]	-0.029*** [0.006]
Gross inv. In FA (-4)		-0.025*** [0.004]		-0.034*** [0.005]	-0.024*** [0.005]
Gross inv. In FA (-5)		-0.005 [0.003]		-0.017*** [0.005]	-0.016*** [0.005]
Sales growth	0.071 [0.046]	0.134*** [0.039]	0.144*** [0.051]	0.183*** [0.055]	0.155** [0.064]
Sales growth (-1)	0.500*** [0.064]	0.395*** [0.060]	0.406*** [0.077]	0.468*** [0.088]	-0.013 [0.056]
Sales growth ²	-0.064*** [0.020]	-0.036** [0.016]	-0.065*** [0.024]	-0.059** [0.025]	-0.130*** [0.030]
Sales growth ² (-1)	-0.008 [0.019]	0.005 [0.014]	0.000 [0.027]	0.032 [0.023]	-0.027 [0.036]
Sales growth ² (-2)	-0.008 [0.007]	-0.006 [0.006]	-0.037** [0.014]	-0.037** [0.015]	
lnSales/lnFA(-1)	-0.416*** [0.050]	-0.295*** [0.048]	-0.345*** [0.052]	-0.338*** [0.062]	0.080*** [0.007]
lnSal/lnFA(-2)	0.562*** [0.057]	0.412*** [0.054]	0.473*** [0.060]	0.463*** [0.071]	
Debt/assets (-1)	-0.001*** [0.000]	-0.001*** [0.000]	-0.001*** [0.000]	-0.001*** [0.000]	-0.001*** [0.000]
Debt/assets(-2)	-0.001* [0.001]	0.000 [0.000]	0.000 [0.001]	0.001 [0.001]	
ROA (-1)	0.006* [0.001]	0.012*** [0.001]	0.010 [0.001]	0.010** [0.001]	0.006 [0.001]

	[0.003]	[0.002]	[0.007]	[0.004]	[0.007]
InAge	-0.097***	-0.259***	-0.100***	-0.148***	-0.109***
	[0.016]	[0.040]	[0.015]	[0.020]	[0.020]
lnVA/Empl (-1)	0.004	0.057***	0.016	0.018	0.010
	[0.021]	[0.019]	[0.031]	[0.032]	[0.037]
Rel. wage (-1)	0.005	-0.010	-0.017	0.011	0.094
	[0.009]	[0.012]	[0.055]	[0.063]	[0.081]
Exporter	-0.010	-0.010	0.073	0.008	0.133**
	[0.006]	[0.007]	[0.069]	[0.063]	[0.065]
Constant	0.346	0.257	-0.819	1.200	0.366
	[0.241]	[0.261]	[0.958]	[0.962]	[0.871]
Industry dummies	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes	yes
Instrumented	Sales growth, Sales growth ² , lnSales_InK, ROA, lnVA/Empl, debt/assets				
Number of instruments	315	523	487	422	394
(df)	39	39	39	39	36
Wald χ^2	1735***	1725***	1980***	1721***	1711.17 ***
(df) Sargan χ^2 (p)	(275) 531.0***	(483) 675.7***	(447) 1256***	(402) 979.4***	(357) 923.2***
AR(1) z(p)	-62.81***	-54.56***	-54.89***	-46.93***	-43.71***
AR(2) z(p)	0.485	0.791	1.398	0.491	0.66
Observations	221,899	148,982	221,899	148,982	149,145
Number of ms7	39,761	29,07	39,761	29,07	29,116

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

Table B.4. Fixed effects estimation of investment function by asset types (other than tangible fixed assets) for Slovenian firms in the 1994-2019 period

Variables	Net investment rate	Net investment rate	Net investment rate	Net investment rate	Net investment rate	Net investment rate
	Intangible assets	Intangible assets	Investment property	Investment property	Long-term financial investment	Long-term financial investment
GFC	-0.002	0.239*	-0.007	-0.170	-0.023***	-0.079
	[0.003]	[0.133]	[0.005]	[0.135]	[0.005]	[0.150]
Sales growth	0.088***	0.089***	0.037***	0.041***	0.077***	0.064***
	[0.003]	[0.004]	[0.005]	[0.007]	[0.005]	[0.008]
GFC x Sales growth		-0.018***		-0.006		0.022**
		[0.007]		[0.010]		[0.010]
Sales growth ²	0.003***	0.001	-0.003*	-0.009***	0.004**	-0.001
	[0.001]	[0.001]	[0.002]	[0.003]	[0.002]	[0.003]
GFC x Sales growth ²		0.001		0.009***		0.008***
		[0.002]		[0.003]		[0.003]
lnSales_InK (-1)	-0.008***	-0.006***	0.039***	0.035***	0.121***	0.119***
	[0.001]	[0.001]	[0.003]	[0.004]	[0.002]	[0.003]

