CHAPTER 2

ASSESSING POLICIES TO REVIVE CREDIT MARKETS

SUMMARY

Policymakers in economies hit hard by the global financial crisis have been concerned about weak growth in credit, considered a main factor in the slow economic recovery. Many countries with near-zero or negative credit growth for a number of years sense that the strategy of very accommodative macroeconomic policies has been insufficient in reviving credit activity. Authorities have therefore implemented a host of policies to target credit creation (which are documented in an appendix to the chapter).[1]

Effectively targeting these policies requires identifying the factors that underlie the weakness in credit. In credit markets, these factors center around the buildup of excessive debt in households and firms, reducing their credit demand, as well as excessive leverage (or a shortage of capital) in banks, restricting their ability or willingness to provide additional loans. The government could also usefully alleviate a shortage of collateral (perhaps resulting from large declines in asset values), which could constrain credit activity.

To address such a technically challenging exercise, this chapter takes a stepwise approach. The first step is an attempt to identify the constraints to credit through the use of lending surveys—trying to disentangle whether banks are unwilling to lend (on the supply side) or whether firms or households are reluctant to borrow (on the demand side). This distinction helps narrow down the set of policies to consider, which differ depending on the side of the market that faces the major constraint. A more challenging second step—which is hampered by the lack of sufficient data for many countries—is to identify the individual factors that are constraining credit, specifically what makes banks unwilling to lend or households and firms reluctant to borrow.

Using this approach for several countries that have sufficient data, the analysis finds that the constraints in credit markets differ by country and evolve over time. This reinforces the importance of a careful country-by-country assessment and the need for better data on new lending. In many cases, demand- and supply-oriented policies will be complementary, but their relative magnitude and sequencing will be important. For example, relieving excessive debt in firms will help only if the banking sector is adequately capitalized. Policymakers should also recognize the limits of credit policies and not attempt to do too much. Because many policies will take time to have an impact, assessment of their effectiveness and the need for additional measures should not be rushed.

When credit policies work well to support credit growth and an economic recovery, financial stability is enhanced, but policymakers should also be cognizant of longer-term potential risks to financial stability. The main risks center on increased credit risk, including a relaxation of underwriting standards and the risk of "evergreening" existing loans. Mitigation of these risks may not be necessary or appropriate while the economic recovery is still weak, as it could run counter to the objectives of the credit policies (which are often designed to increase risk taking); still, policymakers will need to continually weigh the near-term benefits against the longer-run costs of policies aimed to boost credit.

[1]Appendix 2.1 is available online on the GFSR page at both www.imf.org and http://elibrary.imf.org.

Introduction

This chapter examines possible reasons behind the weakness in private credit in many countries since 2008, and it offers a framework for assessing the various policies that have been implemented to revive credit markets. These policies were put in place in the wake of a sharp decline in lending growth in most advanced economies and some emerging markets (Figure 2.1). Total credit to the private sector showed sluggish growth, while credit extended by domestic banks declined for advanced economies.

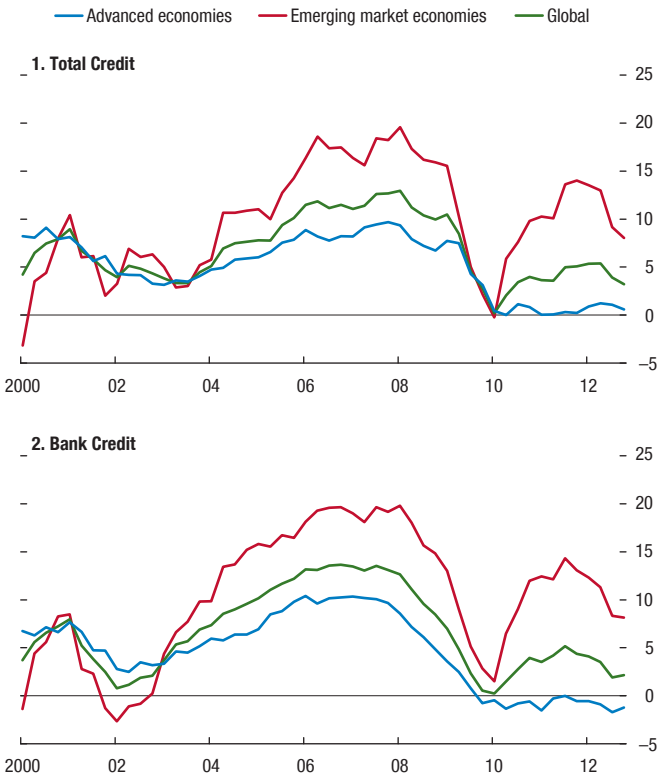
Policymakers want to support credit markets because the decline in lending is seen to be a primary factor in the slow recovery. Well-functioning credit markets make major contributions to growth and macroeconomic stability, and restarting credit plays an important role in economic recovery after a downturn. Recent studies show that creditless recoveries are typically slower than those with more robust credit growth, at least for the first few years, especially after recessions that feature large declines in asset prices, a characteristic of this financial crisis.[2]

