

CORPORATE DEBT AND CRISIS SEVERITY IN EUROPE

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Abstract The aim of this paper is to analyse the financial structure of non-financial corporations in the European Union prior to the 2008 crisis and to determine whether the ex-ante differences in corporate financial structure had an impact on the severity of the 2008 financial crisis in European countries. The analysis confirms a negative relationship between the corporate debt ratio prior to the crisis and crisis-induced contractions in corporate investment and GDP. The results indicate a greater importance of the growth in corporate indebtedness in the years prior to the crisis for crisis vulnerability than solely the level of debt immediately before the crisis. The paper has several important implications for crisis prevention and mitigation policy.

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INTRODUCTION

The global financial crisis of 2008, which was triggered by the USA subprime crisis, had a severe impact on the real economy in Europe. In 2009 GDP declined in every country in the European Union, except for Poland. Growth contractions varied from -1.9% in Cyprus to -17.7% in Latvia. Various reasons have been identified as the triggers of the global meltdown, including the lack of financial supervision, relaxed credit standards, the development of securitisation, financial innovation, the misjudgement of risk by rating agencies or excess leverage (see e.g. Jickling, 2010; Blundell-Wignall, et al., 2008; European Commission, 2009; Brunnermeier, 2009). As stressed in the financial crisis literature, the financial structure of the corporate sector prior to the crisis could be one of the channels determining the severity of the crisis among countries (Stone & Weeks 2001).

The importance of corporate sector dynamics in exploring financial crises was recognized particularly after the East Asian crisis of 1998. First generation crisis models stressed the role of budget deficits leading to the collapse of a fixed exchange rate (Krugman, 1979; Flood & Garber, 1984). Second

generation models explained crises as the result of a conflict between a fixed exchange rate and the desire to pursue expansionary monetary policy (Obstfeld, 1994). But the Asian financial crisis countries did not suffer from the traditional fiscal imbalances. The crisis had some elements of a self-fulfilling liquidity run (Rodrik & Velasco, 1999). It also revealed that currency crises are often associated with banking crises. But most importantly it revealed the role of corporate sector balance sheets in determining their ability to invest and capital flows in affecting the real exchange rate (Krugman, 1999; Bris & Koskinen, 2002).

Several studies followed to analyse corporate crisis dynamics in other parts of the world. Stone (2000) investigated the impact of financial crises on output via the corporate sector for nine emerging market countries, concluding that high levels of corporate leverage played an important role. Stone and Weeks (2001) analysed a large sample of medium and large industrial countries with access to capital markets. Their results confirmed the importance of corporate balance sheet indicators in explaining crisis probability and intensity, including corporate liquidity and leverage. The extent of corporate leverage

and the maturity structure of debt were found to be significant indicators of external vulnerability in an analysis of emerging market crises by Mulder, et al. (2002). The impact of those indicators, especially on the depth of the crisis, depends on the size of credit by the banking sector to the economy suggesting that corporate weaknesses are transmitted through the banking system. Davis and Stone (2004) used balance sheet and flow of funds data for a sample of OECD and emerging market countries. They concluded that investment and inventory contractions are the main contributors to post-crisis GDP contractions and they are correlated with corporate financial structure (debt-to-equity ratio). The contractions were found to be more severe for emerging market countries.

Although not originated in the corporate sector, the global financial crisis of 2008 provided again a fertile ground for an analysis of its financial vulnerabilities. Tong and Wei (2008) found that an ex-ante classification of US firms based on their degrees of liquidity constraint and sensitivity to demand contraction prior to the subprime crisis, helped to predict their stock price performance during the crisis. Kamil and Sengupta (2010) analysed the impact of ex-ante firm specific characteristics in Latin America (including leverage, debt maturity, bank credit dependence, cash holdings, exports or access to international credit markets) on their sales performance during the crisis and found leverage and bank credit growth the most important factors explaining the drop in sales. Didier, et al. (2010) conclude that stock markets in countries with more indebted corporate sectors prior to the crisis were more significantly correlated with the US market.