GFC x lnSales_InK(-1)		-0.006*** [0.001]		0.010*** [0.003]		0.004* [0.002]
Debt/assets (-1)	-0.009*** [0.003]	-0.011*** [0.003]	-0.066*** [0.016]	-0.090*** [0.018]	0.000 [0.003]	-0.017* [0.009]
GFC x Debt/assets(-1)		0.001 [0.005]		0.017 [0.017]		0.020** [0.009]
ROA (-1)	0.026*** [0.006]	0.026*** [0.007]	0.087*** [0.028]	0.078** [0.040]	0.038*** [0.012]	0.019 [0.016]
GFC x ROA(-1)		-0.014 [0.013]		-0.019 [0.049]		-0.040* [0.024]
Current ratio (-1)	-0.000 [0.000]	-0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000*** [0.000]	0.001*** [0.000]
GFC x current ratio(-1)		-0.000 [0.000]		0.000 [0.000]		-0.000 [0.000]
lnAge	-0.145*** [0.003]	-0.227*** [0.009]	-0.247*** [0.011]	-0.134*** [0.025]	-0.297*** [0.011]	-0.219*** [0.024]
GFC x lnAge		-0.006 [0.006]		-0.005 [0.011]		-0.026** [0.010]
lnSize (-1)	0.038*** [0.003]	0.042*** [0.003]	-0.011** [0.006]	-0.018*** [0.006]	-0.041*** [0.005]	-0.039*** [0.006]
GFC x lnSize(-1)		-0.008*** [0.002]		-0.001 [0.004]		-0.002 [0.003]
Exporter	0.008* [0.004]	0.009 [0.007]	-0.011 [0.007]	-0.000 [0.010]	-0.011 [0.008]	-0.012 [0.010]
GFC(0) x exporter		0.002 [0.007]		-0.016 [0.011]		0.006 [0.012]
lnVA/Empl (-1)	0.030*** [0.003]	0.027*** [0.003]	-0.021*** [0.005]	-0.022*** [0.006]	-0.026*** [0.005]	-0.026*** [0.006]
GFC x lnVA/Empl(-1)		0.001 [0.005]		0.002 [0.006]		0.002 [0.007]
Rel. wage (-1)	0.006*** [0.002]	0.002 [0.002]	0.004 [0.005]	-0.004 [0.006]	0.005 [0.005]	0.009 [0.006]
GFC x Rel. Wage(-1)		-0.009 [0.006]		0.004 [0.007]		-0.007 [0.008]
Constant	-0.229*** [0.049]	-0.145 [0.126]	0.806*** [0.110]	0.647*** [0.146]	0.716*** [0.126]	0.672*** [0.156]
Industry dummies	yes	yes	yes	yes	yes	yes
Year dummies	no	yes	no	yes	no	yes
Industry-year dummies	no	yes	no	yes	no	yes
Firm fixed effects	yes	yes	yes	yes	yes	yes
Observations	226,433	226,433	26,989	26,989	91,313	91,313
Number of ms7	35,373	35,373	5,176	5,176	18,402	18,402
R ²	0.021	0.027	0.037	0.049	0.054	0.059

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

Table B.5. Augmented specification of the investment function in fixed assets with financial factors for Slovenian firms in 2006-2019 period

	net invest. rate Fixed assets	net invest. rate Fixed assets	net invest. rate Fixed assets	gross invest. rate Fixed assets	gross invest. rate Fixed assets
GFC	-0.060*** [0.002]	-0.060*** [0.002]	-0.052 [0.056]	-0.063*** [0.002]	-0.092 [0.063]
Fin. liab_banks/assets (-1)	-0.063*** [0.007]	-0.062*** [0.007]	-0.050*** [0.009]	-0.064*** [0.008]	-0.062*** [0.010]
GFC x Fin. liab_banks/assets (-1)			-0.025** [0.011]		-0.012 [0.013]
Fin. liab_group/assets (-1)	0.001 [0.004]	0.005 [0.005]	-0.009 [0.011]	0.005 [0.005]	-0.025** [0.012]