Credit-supporting policies are most effective if they target the constraints that underlie the weakness in credit. Policymakers are sensing that the exceptionally accommodative macroeconomic policies implemented since the crisis have been insufficient and that additional measures targeting credit creation could further underpin the recovery. To target such policies effectively, policymakers must determine the factors that constrain lending activity. This chapter provides a framework for this purpose.[3]

In the past, a clear case for government intervention emerged only when there were market failures or externalities, but this crisis showed that such developments in credit markets can be prevalent, amplifying upturns and downturns. This is leading to some rethinking that the role of government policies, particularly macroprudential policies, may be larger than previously considered. In addition to exacerbating the current crisis, these amplifying tendencies appear also to be present in upswings, as the current crisis was in part precipitated by excessive credit creation during the preceding boom. Therefore, policymakers need also to mitigate excessive credit creation during economic upswings, which would lower the risk of similar future crises, and thus in turn obviate the need for credit-supporting policies.

Although well-designed credit policies can support credit intermediation and a more robust economic recovery, the choice of policies should also take into account direct or indirect fiscal costs and unintended consequences for financial stability. Although many policies have been implemented in a range of countries, which helped to keep financial instability from worsening and the supply of credit from slipping

Figure 2.1. Real Credit Growth
(Percent; year over year)



Sources: Bank for International Settlements (BIS); and IMF staff estimates.
Note: Unweighted average of real credit growth rates across countries. Total credit includes private sector borrowing (loans and debt instruments) from domestic banks and all other sources ("other credit"), such as other domestic nonbanks and foreign lenders (see BIS, 2013). Advanced economies include Australia, Austria, Belgium, Canada (not included in panel 2), Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Korea, Luxembourg (from 2004:Q1), Netherlands, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, United Kingdom, and United States; emerging market economies include Argentina, Brazil, China, Hungary, Indonesia, India, Malaysia, Mexico, Poland, Russia, South Africa, Thailand, and Turkey. Global consists of advanced and emerging market economies identified above.

The authors of this chapter are S. Erik Oppers (team leader), Nicolas Arregui, Johannes Ehrentraud, Frederic Lambert, and Kenichi Ueda. Research support was provided by Yoon Sook Kim. Fabian Valencia shared data and methodology.

[2]The importance of credit in supporting economic recovery has been discussed at length in the literature. See Table 2.7 for a summary of these studies, under the heading "Creditless Recovery."

[3]Focusing on these potential constraints to credit (rather than simply its weakness) could also prevent policymakers from doing too much. In some cases, it may be that an expansion of credit is not desirable; deleveraging by firms or households may in fact be important to pave the way for more sustainable economic growth.

even further, there is not always a clearly favorable cost-benefit nexus. In particular, policymakers should be mindful of possible consequences for financial stability in the medium term, especially if new credit is extended without adequate attention to the risks involved (including if credit is extended by nonbanks). In addition, these policies may have fiscal costs, and policymakers should make sure that initiatives are as cost-effective as possible.

In connection with recent efforts to revive credit markets, the chapter addresses the following questions:

- Which countries have seen weak credit growth recently, and what are the potential causes?
- What policies have been put in place in various countries to support credit?
- Have the policies targeted the constraints that underlie the weakness in credit?
- What, if anything, can policymakers do to make credit policies more effective?

