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Caught in the US subprime meltdown 2007/2008: Germany loses its wallet but escapes major Harm

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Discussion Papers

825

Stefan Kooths • Matthias Rieger

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Berlin, October 2008

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Caught in the US Subprime Meltdown 2007/2008: Germany Loses its Wallet but Escapes Major Harm

Stefan Kooths and Matthias Rieger, DIW Berlin

Abstract

The ongoing financial crisis so far cost the German financial sector 38 billion Euros due to losses on its mortgage-related subprime bank exposures. This paper looks for the impact of these losses on the real sector of the economy. First, the financial sector is looked at as part of the overall macro economy in order to identify the direct impact of the write-offs and devaluations of financial assets on value-added and employment in the financial industry. In the second part of the paper the financial sector's role as enabler of real investment is analyzed. So far, there is no significant evidence that the credit creation capacity of the German banking system as a whole was negatively affected (as indicated by stable money multiplier and base equity ratio values). In particular, the flow of credit to non-financial businesses remains intact despite heavy turmoil within the financial sector. Also, the overall interest rate for corporate lending did hardly increase. Econometrically, a switching disequilibrium model and a market-clearing approach were setup to test for excess demand during the crisis and any general impact of the crisis on the credit market respectively. The statistical tests turned out to be little helpful for quantifying any major effect. We conclude that despite the substantial financial losses there is no major negative spill-over from the banking sector to the real economy in Germany.

1. Introduction

The longer the current financial crisis lasts the more urgent becomes the question of what its impact on the real economy is going to be. This paper focuses on the situation in Germany, a country which itself did experience neither a housing price bubble in the last decades nor a crisis in its mortgage markets and where a subprime market segment does not even exist. Nevertheless, German investors (mainly from the banking sector) were significantly engaged in structured financial products that came under heavy pressure during the course of the crisis.¹ During the first year of the crisis the German financial sector has incurred write-offs and losses on its mortgage-related subprime bank exposure of over 38 billion Euros [Bloomberg (2008)]. This amount represents 10 percent of all losses expected world-wide and is the lion share of the damage incurred by all Euro Area-based banks. The write-offs and devaluations account for 0,4 percent of the German banking sector's total assets. While this might seem a rather negligible magnitude, the macroeconomic scale of the problem becomes evident when the losses are put in relation to GDP (more than 1 percent) or the banking sector's capital and reserves (about 8 percent).

The potential impact of the financial market turbulences on the macro economy has two major aspects that are dealt with in the subsequent chapters. Chapter 2 looks at the financial industry as a producing part of the overall economy (in terms of employment, value added, earnings and tax payments) and therefore analyses the possible direct impact on GDP. Given the substantial amount of write-offs within the banking sector it is important to know how these losses are handled within the system of national accounts in order not to expect any misleading technical repercussions on GDP. Also, possible indirect effects on the level of activity in the banking sector (production of financial services) are assessed. The next chapter focuses on the banking sector's major role as a financial intermediary (acting as a matching agent for overall saving plans and real investment projects). Many observers argued that the turmoil in the financial world, by eroding the banking sectors capital stock, would negatively affect its capacity to create credit for the non-financial sectors of the economy. Therefore, the lending volumes and interest rates for the household and non-financial corporate sector during the crisis are of particular interest. In the sake of keeping the study focused on the interplay between the banking sector and the rest of the economy, other aspects that might be associated with the crisis (like stock market developments)

¹ For a brief depiction of the development of the crisis see Baker (2008).

remain uncovered. Finally, Chapter 4 concludes. As an appendix, chapter 5 discusses the econometrics of assessing the crisis impact on the German credit market.

The analysis draws on the data available for the first four quarters of the course of the crisis (July 2007 to June 2008). Thus the results presented here are necessarily of a preliminary nature. The paper serves to structure different transmission channels, to assess the current effects and to make more informed projections with respect to the impact of the financial crisis on the German business cycle in the near future before final evidence becomes available.

2. The financial industry as part of the macro economy

It is widely accepted that the financial industry plays a key role for the prosperous development of modern economies which gets this sector permanently hold of close attention by the media, regulators, and policy makers. Germany, although its banking industry is a relatively small player in the global arena, is no exception in that respect. Of course, this prominence in public interest stems almost exclusively from the banking sector's financial intermediation role for the rest of the economy whereas in its part as a producer and, therefore, as a direct contributor to value added or national income this sector remains more or less unnoticed (in theoretical macroeconomics, this latter aspect is typically even completely ignored). But, when the banking sector sees its profits significantly compressed due to write-offs and revaluations caused by non-performing foreign loans or heavily devalued foreign assets by which these loans were securitized (like asset backed securities or collateralized debt obligations), one may wonder whether the reduced corporate earnings that were reported in the course of the financial crisis also show up in the national accounts' income aggregates of the country that the banks are located at. Besides this possibly immediate impact of bank losses on profits and national income, the financial turbulence might negatively affect the overall business model of the banking sector and reduce the demand for financial services and thus erode production and value added in this sector indirectly. This latter aspect is dealt with in the second section of this chapter.

2.1 Are financial losses lost in the national accounts?

Asking the headline question is – prima facie – for good empirical and theoretical reasons. Empirically, the magnitudes in the German case are such that the question is highly relevant even in macroeconomic terms: The accumulated losses of banks on their mortgage-related subprime exposures already exceed the threshold of one percent of gross domestic product (GDP) or gross

national income (GNI) respectively (see Table 3, p. 11, for details). Irrespective of the fact that this number still contains mere bookings losses due to pricing-to-market devaluations that need not necessarily materialize as final write-offs in the future it should be clarified whether it makes sense – in conceptual terms – to relate the losses from defaulting financial investments to income flows that are computed in the system of national accounts. Theoretically, this might seem well justified because

- (i) the write-offs and devaluations are on foreign assets that result from former investment of German banks in the US (if domestic securities were involved there would be no aggregate effect because the changes in assets and liabilities would cancel out), and
- (ii) the assumed impact would be fully in line with the standard theoretical concept of income that – following a Hicksian tradition [Hicks (1946), p. 172] – is officially defined within the System of National Accounts (1993 SNA) as “the maximum amount that a household, or other unit, can consume without reducing its real net worth” [UNSD (1993), § 8.15].²

Clearly, the real net worth of the German banking sector (and that of the German total economy) vis-à-vis the rest of the world is negatively affected by the bad investments in the US subprime mortgage market. So, again, do these losses have – quasi by definition – an immediate impact on German GDP or GNI? Will they eat up more than half of this country’s expected annual growth for the year 2008?

The answer is ‘no’ and the reasoning behind it gives an illustrative example why national accounting is – and logically must be – different from just aggregating flows and stocks from the micro level. The accrual of primary income, as it is recorded in the national accounts, corresponds to the creation of value added which is conceptually linked to production (value added = production of goods and services less intermediate input).³ The concepts of production and, consequently, that of value added are free of any redistributive elements.⁴ Production of any economic unit is always and everywhere a creative activity: something new is created and not taken

² For a discussion of alternative income concepts cf. Reich (1991).

³ Distinguishing between gross and net value added is irrelevant here, because the write-offs on financial assets have nothing to do with the consumption of fixed capital that marks the difference between both quantities.

⁴ The interpretation of “net other taxes on production” as compensation for publicly provided inputs might be controversial in this respect. But this borderline case is not relevant to the general conceptual design discussed here.

away from someone else. Therefore, wherever on this planet value added is created, it fully reflects in an increase of gross global product (= gross world income) and therefore cannot diminish the value added of another area.

The conceptual linkage between production and income ensures that within the framework of national accounts gross domestic product can be calculated consistently from three different approaches: the production approach (creation of products), the income approach (compensation of production factors) and the expenditure approach (use of products). Within this concept, the productive activity of the banking sector consists in providing financial services (like account management or loan assessment and monitoring activities) for which the sector is compensated (value added) so that it can pay for the use of the primary input factors (labor and physical capital) in the form of wages and profits. The economic value created by delivering these services is by no means affected when borrowers default or when financial assets are devalued. Therefore, although these loan and devaluation losses leave deep traces in the banks' earnings statements at the firm level, they do not diminish value added of the banking sector (and the total economy) as shown in the national accounts.⁵ Therefore, one would commit a conceptual mistake if the profits of the banking sector were calculated just by adding up the banks' net incomes that are reported in their balance sheets.

It follows from the fact that value added is conceptually unaffected by the subprime-related write-offs of the banking industry that GDP remains also unchanged. The effect on GNI is slightly more subtle: although there is also no direct loss, GNI is lowered as the future income earned by defaulted capital abroad is lost. Hence future earnings are lower and thus future GNI decreases⁶.