The commonly analysed indicators of vulnerability of the corporate sector include: corporate financial leverage, liquidity, debt maturity, profitability and cash flows. It is believed that the higher the indebtedness of a firm, the more likely a severe erosion of its balance sheet due to a shock to its assets' value that could lead to a call of loans and a postponement of investment. Cash flow problems could be additionally exacerbated by a high proportion of short term debt in total debt. Liquidity ratios are used to measure the extent to which a corporation could run into problems because of lack of liquid assets to meet obligations (Mulder, et al., 2002). If the crisis is associated with liquidity tightening in the non-financial sector, the effect should be more damaging for firms that are relatively

more liquidity constrained to start with (Tong & Wei, 2008).

The goal of this paper is to analyse the financial structure of non-financial corporations in the EU prior to the 2008 crisis and to determine whether the ex-ante differences in corporate financial structure had an impact on the severity of the 2008 financial crisis in European countries. The analysis is based on aggregate corporate balance sheet and flow of funds data from Eurostat. It covers 26 EU countries for which data is available in the Eurostat database: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden. Covering such a wide range of European countries in the analysis presents an opportunity to compare the financial structure of the corporate sectors in emerging and developed European economies and its consequences for growth contractions during the crisis. The analysis has important policy implications for mitigating financial crises.

The paper is structured as follows: the next section presents the data and methodology. The analysis of the financial structure of the firms prior to the crisis and its impact on crisis severity is conducted in section three. The last section concludes.

DATA AND METHODOLOGY

The paper uses aggregate annual corporate sector financial data on the stock of assets and liabilities as well as flow of funds from the Eurostat database. The year 2008 is considered as the crisis year, assuming the bankruptcy of Lehman Brothers in September 2008 as the main triggering event. Corporate financial structure at the start of the crisis is analysed based on the data for 2008. Total corporate external liabilities for both stocks and flows dimensions are organized into four categories: loans, debt securities, shares and trade credit. To check for debt maturity problems, both loans and debt securities categories are divided into long- and short- term components. The analysis is divided into several sections. The first section analyses the size and composition of corporate liabilities prior to the crisis based on the stocks data and the changes in corporate liabilities based on financing flows. In the stocks analysis liquidity ratios are reported in addition. In the second section t-tests are applied in order to identify significant differences

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in corporate financing structures between developed and emerging EU countries. Countries are classified as either developed or emerging according to Standard and Poor's (2011). As suggested in the literature, corporate financing choices can be determined by the level of economic development. The size of corporate sector balance sheets can be greater for developed markets due to their larger and more developed financial sectors. Emerging market firms were found to have lower levels of leverage than developed market firms (Hussain & Nivorozhkin, 1997; Glen & Singh, 2003; Peev & Yurtoglu, 2007) and can be expected to rely more on debt financing from banks than from securities' markets, which are less developed there. Additionally, studies on the capital structure of CEE transition economies report very low long-term debt ratios, but these have been growing over time (Peev & Yurtoglu, 2007). Due to their greater vulnerability to shocks, emerging markets corporations can also be expected to maintain higher levels of liquidity.

Next, changes in financing structures are analysed since 2004. The fourth section presents the changes in GDP as a result of the crisis (in 2009 and 2010) in the analysed countries and examines the correlation between corporate financial structure prior to the crisis and the subsequent GDP contractions. In addition to aggregate GDP change, also changes in GDP components such as domestic demand, final consumption expenditure, gross fixed capital formation, net exports and gross investment rate of non-financial corporations are reported. In the correlation analysis the contractions in GDP, gross fixed capital formation and corporate investment rate in 2009 are used and also average contractions during 2009-2010 are calculated to consider the possible longer term effects of the crisis.

The study has several limitations. First, it uses aggregate country level data on corporate financial structure, rather than micro-level data. Second, it only considers the external financing sources of corporations. The main implication of this is that the debt to equity ratio calculated here differs from the commonly reported debt ratios where total equity (internal and external) is used. The data has annual frequency, which may slightly distort the results if September 2008 is considered as the start of the crisis.