GFC x Fin. liab_group/assets (-1)			0.014		0.040***
			[0.012]		[0.013]
LT fin. liab_banks/assets (-1)	-0.000***		-0.000***	-0.000***	-0.000***
	[0.000]		[0.000]	[0.000]	[0.000]
GFC x LT fin. liab_banks/assets (-1)			0.000		-0.000
			[0.000]		[0.000]
LT fin. liab_group/assets (-1)	-0.000***		-0.000***	-0.000***	-0.000***
	[0.000]		[0.000]	[0.000]	[0.000]
GFC x LT fin. liab_group/assets (-1)			0.000		-0.000
			[0.000]		[0.000]
Debt overhang (-1)	-0.026***	-0.026***	-0.035***	-0.033***	-0.044***
	[0.003]	[0.003]	[0.004]	[0.003]	[0.005]
GFC x Debt overhang (-1)			0.018***		0.021***
			[0.005]		[0.006]
Effect. tax rate (-1)	0.001	0.001	0.001	0.001	0.003*
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
GFC x Effect. tax rate (-1)			-0.001		-0.002
			[0.001]		[0.002]
CF/costs (-1)	0.004	0.004	0.002	0.008***	0.008**
	[0.002]	[0.002]	[0.003]	[0.003]	[0.004]
GFC x CF/costs (-1)			0.004		-0.001
			[0.004]		[0.005]
Sales growth	0.178***	0.179***	0.190***	0.236***	0.251***
	[0.002]	[0.002]	[0.003]	[0.002]	[0.003]
GFC x Sales growth			-0.025***		-0.030***
			[0.004]		[0.004]
Sales growth ²	0.016***	0.016***	0.017***	0.022***	0.023***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
GFC x Sales growth ²			-0.002		-0.003*
			[0.001]		[0.002]
Error correction term	0.120***	0.120***	0.125***	0.242***	0.248***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
GFC x Error correction term			-0.009***		-0.010***
			[0.001]		[0.001]
ROA (-1)	0.030***	0.030***	0.036***	0.025***	0.030***
	[0.002]	[0.002]	[0.004]	[0.003]	[0.004]
GFC x ROA (-1)			-0.010**		-0.009*
			[0.005]		[0.005]
lnAge	-0.169***	-0.169***	-0.174***	-0.159***	-0.152***
	[0.003]	[0.003]	[0.007]	[0.004]	[0.008]
GFC x lnAge			0.009***		0.022***
			[0.003]		[0.004]
lnSize (-1)	-0.007***	-0.007***	-0.007***	-0.043***	-0.046***
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
GFC x lnSize (-1)			-0.003**		-0.004**
			[0.002]		[0.002]

InVA/Empl (-1)	0.019*** [0.002]	0.019*** [0.002]	0.017*** [0.003]	-0.007*** [0.002]	-0.009*** [0.003]
GFC x InVA/Empl (-1)			0.001 [0.003]		-0.000 [0.003]
Exporter (-1)	0.006** [0.003]	0.006** [0.003]	-0.000 [0.004]	-0.002 [0.003]	-0.008** [0.004]
GFC x Exporter (-1)			0.001 [0.004]		0.003 [0.005]
Constant	0.044 [0.046]	0.044 [0.046]	0.034 [0.056]	0.398*** [0.052]	0.361*** [0.063]
industry dummies	yes	yes	yes	yes	yes
year dummies	no	no	yes	no	yes
industry-year dummies	no	no	yes	no	yes
firm fixed effects	yes	yes	yes	yes	yes
Observations	367,573	367,573	367,573	367,434	367,434
Number of ms7	59,951	59,951	59,951	59,905	59,905
R-squared	0.069	0.069	0.071	0.132	0.135