So, are all these write-offs that made the headlines in the financial newspapers for months completely ignored by national accounts? No, but they are recorded outside the current accounts and treated either as "other volume changes in financial assets and liabilities" (K.10 in the "other

⁵ The different measurement of profits by firms and national accounts is not specific to the financial industry. See Görzig (2001) for a detailed conceptual discussion and an analysis of profits in the German manufacturing sector.

⁶ However, to the extent that the subprime-related losses compress official earnings of the banking sector, the tax bill of this sector is also reduced. This might not only have redistributive effects but – for technical reasons of closing the national accounts – also affect the magnitude or composition of value added in as much as taxes on production are influenced.

changes in volume of assets account”) in the case of write-offs due to defaulting loans or as “nominal holding gains/losses” (K.11 in the “revaluation account”) for those losses that are due to devalued securities. As a result they negatively influence the net worth of the German total economy.

2.2 The German financial industry: Too small to hurt

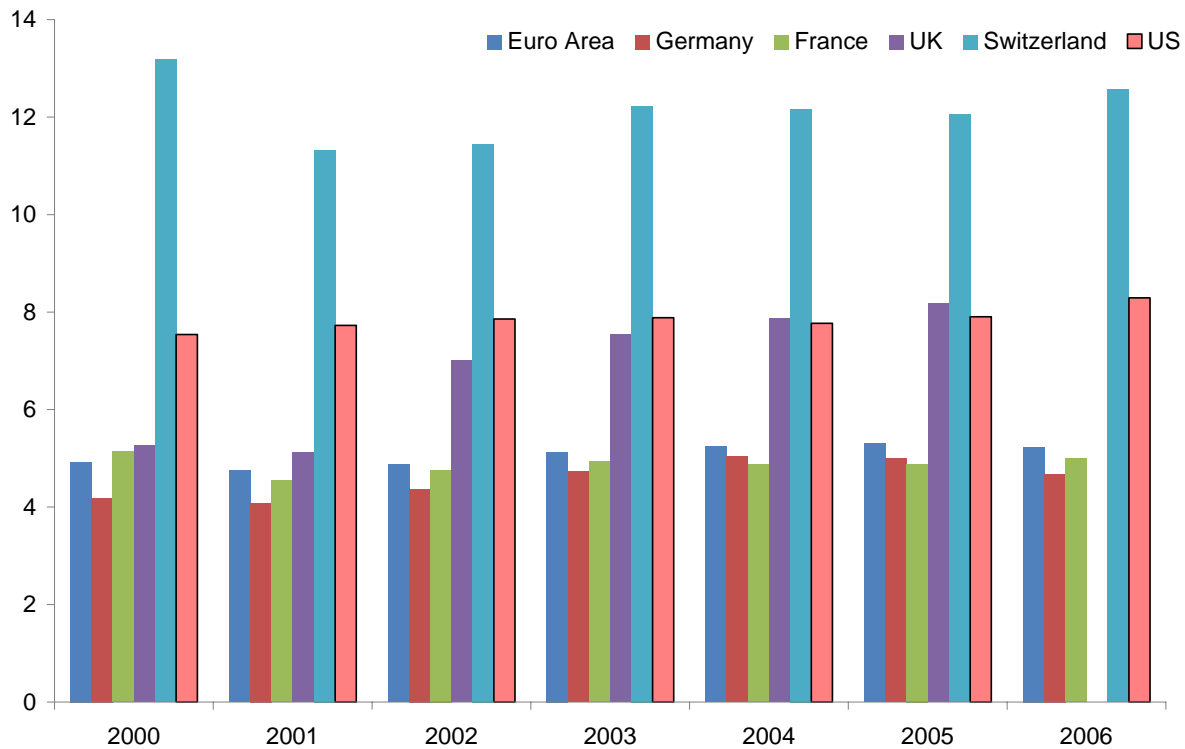
So far, the analysis has shown that the dozens of billions of Euros that German banks have burnt in the subprime crisis do not as such reflect in lower operating profits of the financial sector as recorded in the national accounts; however, this crisis could have an indirect effect on value added if the turbulence in the financial markets influenced the level of activity of the sector as a whole (i.e. the volume of financial services produced for the rest of the economy). Whether and to what extent this could be the case is currently difficult to access. The empirical evidence in terms of lending volumes (presented in the next chapter) suggests a rather mild effect. Before we look at this data more closely, the remainder of this chapter examines the relative importance of the German banking sector in order to clarify what is at stake when its business slows down.

Figure 1 gives an impression of the importance of the financial industry (finance and insurance) in selected countries. In Germany, this sector contributes less than 5 percent to total value added, 70 percent of which stem directly from the banking sector (similar intra-industry shares apply to Switzerland and the United States). For the Swiss economy, the direct economic impact of the financial industry is more than twice as high as that for its German neighbor. The Anglo-Saxon economies also create significantly more income out of their financial industry than Germany. This clearly reflects the dominance that their financial centers hold in the global markets [Maslakovic (2008)].

Of course, in times of financial crises the flip side of this dominance is that they are more directly exposed to potential damages from financial turbulences. This is all the more important as these crises are more likely to severely affect those financial services that make the difference in value added between Germany and countries with a more advanced financial industry. The most important of these services is investment banking with core activities such as the mergers and acquisitions business or debt and equity capital markets underwriting. By contrast, the bread-and-butter business of retail banking is usually much less influenced by financial turmoil. Given the overall attractiveness of the Anglo-Saxon (and other international) financial centers (favorable regulatory design, network and economies-of-scale effects) they are also the playing field for those German

banks that are active in this business, so that the activities of their investment banking branches usually do not show up in German GDP.

Figure 1 | Value added in the financial industry as percent of total value added



Sources: Eurostat, Swiss Statistics, Bureau of Economic Advisors.

Note: UK numbers were not available for 2006 at the time of publication.

Therefore, given the landscape of the financial industry, it is unlikely that the current crisis will do much damage to domestic production and value-added of the German banking sector. This is confirmed by the employment impact of the crisis that is known so far. Until mid-2008, German financial corporations cut 4000 jobs due to the difficulties they face in the subprime crisis (Table 3). This corresponds to less than 2 thousandths of the financial industry's labor force. This direct employment effect of the crisis is further qualified by the fact that the German financial industry – due to ongoing restructuring and productivity growth – has been reducing its staff by about 10000 employees per annum since the year 2000.

3. The banking sector as enabler of real investment

By collecting funds from one set of customers (economic units with a financing surplus) and lending them to those who face a financing deficit, the banking sector plays an important role as enabler for physical investment spending of the real sectors of the economy, in particular for non-financial corporations and private households. Fears are that the turbulence caused by the subprime crisis might interrupt this process of financial intermediation and thereby negatively impact private aggregate demand for goods and services (spill-over of the subprime crisis to the real economy via the credit channel). The theoretical underpinning for the specific importance of banks as financial intermediaries is based on the fact that intermediated loans and marketable bonds are not perfect substitutes because not all borrowers have access to capital markets (which is obvious for households but also for many typically smaller firms). Therefore, bank lending (or the absence of it) might have macroeconomic impacts that need not necessarily fully reflect in bond market equilibrating interest rates which give rise to the “lending channel” view of monetary transmissions [see Kashyap and Stein (1994) for a more detailed discussion].

Some observers interpreted the tensions on the interbank money markets (caused by mutual mistrust and reflected in the unwillingness of banks to lend money to competitors at conditions near the target rates of the central banks) as forerunners of a general credit squeeze. Others, like the IMF (2008), point at higher risk premiums that would make financing of investment projects more expensive for borrowers. Within the conventional IS-LM framework these views imply contractionary left shifts in the IS- (increase in risk premiums) and LM-curves (decrease in the supply of money and credit) respectively [Bernanke and Blinder (1988); Bernanke and Gertler (1995)].

Now that the subprime crisis has been lasting for more than four quarters, potential problems for the real economy had some time to materialize and to show up in the data. The analysis in this chapter draws on the assumption that significant macroeconomic repercussions from the financial tensions on the real economy must – in one way or another – show up in the consolidated balance sheets of the banking system and/or in the borrowing cost of the real sectors.

3.1 Technical restrictions on the banking system’s lending capacity

Generally, the lending capacity of the banking sector is limited by two factors, (i) the availability of base money in conjunction with the money multiplier and (ii) the banking sector’s capital ade-

quacy for sustaining sound credit-equity ratios. From a theoretical perspective, there are reasons to assume that both factors are negatively affected by the subprime crisis. In the following, the theoretical mechanisms are briefly discussed and then checked for empirical evidence. Given the high degree of financial integration within Europe, data for Germany and the Euro Area are looked at simultaneously.