RESULTS

CORPORATE FINANCING CHOICES PRIOR TO THE CRISIS

STOCKS DATA

As presented in table 1, in 2008 the size of corporate financial liabilities varied widely among EU countries. They amounted to a record 527% of GDP in Luxembourg and stood at above 250% of GDP in Hungary, Sweden, Cyprus and Ireland. The exceptionally high figure for Luxembourg may result from the strong presence of multinational corporations in the country and their high borrowing. However, this does not need to be a worrying sign as borrowing by multinationals is related to their global activities and the debt-servicing can be covered by income from global sales. On the other hand, financial liabilities of corporations in Greece and Poland were the smallest in proportion to GDP and accounted for 101% and 116% of GDP respectively.

Looking at the composition of corporate external financing it can be concluded that, on average, debt and external equity were almost equally important sources of financing for EU firms prior to the crisis. Corporations in Belgium (65%), Hungary (63%), Estonia (56%), the Czech Republic (55%), Poland (54%), Italy (53%), France and Lithuania (51%) relied on external equity to the greatest extent, which translated into the lowest debt to equity ratios in those countries and suggests lowest vulnerability in adverse economic conditions. On average, total debt financing (as the sum of loans and debt securities) accounted for 44% of financial liabilities in EU corporations at the start of the financial crisis of 2008. However, there were companies for which debt was the major source of external financing, including those in Greece (66%), Latvia (58%), Cyprus (56%), Spain (55%), Ireland (54%), Denmark, Luxembourg and Portugal (53%). Consequently Greek and Latvian corporations had the highest debt to equity ratios of 2.43 and 1.92, respectively. Such a high reliance on debt financing could have had adverse effects on the performance of corporations in those countries in a crisis contributing to a drop in GDP. On average, the greater part of debt finance came in the form of loans (41%) with only a small proportion being sourced from the bond market (3%). The latter was especially significant in Greece, Portugal, France and Austria.

* Similarly to Sweden and Ireland (see EC, 2012 and Cussen & O'Leary, 2013).

On the other hand, in many European countries the role of the bond market in corporate financing was negligible (including Cyprus, Hungary, Latvia, Lithuania and Romania). High reliance on short term debt could be another sign of corporate vulnerability. Only in the case of Belgium was there more than 50% of loans maturities shorter than one year, while in Greece and Slovakia short term loans accounted for at least 40% of all loans. The share of trade credits in total external financing was 6% on average in the EU, but they were extremely important for Slovak (27%) and Maltese (14%) firms. That may reflect the relatively small size of the stock and bond markets especially in Slovakia and a need to look for funds from other sources. Trade credit may be a substitute for bank credit where companies are credit-rationed by banks.

The debt to equity ratio of non-financial corporations varied between 2.43 in Greece and 0.5 in Belgium. The net debt ratio was positive in all of the analysed countries and was lowest in the Czech Republic, Belgium and Luxembourg indicating high cash reserves that could cover part of the debt obligations of the companies in those countries. On average, corporate liquidity ratios were sound, though companies in Italy, Portugal, Denmark, Greece and Spain could face problems with meeting their current obligations. The exceptionally high value for Sweden may, on the one hand, result from high cash reserves and on the other, from the fact that the debt of Swedish firms is almost entirely long-term (99% of loans and 90% of debt securities).

Overall, based on the balance sheet data of non-financial companies in Europe it can be concluded that the financial positions of the firms indicated possible risks to financial stability stemming from this sector, especially in such countries as Cyprus, Denmark, Greece, Ireland, Latvia, Portugal and Spain.