The analysis confirms that constraints in credit markets differ by country, and policies to support credit should be based on a country-specific analysis of the constraints that government policy may alleviate. As expected, higher bank funding costs and lower bank capital have reduced the ability of banks to supply loans, and high debt levels in firms and households (along with lower GDP growth forecasts) have lowered credit demand (and affected credit supply). These factors are present to different degrees in different countries. Policymakers should be mindful of interactions with other policies, including regulatory measures, direct and contingent costs to the government, and potential longer-term financial stability implications. If appropriate, prudential measures to mitigate such stability risks should be put in place.

Recent Developments in Credit Markets

Where Has Credit Growth Been Weak?

To find where credit growth has been weak, a simple rule can be applied. A transparent operational rule used in the literature defines weak credit growth as negative average real credit growth over a certain period.[4] To identify where credit is currently still weak several years into the crisis, this rule is applied to a number of countries, using data from the Bank for International Settlements (BIS) and other sources. A separate determination is made for particular segments of credit markets when disaggregated data are available.

Many advanced economies have experienced weak bank credit growth (Table 2.1), including the United Kingdom and the United States, as have many euro area countries (including Austria, Belgium, Germany, Greece, Ireland, Italy, Portugal, and Spain).[5] Interestingly,

Table 2.1. Identifying Countries with Weak Credit Growth, BIS Data

	Bank Credit to Private Sector	Total Credit to Private Sector	Total Credit to Households	Total Credit to Nonfinancial Corporations
Advanced Economies				
Australia				
Austria	Weak		Weak	
Belgium	Weak			
Canada	. . .			
Czech Republic				
Denmark	Weak	Weak	Weak	Weak
Finland				
France				
Germany	Weak	Weak	Weak	Weak
Greece	Weak	Weak	Weak	Weak
Ireland	Weak	Weak	Weak	
Italy	Weak	Weak	Weak	Weak
Japan		Weak	Weak	Weak
Korea				
Luxembourg	Weak			
Netherlands		Weak	Weak	Weak
Norway	Weak			
Portugal	Weak	Weak	Weak	Weak
Singapore				
Spain	Weak	Weak	Weak	Weak
Sweden				
Switzerland				
United Kingdom	Weak	Weak	Weak	Weak
United States	Weak	Weak	Weak	
Emerging Market Economies				
Argentina			. . .	. . .
Brazil			. . .	. . .
China				
Hungary	Weak	Weak	Weak	Weak
India				
Indonesia				
Malaysia			. . .	. . .
Mexico				
Poland				
Russia			. . .	. . .
South Africa				
Thailand				
Turkey				

Sources: Bank for International Settlements (BIS); De Nederlandsche Bank; Instituto Nacional de Estadistica y Censos (INDEC); IMF, *World Economic Outlook;* Banca d'Italia; and IMF staff estimates.

Note: Weak credit is identified if the average year-over-year credit growth (deflated by consumer price index inflation; official wage index inflation for Argentina) is negative over a two-year window (2011:Q1–2012:Q4). Growth rates are computed using stocks in local currency and not adjusted for exchange rate variations. Cells are blank if this criterion is not met. Cells with ". . ." indicate that the data are not available, except for bank credit in Canada, which is ignored because of a break in the series. Total credit includes private sector borrowing (loans and debt instruments) from domestic banks and from all other sources ("other credit"), such as domestic nonbanks and foreign lenders (see BIS, 2013).

[4]For instance, Abiad, Dell'Ariccia, and Li (2011) and Sugawara and Zalduendo (2013) use negative average credit growth over recovery periods to identify creditless recoveries.

[5]The selection of countries is mostly unchanged if only the last year of credit is considered. The Netherlands would join the group of countries with weak bank credit growth, and the United States and Luxembourg would drop from the list. Austria, Belgium,