Table 1 | Money and credit market parameters in Germany (Euro Area in parentheses)

	Pre-crisis I (2003.M1 to 2007.M6)	Pre-crisis II (2006.M7 to 2007.M6)	Crisis (2007.M7 to 2008.M6)
Money multiplier	9,08 (10,79)	8,14(10,02)	8,26 (10,21)
Effective reserve rate, %	3,29(2,71)	3,24 (2,73)	3,24 (2,77)
Monetary base (annual growth), %	10,91 (12,91)	9,39 (10,88)	8,69 (9,50)
M3 (annual growth), %	3,63 (7,73)	4,69 (9,54)	10,24 (11,57)

Source: Deutsche Bundesbank, European Central Bank, DIW calculations.

Ad (i): The maximum amount of money and credit that the banking sector can create on aggregate depends on the supply of base money and the size of the money multiplier as emphasized by the so-called credit view of monetary policy [Bernanke and Lown (1991), pp. 213 f.]. While the monetary base is under control of the central bank the parameters that shape the money multiplier (the cash ratio and the effective reserve ratio) are not. The macroeconomic concept of the money multiplier is influenced by the workability of interbank markets. When banks with excess liquidity are reluctant to transfer their surplus funds to those that are short of liquidity the average effective reserve ratios increases which reduces the money multiplier as well as the maximum quantity of money and credit. However, despite the heavy turbulence on the interbank markets reported during the first months of the crisis, this potentially depressing effect does not show up in the data (Table 1). Actually, the effective reserve ratio is quite stable over time and money multiplier movements are primarily dominated by cash ratio alterations whose increasing trend from the previous years was slightly reversed during the crisis. Additionally, the ECB faced the financial tensions with expansionary interventions, so the potentially dampening effect on credit growth via freezed interbank markets did not materialize.

Table 2 | Balance sheet ratios of the consolidated financial sector in Germany (Euro Area in parentheses)

	Pre-crisis I (2003.M1 to 2007.M6)	Pre-crisis II (2006.M7 to 2007.M6)	Crisis (2007.M7 to 2008.M6)
Base equity ratio (domestic), %	7,26 (9,56)	7,94 (9,78)	7,94 (9,87)
Base equity ratio (total), %	5,90 (7,64)	6,23 (7,56)	6,58 (8,16)
Domestic loans (annual growth), %	0,75 (6,95)	0,68 (8,79)	4,44 (12,29)
Capital and reserves (annual growth), %	4,46 (7,85)	8,71 (10,93)	4,46 (13,34)

Source: Deutsche Bundesbank, European Central Bank, DIW calculations.

Ad (ii): The second limiting factor for the lending capacity of the banking sector stems from its need to show up sound equity ratio numbers in order to fulfill risk coverage requirements [Sharpe (1995); Bernanke and Lown (1991), pp. 221 ff.]. Given the heavy write-offs and revaluations German and European banks incurred with respect to their subprime-related investments the so-called capital channel that works via the banking sector's balance sheets is an obvious potential threat to their ability to create credit. But, as can be seen from Table 2, both German and European banks' so far were able to protect their equity base ratios.⁷ They did so not by cutting back their outstanding loans but by either compensating subprime losses by other profits or by fresh equity inflows from the capital markets.⁸ German banks were able to raise over 16 billion euro in new capital, while facing about 38 billion in subprime-related losses (Table 3). In addition, if it is true that the bulk of losses is already reflected in the banks' balance sheets then there is no major threat of a capital crunch [Syron (1991)] that would negatively affect the banking sector's lending capacity due to the subprime crisis in Germany and Europe.

⁷ However, as there exists no clearing environment on a day-to-day basis for equity among banks (like the interbank market for base money) the aggregate view on the banking sector conveys only a necessary, not a sufficient view on the system-wide lending capacity [Friedman (1991)].

⁸ According to an ECB analysis it can be ruled out that the stiffening loan expansion during the course of the crisis is just a technical effect due to possibly fewer securitization possibilities that would mitigate the "originate and distribute" banking model. Cf. ECB (2008b), pp. 23 ff.

Table 3 | Estimated subprime-related writedowns, losses, and job cuts in Germany (by August 27th 2008)

German Banks	Writedown & Loss	Capital Raised	Job Cuts
<i>In Billion Euro</i>			
IKB Deutsche Industriebank AG	10,27	8,44	
Deutsche Bank AG	7,21	2,18	470
Bayerische Landesbank	4,83	0,00	
WestLB AG	3,20	4,97	1530
Dresdner Bank AG	2,72	0,00	
Landesbank Baden-Wuerttemberg	2,59	0,00	
HSH Nordbank AG	1,84	1,29	
Landesbank Sachsen AG	1,77	0,00	
Commerzbank AG	1,56	0,00	
DZ Bank AG	1,36	0,00	
Hypo Real Estate Holding AG	0,82	0,00	2000
Germany	38,16	16,87	
World	234,21	163,17	

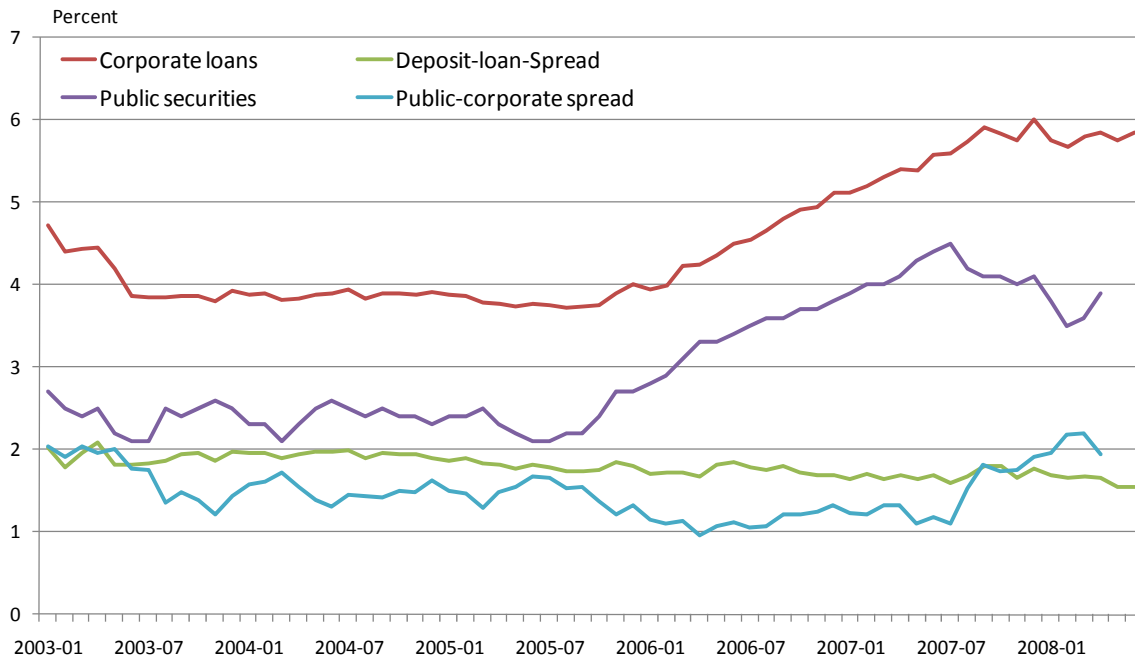
Sources: Bloomberg (2008), DIW calculations.

Note: Dollar numbers have been converted at a rate of 1.47 Dollar per Euro.

3.2 Risk premiums and credit costs

From the facts analyzed so far, there is little evidence that the non-financial sector in Germany is facing a credit squeeze as the aggregate lending volumes seem to be more or less unaffected. But, availability of credit is only one side of the coin. The other side, of course, is the cost (interest rate and credit conditions) at which credit is made available to potential investors in the real sector. Theory suggests that the financial turmoil (triggered of by increasing shares of defaulting mortgages in the US) translates into higher risk awareness reflected in increased risk premiums that put upward pressure on relevant capital cost for non-financial investors (contractionary shift in the IS curve).

Figure 2 | Interest rates and spreads



Source: Deutsche Bundesbank, DIW calculations.