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

Table B.6. Augmented specification of the investment function by asset type with financial factors for Slovenian firms in 2006-2019 period

	net invest. rate	net invest. rate	net invest. rate	net invest. rate	net invest. rate	net invest. rate	net invest. rate LT	net invest. rate LT
	Tangible fixed assets	Tangible fixed assets	Intangible assets	Intangible assets	Investmen t property	Investmen t property	financial investmen t	financial investmen t
GFC	-0.061*** [0.002]	-0.053 [0.058]	-0.040*** [0.003]	0.042 [0.102]	-0.007 [0.005]	-0.193 [0.133]	-0.019*** [0.005]	-0.050 [0.148]
Fin. liab_banks/assets (-1)	-0.063*** [0.007]	-0.050*** [0.009]	-0.011 [0.016]	-0.041* [0.021]	0.015 [0.025]	0.013 [0.033]	-0.066*** [0.023]	-0.061** [0.029]
GFC x Fin. liab_banks/assets (-1)		-0.026** [0.011]		0.026 [0.022]		-0.022 [0.031]		0.006 [0.032]
Fin. liab_group/assets (-1)	0.005 [0.005]	-0.004 [0.011]	-0.011 [0.021]	-0.008 [0.030]	-0.048 [0.050]	-0.044 [0.062]	-0.091** [0.038]	-0.067 [0.049]
GFC x Fin. liab_group/assets (-1)		0.010 [0.012]		0.001 [0.032]		0.012 [0.063]		-0.031 [0.058]
LT fin. liab_banks/assets (-1)	-0.000*** [0.000]	-0.000*** [0.000]	-0.000 [0.000]	0.006*** [0.002]	0.011 [0.009]	0.022 [0.014]	0.000 [0.001]	0.000 [0.001]
GFC x LT fin. liab_banks/assets (-1)		0.000 [0.000]		-0.006*** [0.002]		-0.012 [0.014]		0.003 [0.005]
LT fin. liab_group/assets (-1)	-0.000*** [0.000]	-0.000*** [0.000]	0.002 [0.002]	0.003 [0.002]	0.004 [0.042]	-0.020 [0.057]	-0.000 [0.000]	-0.002 [0.007]

GFC x LT fin. liab_group/assets (-1)		0.000 [0.000]		-0.005* [0.003]		0.044 [0.049]		0.002 [0.007]
Debt overhang (-1)	-0.027*** [0.003]	-0.035*** [0.004]	-0.012** [0.005]	-0.006 [0.008]	-0.009 [0.007]	-0.014 [0.009]	-0.022*** [0.008]	-0.037*** [0.011]
GFC x Debt overhang (-1)		0.017*** [0.006]		-0.005 [0.009]		0.011 [0.011]		0.027** [0.013]
Effect. tax rate (-1)	0.000 [0.001]	0.001 [0.001]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.001]	-0.000 [0.001]
GFC x Effect. tax rate (-1)		-0.001 [0.002]		-0.000 [0.001]		-0.002** [0.001]		0.002 [0.002]
CF/costs (-1)	0.005** [0.003]	0.002 [0.003]	-0.002 [0.005]	-0.006 [0.007]	0.005* [0.003]	0.007** [0.003]	-0.001 [0.003]	-0.000 [0.004]
GFC x CF/costs (-1)		0.006 [0.005]		0.004 [0.009]		-0.006 [0.006]		-0.003 [0.005]
Sales growth	0.185*** [0.002]	0.196*** [0.003]	0.065*** [0.004]	0.060*** [0.006]	0.035*** [0.005]	0.036*** [0.007]	0.077*** [0.005]	0.064*** [0.008]
GFC x Sales growth		-0.024*** [0.004]		0.008 [0.008]		-0.002 [0.010]		0.021** [0.010]
Sales growth ²	0.016*** [0.001]	0.017*** [0.001]	0.001 [0.001]	0.001 [0.002]	-0.003* [0.002]	-0.009*** [0.003]	0.004** [0.002]	-0.000 [0.003]
GFC x Sales growth ²		-0.002* [0.001]		0.002 [0.003]		0.009*** [0.003]		0.008** [0.003]
lnSales_InK (-1)	0.119*** [0.001]	0.124*** [0.001]	-0.003** [0.001]	-0.003* [0.002]	0.037*** [0.003]	0.033*** [0.004]	0.121*** [0.002]	0.119*** [0.003]
GFC x lnSales_InK (-1)		-0.009*** [0.001]		0.000 [0.002]		0.010*** [0.003]		0.005** [0.002]
ROA (-1)	0.031*** [0.002]	0.042*** [0.004]	0.018*** [0.007]	0.016* [0.010]	0.099*** [0.029]	0.097** [0.042]	0.032*** [0.012]	0.024 [0.016]
GFC x ROA (-1)		-0.016*** [0.005]		0.000 [0.013]		-0.015 [0.052]		0.022 [0.022]
lnAge	-0.169*** [0.003]	-0.173*** [0.007]	-0.307*** [0.006]	-0.207*** [0.014]	-0.238*** [0.011]	-0.124*** [0.025]	-0.302*** [0.011]	-0.217*** [0.024]
GFC x lnAge		0.007** [0.004]		-0.009 [0.006]		-0.009 [0.010]		-0.029*** [0.010]
lnSize (-1)	-0.003 [0.002]	-0.003 [0.002]	0.041*** [0.004]	0.042*** [0.004]	-0.012** [0.005]	-0.018*** [0.006]	-0.043*** [0.005]	-0.041*** [0.006]
GFC x lnSize (-1)		-0.002 [0.002]		-0.011*** [0.002]		0.003 [0.004]		-0.003 [0.004]
lnVA/Empl (-1)	0.023*** [0.002]	0.021*** [0.003]	0.028*** [0.004]	0.030*** [0.005]	-0.022*** [0.005]	-0.025*** [0.006]	-0.026*** [0.005]	-0.024*** [0.006]
GFC x lnVA/Empl (-1)		0.002 [0.003]		-0.007 [0.005]		0.006 [0.005]		-0.001 [0.006]
Exporter (-1)	0.007** [0.003]	0.002 [0.004]	0.010** [0.005]	0.011 [0.007]	-0.006 [0.007]	-0.012 [0.009]	0.010 [0.008]	0.004 [0.010]
GFC x Exporter (-1)		-0.000 [0.005]		-0.011 [0.008]		-0.009 [0.011]		-0.007 [0.012]
Constant	-0.005 [0.047]	-0.020 [0.058]	0.210** [0.085]	-0.033 [0.104]	0.765*** [0.109]	0.612*** [0.145]	0.733*** [0.126]	0.665*** [0.156]
industry dummies	yes	yes	yes	yes	yes	yes	yes	yes
year dummies	no	yes	no	yes	no	yes	no	yes
industry-year dummies	no	yes	no	yes	no	yes	no	yes
firm fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Observations	364,122	364,122	135,56	135,56	26,942	26,942	91,226	91,226
Number of ms7	59,513	59,513	25,996	25,996	5,177	5,177	18,431	18,431
R-squared	0.067	0.070	0.028	0.033	0.037	0.049	0.054	0.059