Table 2.2. Identifying Countries with Weak Credit Growth, Other Data Sources

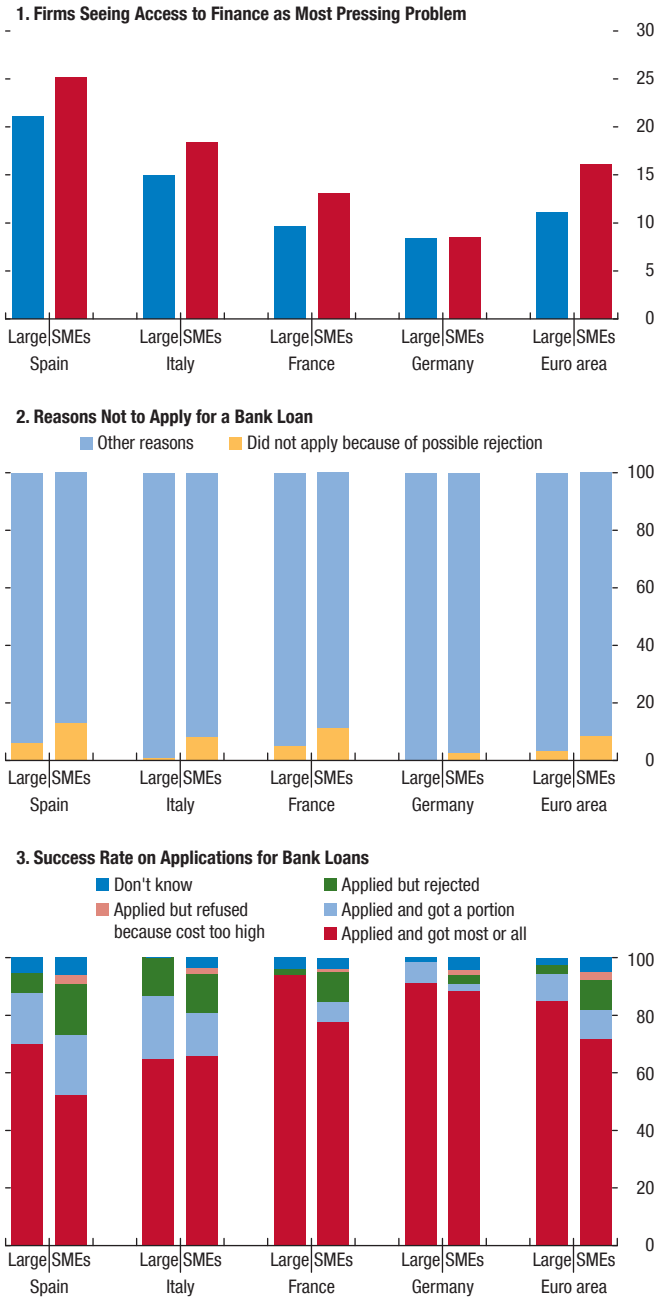
	Bank Credit to Private Sector
Albania	
Belarus	Weak
Bosnia and Herzegovina	
Bulgaria	Weak
Croatia	Weak
Estonia	Weak
Iceland	Weak
Kosovo	
Latvia	Weak
Lithuania	Weak
FYR Macedonia	
Moldova	
Montenegro	Weak
Romania	
Serbia	
Slovak Republic	
Slovenia	Weak
Ukraine	

Sources: European Central Bank; IMF, *International Financial Statistics* and *World Economic Outlook;* Haver Analytics; and IMF staff estimates.
Note: Weak credit is identified if the average year-over-year credit growth (deflated by consumer price index inflation) is negative over a two-year window (2011:Q1–2012:Q4). Growth rates are computed using stocks in local currency and not adjusted for exchange rate variations. Column is blank if this criterion is not met.

Ireland and the United States show weak credit growth (from all sources) to households but not to nonfinancial corporations.[6,7] In addition, data from non-BIS sources indicate that many countries in central, eastern, and southeastern Europe, including Bulgaria, Croatia, Slovenia, and the Baltic countries, have also recently seen weak bank credit growth (Table 2.2).

Survey data indicate particular challenges faced by small and medium enterprises (SMEs) as they attempt to access credit. The most recent European Central Bank (ECB) Survey on the Access to Finance of SMEs in the euro area (SAFE) (ECB, 2013) shows that SMEs tend to report access to finance as their most pressing problem more often than do large companies (Figure 2.2). Also, their loan applications were less successful than those of large corporations. In addition, the survey showed that SMEs were discouraged more often than larger firms from applying for a loan because of the anticipation of rejection. A reluctance to apply may also be a result of the higher lending rates they

Figure 2.2. Perceived Obstacles in Access to Finance
(Percent of respondents)