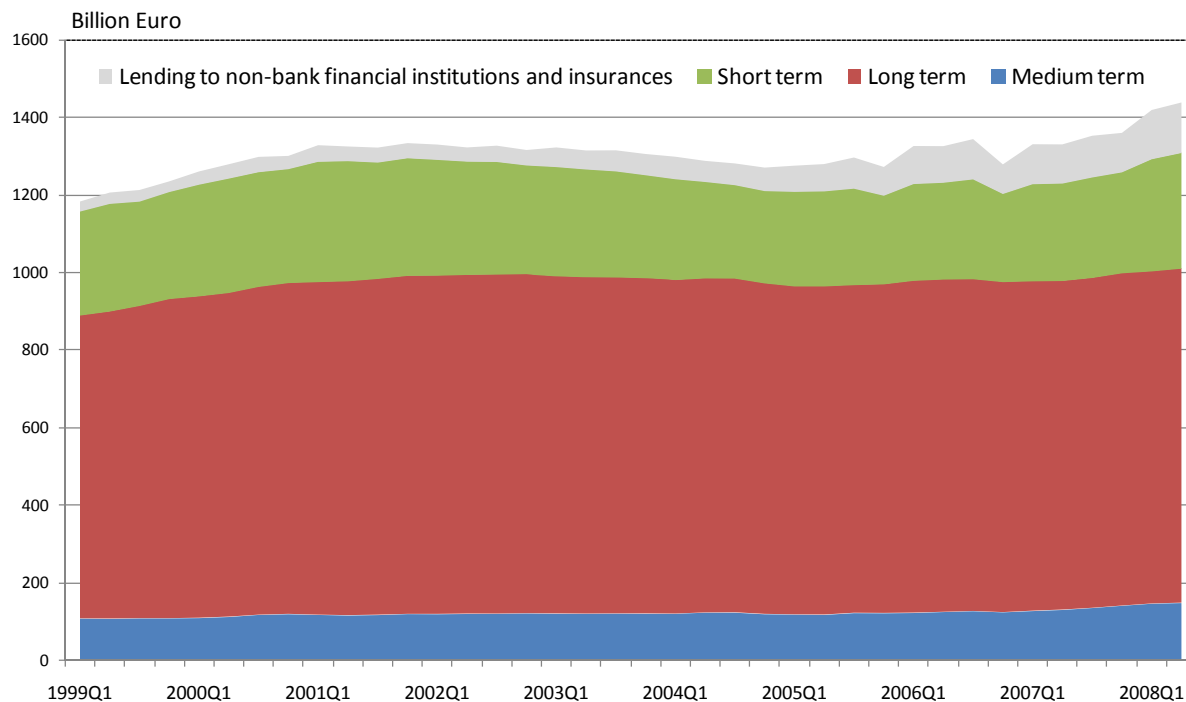
In its attempt to quantify the impact of the subprime crisis on the real economy in Europe, the IMF assumed (i) a 100-basis point increase in corporate spreads and (ii) a 100-basis-point increase in the spread between lending and deposit rate both for two years in all advanced economies [IMF (2008), p. 31 f.]. Compared to a no-shock-scenario the first effect is estimated to cause growth losses for the Euro Area between 0.3 and 0.4 percent of GDP in 2008 and 2009 while the second effect reduces GDP in both years by 0.1 percent. While the assumed increase in corporate spreads seems to hold for the German economy, so far there is no evidence for the deposit-loan spread (Figure 2). Plus, the higher risk premium for corporate loans of about one percentage point coincides with a decline of the (risk free) public interest rate of about the same amount so that the overall interest rate for corporate lending (as the sum of risk free yield and risk premium) remains nearly unaltered (both effects are not independent from each other as higher risk aversion leads to increasing demand for public securities thereby lowering their yield rate).

The following four subsections sketch major segments of the German credit market and briefly discuss their respective potential impact on aggregate demand and the German business cycle.

3.3 Lending to non-financial corporations and investment demand

This subsection breaks down credit volumes to German businesses by maturity and type of lending bank to further underline that the financial turmoil's impact has been limited (Figure 3). Total loans have grown more strongly rather than contracted since the beginning of the crisis in July 2007.

Figure 3 | Loans to Domestic Enterprises and Self-Employed Individuals by maturity



Source: Deutsche Bundesbank.

Note: These time series are not available on a monthly basis. However closely related monthly proxies confirm the general findings of our analysis.

At first glance this positive development is counterintuitive and puzzling: originating from the U.S., the global financial world has been hit by sub-prime mortgage related turbulences, which are now extending to U.S. securitization instruments and eventually credit markets. In this kind of crisis banks have to swallow and cushion risks by bringing back their off balance sheet adventures into their balances, which is simultaneously impeded and hardened by huge losses. Consequently, banks have a lower capital basis and need to reduce exposure to new risk, which might result in a credit crunch or squeeze that the world is possibly starting to experience [IMF

(2008b)]. The German case seems to be different, although some big German Banks were running disastrous off-balance Special Investment Vehicles.

Yet five indicative explanations may help to shed light on this puzzle in Germany:

i) The recent growth is statistically overstated: The total sum of loans to business and self-employed includes lending to non bank financial institutions and insurances with over 60% of them being short term loans. However, this sector is of minor interest to analyze a crisis impact on real economic activity. Loans to this sector have increased amply during the crisis (Figure 3) which was mainly due to the involvement of firms like Clearstream in the technical processing of repurchase operations between the central bank and commercial banks. By netting out for credits to non bank financial institutions and insurances the average year-on-year credit growth rate to the non-financial business sector drops from 4,2 % to 2,7 % (2007:Q3 to 2008:Q2). But, the puzzle remains, loan growth still remains above its pre-crisis level after netting out this technical effect.

ii) Firms are building up liquidity cushions: In face of the crisis, firms have drawn on outstanding credit lines to secure the financing of their future operations [Almeida et al. (2004)]. This liquidity accumulation is also indicated by ever growing time and sight deposits held by enterprises: While total deposits by enterprises at commercial banks had been growing at average annual growth rates of 6.2% from 2003:1 to 2007:6; deposits expanded rapidly with an average of 14.6% per annum during the crisis period from 2007:7 to 2008:6.

iii) Banks are rediscovering their traditional business: Banks have ceased to pump liquidity in off-balance activities and financial products to concentrate on solid business lending. Indicators of this are withdrawals from Special Investment Vehicles and subprime investment business: Several German commercial and Landesbanken⁹ are selling, or canceling credit lines to Special Investment Vehicles (SIV). For instance Dresdner Bank has been trying to

⁹ Landesbanken are public banks owned by Federal States and public saving banks. They are universal banks and with minor exceptions under public law. They cooperate closely with savings banks and are owned by other Landesbanken, savings banks and the German State. Thus they enjoy prime credit ratings as they are widely backed by the German governments in case of default. Often they act as international commercial banks. Together with their regional retail banks, they offer the whole range of products and services typical of a modern large bank.

lower exposure and credit lines to their SIV K2. Although winding SIVs down completely will take several quarters, this trend contributes to positive loan growth in crisis times.

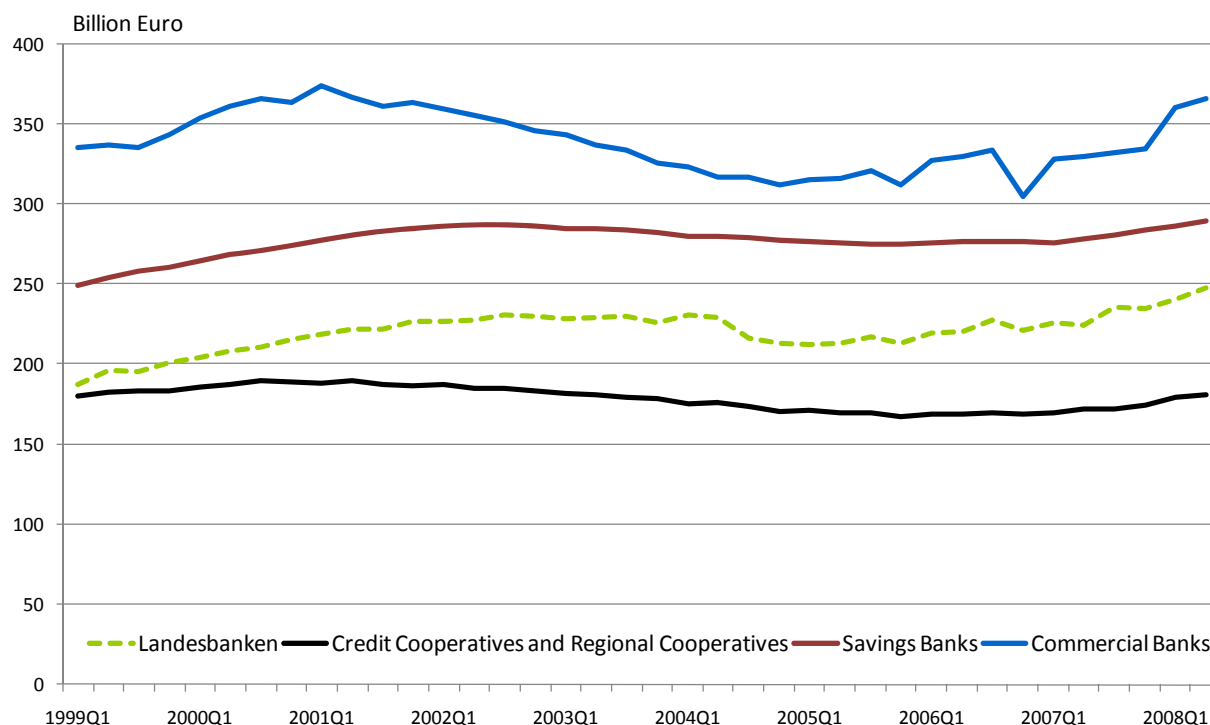
iv) Credit conditions remain favorable: After the dotcom crisis 2000/2001, total loans to business had been falling drastically until the end of 2005 (Figure 3). Lending conditions were tight and banks reluctant to lend [Bundesbank (2008)]. Since 2006 loan growth has been positive and healthy; in fact strong enough to remain unaffected by the crisis. This development may stem from solid business performance and favorable macroeconomic conditions that have so far been decoupled from the ongoing crisis.

v) The maturity distribution of total loans in Germany: The recent, rapid pick up in total loans has been driven by a pronounced expansion in short term loans; whereas long term loans have followed their positive long term trend throughout the crisis. Long term loans are not as responsive to short term developments: Contracts cannot be renegotiated easily and are more insulated from short term shocks. Figure 3 shows that long term loans are the preferred external finance instrument to fund business operations. In total, short term loans have accelerated credit growth temporarily, while central long term loans are stabilizing growth in the long run.