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

Table B.7. Augmented specification of the investment function in fixed assets with ownership factors for Slovenian firms in 2006-2019 period, fixed effects estimation

	net invest. rate Fixed assets	net invest. rate Fixed assets	gross invest. rate Fixed assets	gross invest. rate Fixed assets
GFC	-0.060*** [0.002]	-0.039 [0.049]	-0.063*** [0.002]	-0.065 [0.055]
FDI	-0.014 [0.011]	-0.011 [0.012]	-0.015 [0.012]	-0.004 [0.013]
GFC x FDI		-0.010 [0.008]		-0.022** [0.008]
State ownership	-0.025 [0.023]	-0.007 [0.026]	-0.031 [0.026]	-0.009 [0.029]
GFC x State ownership		-0.035*		-0.044*
Fin. liab_banks/assets (-1)	-0.063*** [0.007]	-0.062*** [0.007]	-0.064*** [0.008]	-0.066*** [0.008]
Fin. liab_group/assets (-1)	0.001 [0.004]	0.002 [0.004]	-0.001 [0.005]	-0.000 [0.005]
Debt overhang (-1)	-0.026*** [0.003]	-0.025*** [0.003]	-0.033*** [0.003]	-0.032*** [0.003]
Effect. tax rate (-1)	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]
CF/costs (-1)	0.003 [0.003]	0.003 [0.003]	0.006* [0.003]	0.006* [0.003]
Sales growth	0.178*** [0.002]	0.176*** [0.002]	0.235*** [0.002]	0.234*** [0.002]
Sales growth ²	0.016*** [0.001]	0.016*** [0.001]	0.022*** [0.001]	0.022*** [0.001]
Error correction term	0.120*** [0.001]	0.120*** [0.001]	0.242*** [0.001]	0.242*** [0.001]
ROA (-1)	0.030*** [0.002]	0.029*** [0.002]	0.025*** [0.003]	0.024*** [0.003]
lnAge	-0.169*** [0.003]	-0.162*** [0.006]	-0.159*** [0.004]	-0.124*** [0.007]
lnSize (-1)	-0.007*** [0.002]	-0.008*** [0.002]	-0.044*** [0.002]	-0.047*** [0.002]
lnVA/Empl (-1)	0.019*** [0.002]	0.018*** [0.002]	-0.006*** [0.002]	-0.008*** [0.002]
Exporter (-1)	0.005* [0.003]	-0.000 [0.003]	-0.002 [0.003]	-0.007** [0.003]
Constant	0.048 [0.046]	0.006 [0.053]	0.399*** [0.052]	0.302*** [0.060]
industry dummies	yes	yes	yes	yes
year dummies	no	yes	no	yes
industry-year dummies	no	yes	no	yes
firm fixed effects	yes	yes	yes	yes
Observations	364,203	364,203	364,107	364,107
Number of ms7	59,464	59,464	59,419	59,419
R-squared	0.069	0.071	0.132	0.134