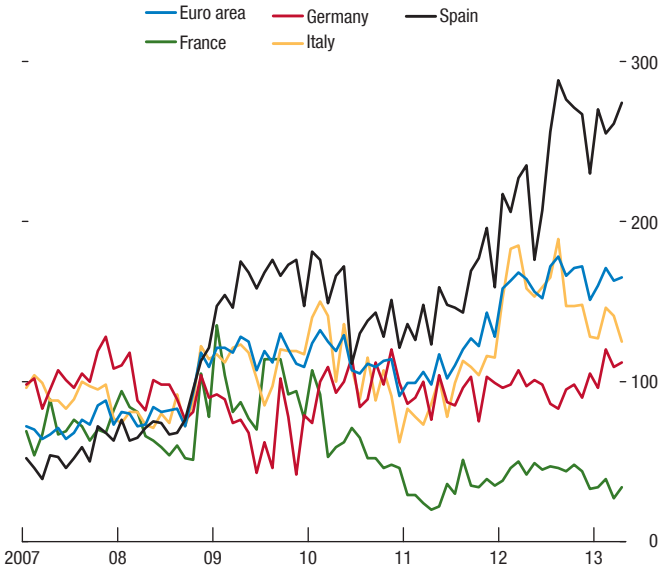
Source: European Central Bank (2013).
Note: SMEs = small and medium enterprises. The distinction between large corporations and SMEs is available only for the countries shown.

Luxembourg, and Norway had mildly negative bank credit growth and actually had positive average real credit growth if other sources of credit (in addition to banks) are included.

[6]Ireland showed negative real growth of credit to nonfinancial corporations in the last quarter of 2012.

[7]Alternative definitions of weak credit growth could be based on either real credit or a ratio of credit to GDP significantly below trend. Most of the countries selected with this chapter's basic rule are also selected by at least one of these additional criteria. These definitions are the converse of methodologies in the literature that identify credit booms, including Borio and Lowe (2002); Mendoza and Terrones (2008); Borio and Drehmann (2009); and Drehmann, Borio, and Tsatsaronis (2011).

Figure 2.3. Interest Rate Spread between Loans to SMEs and to Larger Firms
(Basis points)



Sources: European Central Bank; and IMF staff estimates.
Note: SMEs = small and medium enterprises. Spread is calculated as the difference between the lending rate for loans of less than €1 million and loans greater than €1 million.

face relative to other corporations (see Chapter 1 and Figure 2.3).

What Factors May Be Constraining Credit?

Theoretically, credit markets suffer from potential difficulties that may be amplified in recessions (Annex 2.1). Some major factors that may constrain credit include the following:

- *Collateral constraints:* To secure a loan, a borrower must often post collateral (an asset), because there is an information asymmetry: the lender does not know the borrower's repayment behavior. A drop in the value of collateral as a result of asset price declines (in real estate or stock markets, for example) shrinks the loan that can be obtained with that collateral, tightening credit demand as well as supply—indeed, the amount of collateral required by banks may also rise if bankers forecast further declines in its value. Lower collateral prices also lower the amounts banks will lend to each other in interbank markets, restricting bank funding and again tightening credit supply.
- *Debt overhang:* Excessively indebted firms may not pursue otherwise profitable business opportunities and may strive to bring down their leverage, lowering credit demand. Similarly, highly indebted households may choose not to take out loans, but rather focus on paying off their loans. Banks may also find highly indebted borrowers less creditworthy. Debt overhang in banks can also affect credit supply: highly leveraged banks may have difficulty obtaining funding and thus lack the liquidity to make additional loans.

In most credit cycles, government intervention to mitigate the factors constraining credit is generally not necessary and may ultimately spur too much credit activity, but when various amplification mechanisms are at play, such as in the current cycle, government intervention has a clearer role. In the past, the difficulties mentioned previously could be overcome by the private sector, but they may persist in times of crisis, amplifying the downturn. For example, in the current crisis, declining asset prices restricted credit, worsening the recession, which led to further downward pressure on asset prices. In such situations, the government can implement various policies (detailed below) to ease credit constraints and break the downward spiral.