Total loan growth to business and self-employed can further be disaggregated by types of banks. In 2008:Q2, commercial banks had the largest market share of business loans with 28% followed by public savings banks (22%), Landesbanken (19%) and cooperative banks (14%). Especially savings banks are central to finance small to medium term enterprises on the local level. Also, these banks are only indirectly exposed to the subprime crisis through their ownership of Landesbanken. Savings banks are not solely profit maximizing, but mainly politically driven. They might be in many aspects inefficient, but they are also stabilizing business financing during periods of financial crisis.

As Figure 4 demonstrates, commercial banks most significantly expanded business loans over the last three crisis quarters, most of them being short term loans. More generally, commercial banks' lending volumes have been a lot more volatile since 1999 compared to credit cooperatives, savings banks and Landesbanken. To sum up, commercial banks contributed to short term acceleration in credit growth, while crisis free public banks like saving banks are the basis of stable loan growth.

Figure 4 | Loans to Domestic Enterprises and Self-Employed Individuals



Source: Deutsche Bundesbank.

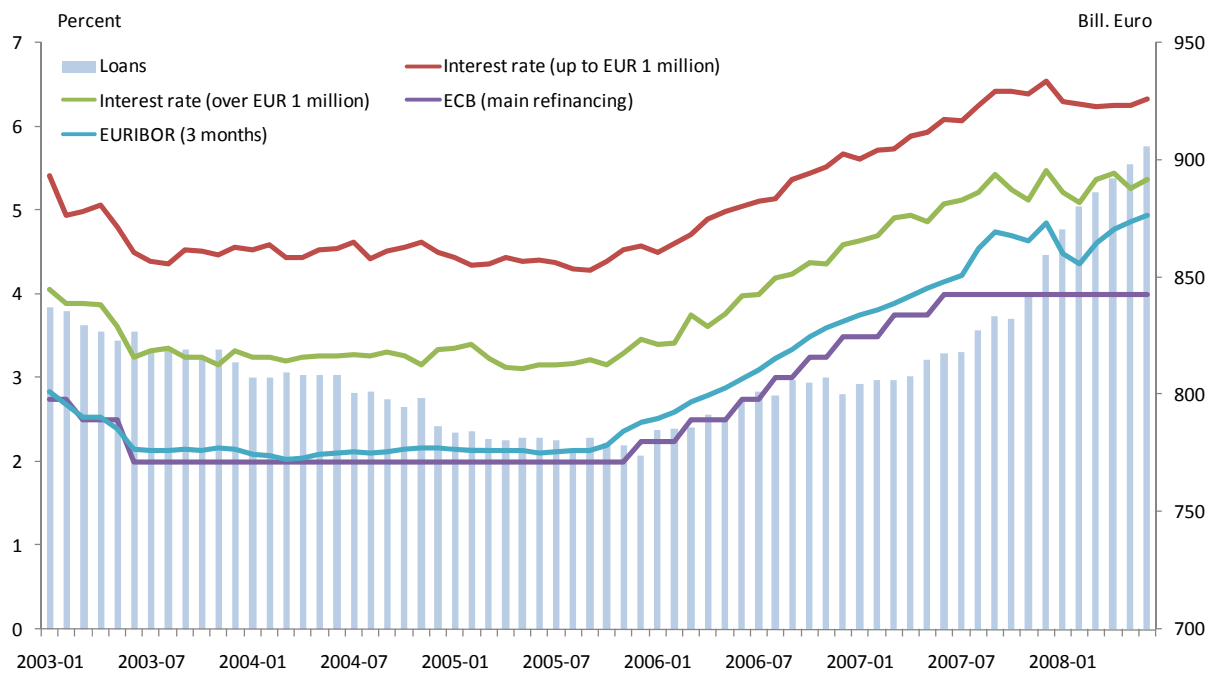
Furthermore, credit expansion progressed rapidly along with the trend of narrowing spreads between short-term corporate interest rates vis-à-vis the Euribor. Interest rates for smaller and larger loans have responded in a very similar way, which gives rise to presume that smaller firms are not set at a relative disadvantage.¹⁰ The distinction between smaller and larger (or, more precisely, poorly and well capitalized) borrowers plays an important role and has been described as the “balance sheet channel” or the “financial accelerator” of monetary shock transmission [Bernanke and Gertler (1995), pp. 35-40] as firms with a sound financial position are much less exposed to funding cost fluctuations due to variations of risk premiums that lenders demand in response of procyclic variations of equity ratios shown in the borrowers’ balance sheets. The evidence derived from constant interest spreads between small and large loans is in line with the qualitative results from the latest bank lending survey for Germany that do not show major dif-

¹⁰ See Gertler and Gilchrist (1994) for evidence from the US that smaller firms play an important role in the propagation mechanism of financial shocks to the real economy. For a model that covers capital constraints both for firms (differentiated by size) and intermediaries cf. Holstrom and Tirole (1997) who confirm the important role that small/poorly capitalized firms play for monetary transmission.

ferences between credit standard trends for small and large borrowers either [see Figure 9 and Bundesbank (2008)]. This finding is crucial, as small to medium term enterprises contribute most to German GDP, and reflects the fact that the equity ratios of German firms has improved constantly on a general scale during the last years.

On a general scale, it appears that tightening of credit standards and the readjustment of risk premiums play a less important role in Germany than for the average bank in the Eurosystem [ECB (2008a); Bundesbank (2008)].

Figure 5 | Interest rates and corporate loans

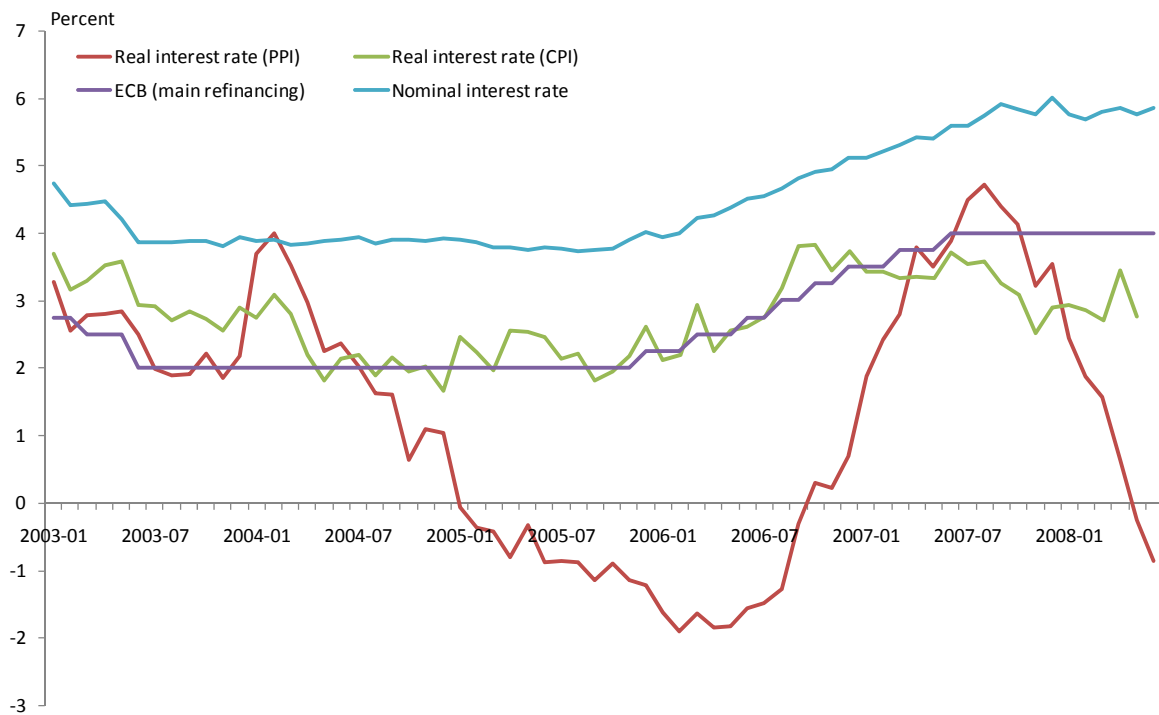


Source: Deutsche Bundesbank.