FLows IN FINANCIAL LIABILITIES

The stocks data show the results of financing choices made by corporations in previous years. The flow of funds data presented in table 2 show average financing flows to the corporate sector in the period 2004-2008. The net lending/ borrowing position captures the change in the net financial position of the entire corporate sector as a percentage of GDP. Negative flows indicate that investment needs exceed revenues and that such corporations can be described

as net borrowers. In 14 out of the 20 countries for which data is available corporations operated as net borrowers of funds prior to the crisis, with the highest negative net financing positions in Latvia, Portugal, Slovenia, Estonia, Romania, and Lithuania. The biggest net lending positions were noted by firms in the Netherlands and in Finland. Although corporate financing varied largely across countries, on average flows from loans accounted for the greatest share of financing (59% of external financial liabilities). Flows in the form of loans comprised approximately 100% of financial liabilities in Finland and Ireland and exceeded 80% of financial liabilities in Spain, Slovenia, Luxembourg and Sweden. As indicated earlier, the majority of those loans were long term on average with short term loans prevailing only in Belgium (57%). The financing flows from debt securities amounted to 3% of financial liabilities on average, though they were exceptionally high in Portugal and Greece, 26% and 22% respectively. Equity issues were the most important sources of funds for Belgian (70%), Austrian (63%), Hungarian (60%), Romanian (58%) and Dutch (53%) firms.

To sum up, the financing flows in the period 2004-2008 indicate the most risky behaviour in terms of financing of firms in the Baltic countries, Ireland, Portugal, Romania and Slovenia.

COMPARISON OF COUNTRY GROUPS

As noted in the previous section, the size and composition of corporate financial liabilities prior to the crisis varied widely among countries. In this section an attempt is made to discover significant differences when countries are divided into groups by their level of economic development.

Out of the 26 analysed countries, 15 were classified as developed and 11 as emerging countries (see Table 1). The average values representing the size and composition of corporate liabilities for the two country groups in 2008 together with the t-test results are presented in table 3. The difference in the mean level of financial liabilities to GDP is barely significant at the 0.1 level. On average, corporate balance sheets are larger in developed than in emerging countries (231.78% of GDP and 175.85% of GDP respectively). That can be attributed to their larger and more developed financial sectors. However, the values vary quite widely across countries; the high value for developed countries results mainly from

the extremely high share of financial liabilities in the GDP of Luxembourg.

There is a significant difference between the share of debt securities and trade credits in the financial liabilities of firms in developed and emerging EU countries. Not surprisingly, developed countries' corporations use debt securities to finance their operations more often than their counterparts in emerging markets. On the other hand, EU emerging market firms are significantly more reliant on trade credits than firms in developed countries (9% vs. 3% of financial liabilities). This confirms the results of previous research indicating that such a situation may result from the lower level of development of financial systems in emerging markets.

The data does not confirm significant differences in the maturity structure of loans as suggested in previous studies. Peev and Yurtoglu (2007) argued that long term debt ratios should be lower for CEE transition economies, but also they should be growing over time. The results obtained here may suggest that EU emerging countries' corporations have caught up with their developed countries' counterparts in terms of long term indebtedness. Previous studies also suggest lower levels of leverage in emerging markets. In the analysed sample of EU firms the debt ratio was indeed lower for emerging than for developed markets, 0.96 vs. 1.16, but the difference was not found to be statistically significant. Average values of liquidity ratios also do not confirm previous results of Davis and Stone (2004). The ratios are higher for developed EU markets but the difference is not significant.

Table 4 presents the average differences in flows for developed vs. emerging EU countries. The net lending/ borrowing position (in percentage of GDP) for emerging markets' corporations is significantly lower than for developed countries indicating greater reliance of companies in emerging Europe on debt sources for financing investments (due to insufficient own sources) prior to the crisis. However, there are gaps in the data for several developed countries that could have influenced the results. Looking at the composition of financial liabilities, again there is a significant difference in average flows from trade credit, with greater flows from this source to emerging market firms.

CHANGES IN CORPORATE FINANCING SINCE 2004

Changes in the size and composition of corporate financial liabilities in 2008 relative to 2004 are analysed in order to identify any developments that could endanger firms' financial situation in constrained market conditions (Table 5). The greatest increases in the proportionate share of loans in total financial liabilities occurred in Ireland (48%), Latvia (43%), Slovenia (38%) and Lithuania (36%). As pointed out above, the first three of those countries were among those with the highest percentage of loans in financial liabilities in 2008. On the other hand, Austrian, Maltese and German firms reduced their reliance on loans in 2008 as compared to 2004. Scandinavian firms noted the largest increases in short term loans, although the share of the latter in total loans was still extremely low in 2008. Additionally, firms in Greece, Lithuania, Cyprus and Hungary substantially increased their usage of debt securities in proportion to other external financing. With the exception of Greece, that change was not important due to the very low initial levels of debt securities in those countries. Consequently, the debt to equity ratios of Greek, Irish and Latvian firms went up by more than 100%, and placed them among the firms with the highest debt ratios in the EU in 2008. The net debt to equity ratio increased most in Romania, Ireland, Greece, Slovenia and Lithuania.