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

Table B.8. Augmented specification of the investment function in fixed assets with ownership factors for Slovenian firms in 2006-2019 period, random effects estimation

	net invest. rate Fixed assets	net invest. rate Fixed assets	gross invest. rate Fixed assets	gross invest. rate Fixed assets
GFC	-0.086*** [0.003]	-0.128*** [0.046]	-0.092*** [0.003]	-0.088* [0.052]
FDI	-0.068*** [0.007]	-0.056*** [0.011]	-0.082*** [0.008]	-0.070*** [0.012]
GFC x FDI		-0.018 [0.012]		-0.018 [0.013]
State ownership	-0.031 [0.022]	-0.001 [0.032]	0.011 [0.025]	0.049 [0.036]
GFC x State ownership		-0.046 [0.035]		-0.062 [0.040]
HHI of founders	0.113** [0.050]	0.142** [0.071]	0.193*** [0.056]	0.252*** [0.081]
GFC x HHI of founders		-0.038 [0.074]		-0.080 [0.084]
HHI of founders ²				
HHI of founders	-0.099*** [0.036]	-0.113** [0.051]	-0.152*** [0.040]	-0.185*** [0.058]
GFC x HHI of founders ²		0.017 [0.053]		0.044 [0.060]
Fin. liab_banks/assets (-1)	-0.018** [0.009]	-0.018** [0.009]	-0.027*** [0.010]	-0.027*** [0.010]
Fin. liab_group/assets (-1)	0.004 [0.004]	0.005 [0.004]	0.005 [0.005]	0.005 [0.005]
Debt overhang (-1)	-0.015*** [0.004]	-0.013*** [0.004]	-0.025*** [0.005]	-0.024*** [0.005]
Effect. tax rate (-1)	0.001 [0.001]	0.001 [0.001]	0.000 [0.001]	0.000 [0.001]
CF/costs (-1)	0.003 [0.004]	0.003 [0.004]	0.017*** [0.005]	0.016*** [0.005]
Sales growth	0.169*** [0.003]	0.169*** [0.003]	0.220*** [0.003]	0.220*** [0.003]
Sales growth ²	0.014*** [0.001]	0.014*** [0.001]	0.018*** [0.001]	0.018*** [0.001]
lnSales_lnK (-1)	0.019*** [0.001]	0.019*** [0.001]	0.114*** [0.001]	0.114*** [0.001]
ROA (-1)	0.045*** [0.003]	0.044*** [0.003]	0.039*** [0.004]	0.038*** [0.004]
lnAge	-0.054*** [0.003]	-0.051*** [0.003]	-0.055*** [0.003]	-0.053*** [0.003]
lnSize (-1)	0.031*** [0.002]	0.031*** [0.002]	0.001 [0.002]	0.001 [0.002]
lnVA/Empl (-1)	0.047*** [0.002]	0.048*** [0.002]	0.033*** [0.002]	0.033*** [0.002]
Exporter (-1)	0.009**	0.007**	-0.002	-0.005
Constant	-0.322*** [0.036]	-0.404*** [0.050]	-0.024 [0.040]	-0.139** [0.057]
industry dummies	yes	yes	yes	yes
year dummies	no	yes	no	yes
industry-year dummies	no	yes	no	yes
firm fixed effects	yes	yes	yes	yes
Observations	151,051	151,051	151,163	151,163
Number of ms7	38,06	38,06	38,046	38,046
R-squared	0.0544	0.0577	0.132	0.134

Note: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Source: Agency of the Republic of Slovenia for Public Legal Records and Related Services, own calculations.

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