With respect to investment demand real interest rates are of course even more important than nominal ones. Assuming adaptive inflation expectations, Figure 6 shows that – due to the recent increase in inflation rates – the real interest rates for corporate loans have decreased since the outburst of the crisis. This trend is particularly pronounced when corporate interest rates are de-

flated on the basis of producer prices.¹¹ Therefore, although German investment demand is hardly interest-responsive the latest developments on the markets for corporate loans are indicating expansionary incentives for investment financed by loans rather than negative spill-overs from the financial crisis.

Figure 6 | Nominal and real interest rates for corporate loans



Source: Deutsche Bundesbank, DIW calculations.

This section discussed loans to business in a non-technical way. Using econometric methods one might hope to detect and quantify the crisis impact on loans, controlling for explanatory variables like GDP, interest rates, bank capital etc. Consequently, we further investigated business lending volumes in two econometric frameworks, a switching disequilibrium model to test for excess demand during the crisis and a market-clearing approach to test more generally for any impact of the crisis on the credit volume via a dummy variable (Technical Appendix). Serious estimation problems arose, mainly because the loan time series has several trend reversals and breaks.

¹¹ The producer price inflation is heavily influenced by the sharp increase of imported goods (raw materials and energy) but qualitatively similar results would be obtained when using the GDP-deflator (which is not available on a monthly basis).

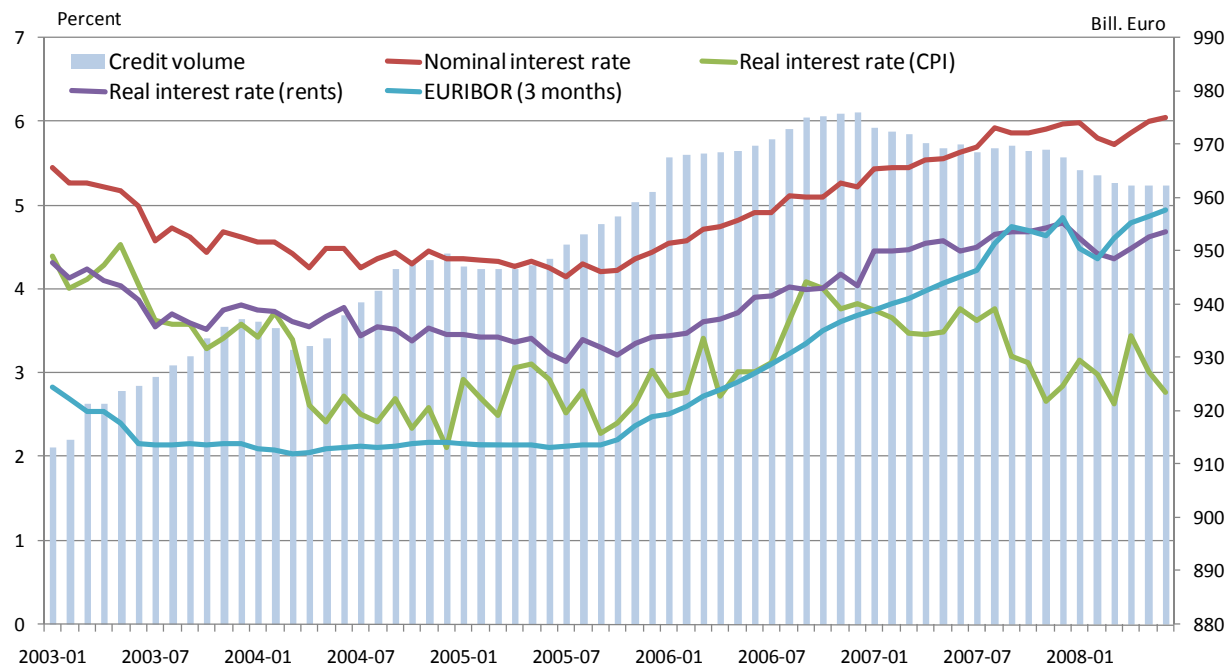
Moreover, the crisis period is at the end of the sample. Although both approaches failed to deliver clear results, the reasons for failure provide further insights in understanding the effect of the crisis on Germany. We found some indications that Germany's loan market is far from a credit crunch and that there is somewhat more evidence in favor of a workable credit market than against it.

3.4 Residential lending and housing purchases

When it comes to assessing potential repercussions from the US subprime market turmoil on the German housing and mortgage markets it is important to note that this sector of the German economy is quite different from its American counterpart. There has been no housing price bubble in the post-war era (in real terms, German house prices were stagnating during the last three decades)¹² and the credit standards in the mortgage market are much tougher than those in the US. A German subprime market segment does not even exist. Therefore, any form of immediate contagion with respect to the current meltdown of the US housing market can be excluded. However, the interest rate channel might still be effective. Indeed, lending to private households for residential spending is on the decline (Figure 7). But this trend, starting by the end of the year 2006, is predominantly driven by household demand (which was negatively affected by a cut in housing subsidies) and can hardly be explained by financial supply-side factors which is fully confirmed by the bank lending survey results [Bundesbank (2008)]. Residential construction will most likely remain weak in the near future but the reason is unrelated to the current financial crisis.

¹² Cf. Kholodilin, Menz and Siliverstovs (2007).

Figure 7 | Nominal and real interest rates for housing loans to private households

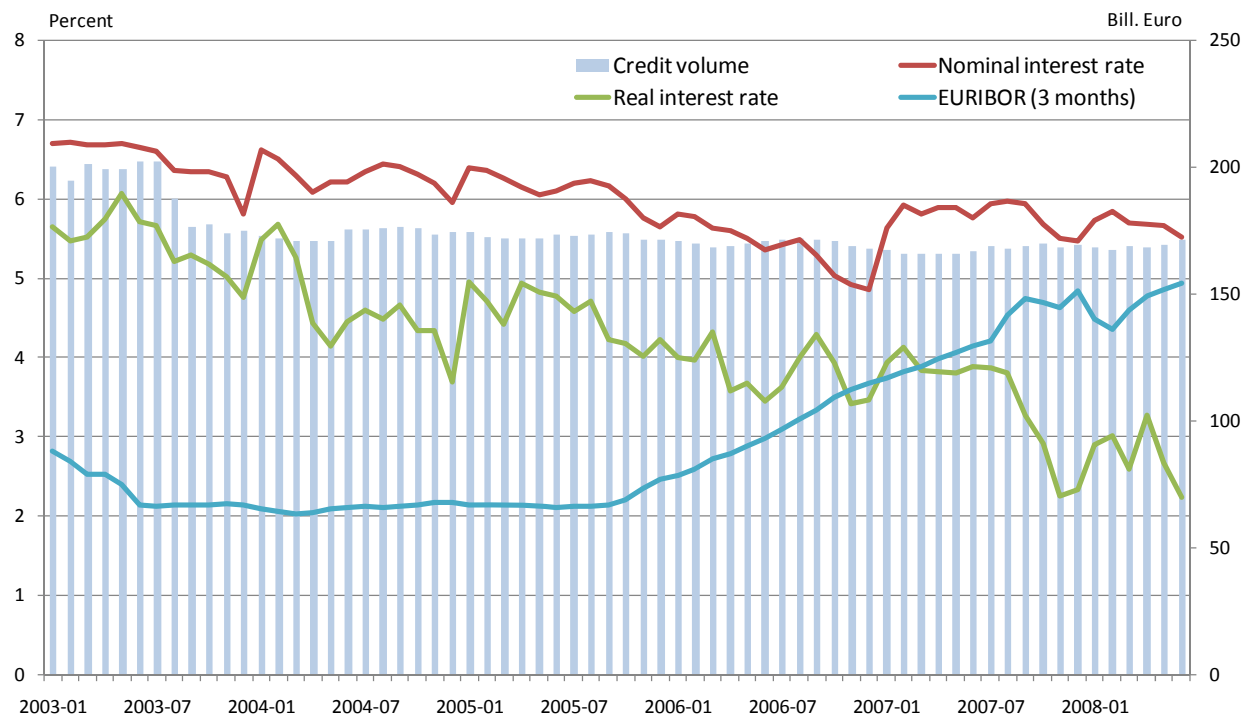


Source: Deutsche Bundesbank, DIW calculations.

3.5 Household lending and private consumption

The volume of loans to German consumers is stagnating in nominal terms for five years now (Figure 8). Also, the nominal interest rate for household loans has not seen much movement in this period, including the most recent three quarters. Therefore, like in the mortgage market, there is no evidence that the current financial turmoil is negatively affecting private consumption. On the contrary, according to the bank lending survey, credit standards of German banks for household loans tend to be loosened due to the improved credit worthiness of the household sector whose net financial assets increased by 5.1 percent per year in the period from 2003 to 2007.