The corporate liquidity situation deteriorated on average in 2008 relative to 2004. The most substantial drops occurred in Sweden, Romania, Bulgaria, Slovenia, Finland and Lithuania. While in the case of Sweden that could be interpreted as a positive development, it left Slovenia with a very low liquidity ratio of 0.5 in 2008, putting its short term obligations in danger.

The average changes in the size and composition of corporate external liabilities indicate a significant build-up of debt in Greece, Ireland, Latvia and Slovenia, with additionally substantially deteriorating liquidity positions in Slovenia, during the five years preceding the crisis. Such developments could indicate significant risks for the real sectors in those countries at the onset of the 2008 crisis.

CORPORATE FINANCIAL STRUCTURE AND CHANGES IN GDP DURING THE CRISIS

This section presents the changes in GDP and its components in the analysed EU countries as a result of the 2008 crisis and investigates the relationship between corporate financial structures prior to the crisis and ex-post GDP contractions. Table 6 presents the percentage changes in GDP, domestic demand, final consumption expenditure, gross fixed capital formation, net exports and gross investment rate of non-financial corporations in 2009 and 2010 (relative to the previous year).

In 2009, the greatest contractions in GDP occurred in the Baltic countries: Latvia (-17.7%), Lithuania (-14.8%) and Estonia (14.3%), but also in Finland (-8.2%), Slovenia (-8%), Ireland (-7%) and Romania (-6.6%). The crisis had the mildest influence on Poland where GDP increased by 1.6% in 2009. On average, the crisis had a more severe impact on the real sectors of emerging than developed EU countries. The main contributor to the GDP contractions was a fall in domestic demand, while net exports positively contributed to economic growth in the majority of countries, including all emerging economies. The downward shift in domestic demand is largely explained by the drop in gross fixed capital formation. Here the numbers vary from -1.2% in Poland to almost -40% in the Baltic countries. Additionally, for 22 out of the 26 countries changes in gross investment rate of non-financial corporations are reported. The average drop rate was -14.9%, with emerging countries' corporations cutting their investment much more significantly (-22.2%) than those in developed countries (-10.8%). In emerging markets the greatest decreases in corporate investment took place in the Baltic countries (-30% to -40%), while in the developed countries' group corporations in Luxembourg and Spain noted the most severe contractions (-25.9% and -20.1% respectively). The drop in corporate investment was the smallest for Dutch corporations (-3.5%). Table 6 also shows that five of the analysed countries did not manage to return to the positive growth path in 2010. In that year GDP contracted further in Greece (-3.5%), Romania (-1.6%), Ireland (-0.4%), Latvia (-0.3%) and Spain (-0.1%). These drops in GDP were related to large decreases in gross fixed capital formation especially in Ireland, Greece and Latvia and further significant reductions in corporate investment. It

is worth noting that in 2010 the investment rate of Irish corporations went down by 35.6% (while in 2009 only by 8%) and firms in Denmark, Finland, Spain, Hungary and Poland experienced investment contractions of more than 10%. That confirms the longer term impacts of the crisis on the real economy which will be considered in the analysis below.

Since corporate investment is largely financed with corporate liabilities, it is important to investigate whether there are any links between corporate financing structure before the crisis described in the previous section and the subsequent contractions in investment and economic growth. The significant contractions in GDP and corporate investment in the Baltic countries and Slovenia can be related to their large negative net lending/ borrowing positions and their large accumulation of debt in the years prior to the crisis. The drops in investment of Spanish corporations could be related to their low liquidity and relatively high debt ratios in 2008. Longer term effects of the crisis for Greece may have been exacerbated by an extremely high indebtedness of its firms in 2008 and low liquidity. Similarly, great accumulation of debt and liquidity problems could have had a negative impact on the growth of Irish corporations. Correlation analysis follows to further investigate possible relationships.