Figure 8 | Nominal and real interest rates for consumer loans



Source: Deutsche Bundesbank, DIW calculations.

3.6 ECB Bank Lending Survey, a viable indicator?

Instead of analyzing time series to infer whether the crisis has dampened credit markets, one can ask the banks themselves. In fact, the Bundesbank has been running a Bank Lending Survey in cooperation with the ECB since 2003. This section will discuss some results from the latest survey of July in the light of the previous analysis [Bundesbank (2008)].

To start with, is the survey a powerful and viable tool at all? The answer is rather negative; the survey is at best a weak instrument. The German sample of 17 banks is very small [Bundesbank (2003), p. 67]. These 17 banks have to include a variety of banks to represent the multifaceted German Banking system. The sample size is problematic for our analysis for two major reasons. First, one cannot break down the survey by banks due to the small sample. Second, one hopes that the very small number of individual banks happen to be representative for the whole cluster; for instance, a bank representing big commercial banks might not have been involved in the crisis at all, while its competitors have taken large losses or vice versa. Furthermore, there are two con-

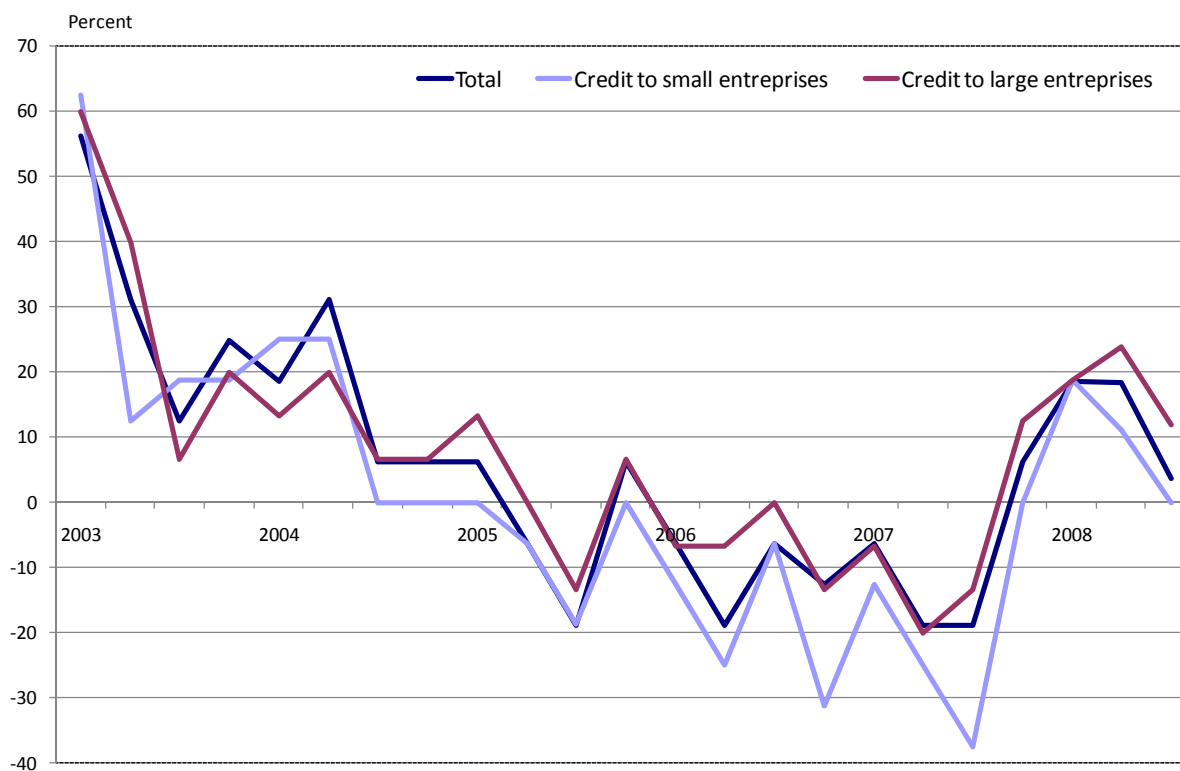
sistency problems: First, the survey is anonymous; it is unclear, if always the same bankers answer the questionnaire. Second, the survey is relatively new and the sample period is small. One might suppose that banks are still getting used to answer questions consistently over time; especially if banks are asked about current conditions vs. future expectations.

Keeping these qualifications in mind, it is still interesting to ask how financial turbulences are affecting survey results (Figure 9). From 2003 on credit standards had been more and more relaxed. By 2005 more banks were easing than tightening. This development is mirrored by ever growing loans since mid 2004 (Figure 3). Also, the survey confirms the above evidence that small enterprises have not been set at a relative disadvantage in terms of credit conditions over time.

During the first months of the crisis in 2007, standards have been visibly tightened. However, the first months of 2008 have seen a reversal of this short term trend. Due to uncertainty and unclear subprime risks, banks were possibly overshooting into risk aversion. This is not quite compatible with accelerating loan growth. One could argue that loan growth could have been slightly stronger without a crisis; or that loan growth was not affected, as tightened standards were easily met by enterprises. Moreover, recall that many firms drew on outstanding credit lines, which were negotiated before the crisis.

In any case, the other survey results on credit terms, conditions etc. yield similar conclusions: the crisis caused an initial tightening of supply side conditions. But this did not clearly affect observed lending volumes, neither positively nor negatively.

Figure 9 | Bank Lending Survey Germany – Change of bank's credit standards (enterprise loans)



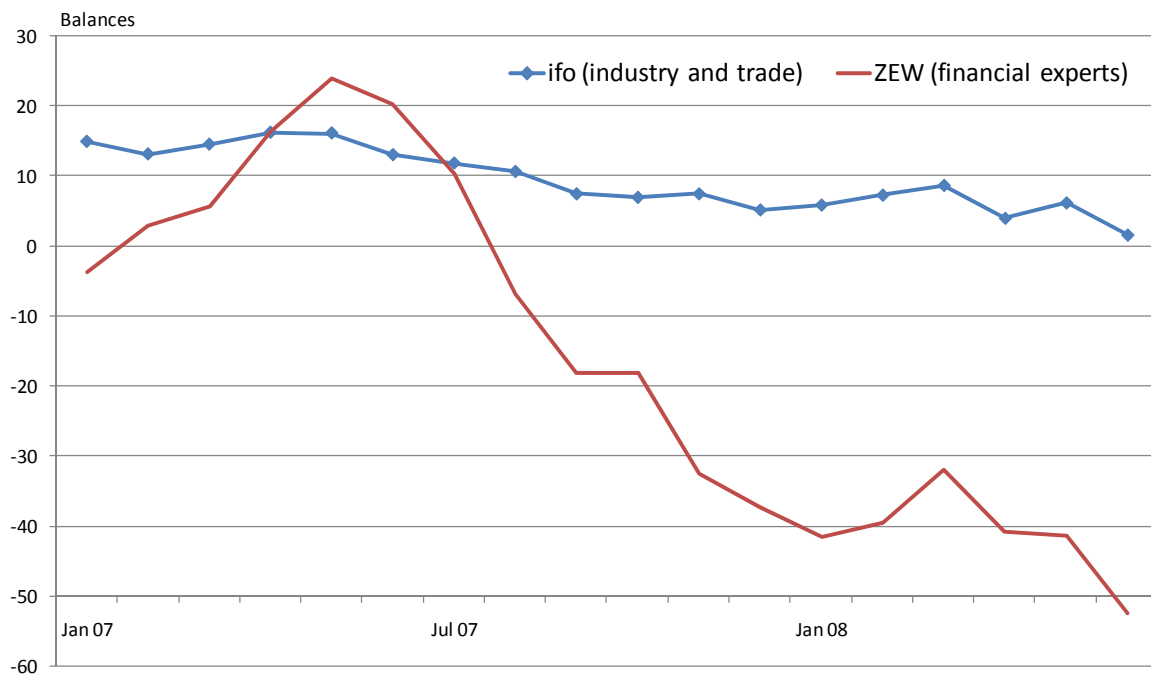
Source: Bundesbank (2008).

Note: The vertical axis represents the difference between the total number of "tightened considerably" and "tightened somewhat" responses and the total number of "eased somewhat" and "eased considerably" responses (as a percentage of all responses received).

3.7 Economic sentiments and the news: Nervous bankers versus cool entrepreneurs

Despite the relatively small importance of the German financial industry in terms of its share in total value added (Figure 1) experts from the banking sector are major players in the media. Therefore, it is hardly surprising that their assessment of the potential impact of the financial crisis on the real economy has been dominating the headlines from the start. However, their sentiments, as expressed by the ZEW indicator, quite drastically conflict with the assessment by managers from industry and trade (manufacturing, construction, wholesaling and retailing) as measured by the ifo business climate (Figure 10). This adds further evidence to the argument that the above discussed transmission channels from the financial sector to the real economy are not that pronounced. Thus, the resilience of Germany's real economy vis-à-vis the financial crisis is quite robust or at least stronger than most of the publicly discussed crisis scenarios may suggest.