Table 7 reports correlation coefficients between the individual components of corporate liabilities prior to the crisis and ex-post changes in GDP and investment. It is evident that the size of corporate liabilities does not correlate with changes in GDP. However, the composition of corporate liabilities matters for GDP growth. Countries where firms used more debt securities to finance their operations experienced lower GDP contractions (.37). Debt securities also exhibit positive correlation with gross fixed capital formation (.39) and corporate investment rate (.36) in 2009. That could indicate that greater use of debt securities as opposed to loans is a sign of greater stability or companies that are able to borrow from the bond market may be in a better financial situation that serves as a buffer in a crisis. Neither GDP changes in 2009 nor changes in corporate investment rate correlate significantly with debt or liquidity ratios of the firms. But the situation changes when average contractions for 2009 and 2010 are considered. Then the correlation between leverage and GDP changes is merely -.28 and not significant, but at 0.1 level gross fixed capital formation correlates negatively with both

debt and net debt ratios. Also corporate investment rate shows a negative relationship with the level of leverage (-.36). In addition, a negative relationship is found between the proportion of loans used in financing and the average change in gross fixed capital formation (-.42) and corporate investment (-.40) in 2009 and 2010. This confirms the hypothesis of negative relationship between corporate leverage prior to crisis and growth contractions afterwards.

Correlations between average flows for 2004-2008 and crisis induced GDP contractions shed additional light on the relationship between financing choices prior to the crisis and crisis severity (table 8). First, the greater were the flows of funds from loans in proportion to other liabilities, the more severe the drops in GDP in 2009 (-.34). On the other hand, GDP changes in 2009 and average changes for 2009 and 2010 positively correlate with flows from equity issues. A similar significant relationship for equity was observed with gross fixed capital formation and corporate investment rate. The correlation is especially strong when average corporate investment changes in 2009 and 2010 and average flows from equity prior to crisis are considered (.56). This indicates that greater reliance of the corporate sector on the stock market proportionally to other sources of external funds can protect it against negative crisis impacts. Average changes in corporate investment in the two years after the start of the crisis were also negatively correlated with the flows from loans (-.47), which confirms the above results of the analysis of stocks data in 2008. Additionally, there is a negative relationship between the use of trade credits and corporate investment rate in 2009. There is no evidence on the importance of the maturity structure of debt for crisis severity.

Finally, changes in the size and composition of corporate liabilities in 2008 relative to 2004 were correlated with the contractions in GDP and corporate investment. Table 9 presents the results. First of all, the correlation coefficients obtained here are higher than those described above. This could indicate a greater importance of the developments in corporate financial structures several years prior to crisis (i.e. changes in the composition of financial liabilities) than the financial structure just at the start of the crisis. The changes in the size of financial liabilities in proportion to GDP do not seem to have any significant relationship with crisis severity, just as to size of liabilities in 2008. But the composition of the liabilities plays an important role. In particular,

significant relationships were found for the changes in the proportion of loans and shares used and as a result also for the changes in debt and net debt to equity ratios. Again, an increase in the proportion of loans used by firms correlates significantly and negatively with all the measures of GDP changes, changes in gross fixed capital formation and corporate investment rate. Changes in the proportion of external equity capital used correlate positively with average changes in GDP, gross fixed capital formation and investment rate for 2009-2010. The negative relationship between the debt and net debt ratio and crisis severity measures is especially strong when growth and investment contractions during the 2 years after the start of the crisis are taken under consideration. That further confirms the negative impact of corporate leverage on crisis severity and indicates the importance of the build-up in leverage in the years preceding the crisis.