Figure 10 | Business climate sentiment (Jan 2007 to May 2008)



4. Conclusions

The financial turmoil that emerged in the course of the US subprime crisis caused heavy stress within the German banking sector. Although the subprime-related write-offs and devaluations exceed more than 1 percent of German GDP, these losses will not show up in the income system of the national accounts. Given the relatively weak position of the German banking sector in those markets whose volumes are most likely impaired by the financial tensions, the indirect effects on value added (via reduced production of financial services) are also very limited.

While theoretical considerations suggest plausible transmission channels for financial turbulences to pass through to the real sector of the economy, convincing evidence is hardly found in the data for the first year of the crisis. So far, major risks for the German real economy have not materialized. In particular, credit supply (both in terms of volumes and in terms of costs) has not been tightened in a way that would reduce aggregate domestic spending. Therefore, the major subprime-related risk for Germany's real sectors remains a slowdown of the US economy. However, this indirect impact is not too pronounced. Simulations with DIW's multi-country econometric model show that each percentage point of lower growth in the US reduces German domestic pro-

duction by no more than 0.1 percentage points which reflects – inter alia – the diminishing relative importance of the US as an importing country of German products (in 2007, German exports to the US accounted for 7,6 % of total German exports after more than 10 % in the year 2000).

According to IMF estimates, two thirds of necessary value adjustments have already been absorbed by the banking sector in Europe. There is little evidence for fearing that the last third will cause significantly bigger problems than the two preceding ones given that the real economy so far was able to cope with the financial turmoil without significant damage to GDP. Nevertheless, the German banking sector (in particular some state-controlled financial institutions) had to pay a considerable price for their off-balance activities. But, given the overall robustness of the German financial system, there is a good chance that the real sector of the German economy overcomes the financial crisis without major harm.

5. Technical Appendix

The indications and signs that the financial crisis's impact has had a limited impact on business lending volumes were further investigated in two econometric frameworks. Although both approaches failed to deliver sound results, the reasons for failure provide further insights in understanding the impact of the crisis on Germany.

5.1 Switching Disequilibrium Model

We first attempted to estimate a switching disequilibrium model of credit supply and demand based on Madala (1989) and Lafont (1979). Falling credit volumes can be the result of lower supply, lower demand, or both. Hence the challenge is to identify the observed changes in credit volume with movements in either market side. The switching disequilibrium regression method addresses this identification issue. A credit supply and demand equation is estimated; furthermore the model is restricted by assuming that the minimum of the two determines the market outcome. In other words, if supply was smaller than demand in period t , then a credit crunch occurred and banks determined the market outcome. Accordingly, supply corresponds to the observed volume of credit in time t . Moreover the a priori restriction is imposed that the lending capacity of banks only changes the supply of credit, not the demand side. This method can also shed light on the relative size of the crunch; the difference between relative demand and supply is an indicator of excess demand [Ghosh and Ghosh (1999); Madala (1989), Lafont (1979); Nehls and Schmidt (2003)].

The model can be specified as follows:

- (1) $S_t = X_{1t}\alpha + \varepsilon_{1t}$
- (2) $D_t = X_{2t}\beta + \varepsilon_{2t}$
- (3) $C_t = \min(S_t, D_t)$

Where equation (1) is credit supply S_t ; equation (2) is credit demand D_t ; and equation (3) observed credit volumes C_t . X_{it} are exogenous variables specified below; ε_{it} are error terms. If interest rates adjust to clear the market then observed credit volumes equal demand and supply. Suppose for some reasons interest rates fail to adjust fully and demand exceeds supply. Then the observed credit volume C_t coincides with supply S_t . Equations (1), (2) and (3) are estimated by maximum likelihood with the Marquardt procedure included in EViews as suggested by Maddala (1987). Following Maddala and Nelson (1974) no price adjustment mechanism is modelled and errors ε_{it} are assumed to be normally distributed with variances σ_i^2 . The model determines the probabilities that each observation belongs to either demand or supply. Endogeneity problems are resolved with lags as instruments.

Model and Data

All data used are quarterly and BIP deflated. Monthly data yielded similar results. They were downloaded from the Deutsche Bundesbank website. Below main variables are listed with expected signs in brackets.

As endogenous variable we used the total loans to business and self-employed, alternatively including or excluding loans to non monetary financial institutions. Also close substitutes were used, all yielding similar results. On the **supply side**, we followed the broad literature [Gosh and Gosh (1999); Schmdit and Nehls (2003)]: short term interest rates on business loans minus deposit rates as spread or monitoring costs (+), the price performance indicator of German shares CDAX as an indicator of risk (+); the book value of bank capital as an indicator of lending capacity (+). Lending capacity is an interesting concept in the light of micro vs. macro issues. In the literature, deposits, sight deposits and capital are often added up to reflect lending capacity [Gosh and Ghosh (1999)]. This is based on a portfolio management approach on the micro level: single

banks decide on the amount of credit taking into account risk, interest rates and availability of resources. On the aggregate level, however, this is not quite consistent. By generating credit from the monetary base, banks automatically create deposits. And even if one bank has lower deposits, they must show up at another bank's balance; in other words on the aggregate nothing changes. A minor exception is money flowing out of Germany into euro currency deposits.

On the **demand side**, real GDP as an indicator of overall macroeconomic conditions (+), the capital market rate as price of capital (+) were included.

Estimation Issues

Although this theoretically elegant method is wide spread in the credit crunch literature, it is highly un-robust for Germany. Credit supply and demand model specifications for Germany found by Schmidt and Nehls (2003) could not be extended to our sample period. Serious doubts exist, if this approach is appropriate for Germany. Because this approach presumes that interest rates fail to equilibrate the market or that credit is rationed; and that demand largely exceeds supply. However, small temporary disequilibria cannot be detected with statistical certainty, i.e. it is hard to differentiate estimation errors from excess demand, implying a workable credit market. Moreover, if credit demand and supply almost always coincide, the model has problems assigning observed credit volumes to the right side of the market with high probabilities.

Then this method is only plausible for high friction, underdeveloped credit markets that are hit by massive shocks [see Gosh and Gosh(1999) for an analysis of the Asian credit crunch], but not for relatively stable and developed cases like Germany. Furthermore, as the model is estimated in levels, fitted demand and supply need to be co-integrated, which was not the case. Another problem stems from aggregation issues. On the micro level, a single firm may experience a credit crunch; whereas on average the market clears.

To sum up, one could infer from these complications, that Germany's exposure of the crisis was too little and the credit market too well-functioning as to show any major frictions that this method could detect.

5.2 Least Squares Regression

We collapsed the demand and supply model to a single equation, using a simple linear specification, as the previous method indicated that the German credit market is more or less in equilibrium. Hence we are assuming that interest rates adjust swiftly to equilibrate the market and that

the healthy average firm that applies for credit at prevailing rates is not rejected by banks. On the aggregate there is no credit rationing à la Stiglitz and Weiss (1981); in other words, banks with surplus funds lower their interest rate to attract clients. And all banks know equally about their customer's creditworthiness. Then the loan market clears, as bad loans can be discerned from good loans. Further credit volumes are determined by exogenous demand and supply side variables. Unlike the disequilibrium model, observed credit volumes coincide with quantities demanded and supplied.

Hence, the observed amount of loans was regressed on supply and demand side explanatory variables. The estimation was made in first log differences, due to non-stationarity and failure to find co-integration relationships. The dataset and variables were similar to the one used in the first approach. However, a crisis dummy for the period 2007:Q3-2008:Q2 is added. If the dummy is significant, the period has had an impact. Of course, a significant dummy could have a demand or supply side origin. Nevertheless, this method is a rough indicator of a positive or negative crisis impact on credit volumes, depending on sign and significance of the dummy, while controlling for underlying fundamentals. Moreover, the dummy can be interacted with other explanatory variables. Alternatively, we applied break point tests, leaving out the dummy.

Estimation Issues

This approach also turned out to be quite problematic. Lags have to be used as instruments due to endogeneity in some variables like GDP. Coefficients turned out to be statistically insignificant, although signs are theoretically correct. More importantly, the crisis is at the end of the sample period and relatively short. Chow tests indicate a break in 2005, while the dummy coefficient is slightly positive during the crisis. Furthermore, loan volumes are non stationary in first differences and problematic due to at least three trend reversals and breaks since 1999. A forecast is almost impossible as most exogenous variables will have been affected by the crisis.

The conclusion of this section is similar to previous ones. There is no evidence that loan growth is negatively affected by the crisis but rather accelerated – so far.

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