The results of this paper confirm previous findings on the role of corporate leverage for crisis severity by Stone (2000), Stone and Weeks (2001), Mulder, et al. (2002), Davis and Stone (2004), Kamil and Sengupta (2010) and Didier, et al. (2010). The negative relationship between short term debt and crisis severity, as suggested by e.g. Mulder, et al. (2002), cannot be confirmed by the data. There is also no evidence confirming the role of corporate liquidity as previously found by Stone and Weeks (2001).

CONCLUSIONS

The aim of the paper was to analyse the financial structure of non-financial corporations in the EU prior to the 2008 crisis and to determine whether the ex-ante differences in corporate financial structure had an impact on the severity of the 2008 financial crisis in European countries. Although non-financial firms were not the main culprits in the global financial crisis of 2008, the paper confirms that their financial structure had implications for crisis severity in Europe.

Based on stocks data, prior to the crisis the greatest risks to financial stability were visible in the corporate sectors of Cyprus, Denmark, Greece, Ireland, Latvia, Portugal and Spain. They resulted from a significant reliance of corporations in those countries on debt and also relatively low liquidity, especially Danish, Greek, Irish, Portuguese and Spanish firms. Additionally, a high reliance of Belgian firms on short term debt could have put them in danger

in times of constrained access to credit and lack of refinancing possibilities. The average flows of funds during the period 2004-2008 generally confirmed the results of the stocks analysis revealing additional weaknesses of Lithuanian, Estonian, Romanian and Slovenian firms stemming mainly from their high net borrowing positions. In addition, changes in the size and composition of corporate financial liabilities in 2008 relative to 2004 revealed a significant build-up of corporate indebtedness in Greece, Ireland, Latvia and Slovenia.

A comparison of developed and emerging EU countries showed that the size of corporate financial liabilities as a percentage of GDP was larger in developed countries, confirming a higher level of development of their financial markets. Corporations in this group also used significantly more debt securities to finance their operations than firms in emerging Europe. On the other hand, trade credit was a much more important source of funds for the latter. Contrary to previous research, neither the maturity structure of debt nor the liquidity ratios of firms were found to be significantly different for those two country groups. This may reflect the convergence of EU emerging market firms' financing patterns to those of EU developed countries' corporations.

As a result of the crisis the drying up of lending in the interbank market led to a tightening of credit conditions and made it difficult for companies to refinance debt (especially those with lower creditworthiness). Consequently, corporations relying to a large extent on financing from loans may have found themselves needing to reduce investment, employment and revisit their expansion plans, which would have had negative implications for general economic growth. The results of the correlation analysis confirm this scenario. It is shown that the size of corporate leverage prior to the crisis correlates negatively with changes in corporate investment and gross fixed capital formation due to the crisis. The average flows from loans during 2004-2008 are negatively related to GDP, gross fixed capital formation and the corporate investment rate, while the flows from equity show a positive relationship. Interestingly, the most significant correlations were obtained when changes in the composition of corporate external liabilities in 2008 relative to 2004 are correlated with post-crisis GDP and investment contractions. The analysis confirms the negative relationship between the growth in the proportion of

loans used in financing as well as the change in the debt ratio and GDP and investment changes. These results indicate a greater importance of the growth in corporate indebtedness in the years prior to crisis for crisis vulnerability than just the level of debt immediately before the crisis. The maturity structure of debt or corporate liquidity prior to crisis were not found to be important factors explaining crisis severity.

The paper has important policy implications. First, it calls for greater surveillance of the corporate sector not only by national governments but also by international financial institutions. That would require collection of timely, complete and comparable data from the corporate sector. Such a close monitoring of the corporate sector should help in a better assessment of the overall economic vulnerability and in preventing future crises. Secondly, corporate vulnerability to crises can be reduced by enhancing the role of financial markets in corporate financing. As shown in the analysis above, greater reliance on external equity prior to the crisis was positively correlated with subsequent growth. Besides that, bond markets play an important role in corporate financing during a crisis when bank credit dries up. Finally, the results call the preferential tax treatment of debt into question. The attractiveness of debt over equity financing results from the tax deductibility of interest. But if debt has a damaging impact on the economy, such tax preferences should be reconsidered.

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