This chapter investigates the role of these factors in detail, but on the face of it, evidence is growing that they have contributed to the weakness in credit in recent years. Indebtedness of households and firms rose markedly in the run-up to the crisis, potentially contributing to a problem of debt overhang for borrowers in some countries (Figure 2.4). Also, the major asset price declines seen globally in 2008 and 2009 depressed the value of large classes of collateral (Figures 2.5 and 2.6). A later section investigates the extent to which these developments played a role in recent years (and perhaps still do) in restricting credit demand and supply.

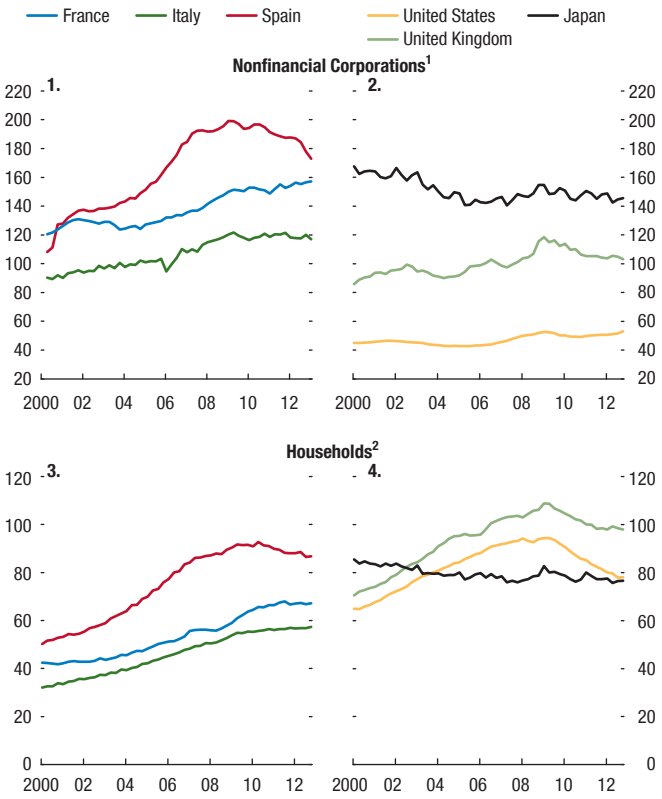
What Policies Have Been Implemented to Support Credit?

Policymakers have sought to boost economic activity by implementing policies to support credit growth. Appendix 2.1 provides an inventory of the policies adopted in the major economies that have experienced weakness in private credit growth.[8] The goal of these

[8]This appendix is only available online at www.imf.org/External/Pubs/FT/GFSR/2013/02/index.htm. This inventory includes the group of countries covered in Tables 2.1 and 2.2, most European countries (except, notably, the financial centers Luxembourg and Switzerland), along with Japan, the United States, and some G20 countries that showed a marked deceleration of credit growth even though the simple rule in this analysis did not identify them as having weak credit (Australia, India, Korea, and South Africa).

Figure 2.4. Corporate and Household Debt Outstanding

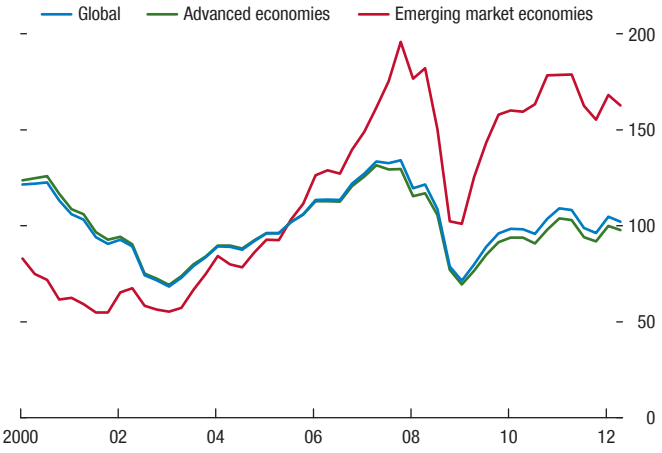
(Percent of GDP)



Source: Haver Analytics.
Note: Seasonally adjusted GDP.
[1]Corporate debt includes securities other than shares (excluding financial derivatives for the United Kingdom), loans, and other accounts payable on a nonconsolidated basis. Consolidated debt levels are significantly lower for some countries, especially those in which intercompany loans represent a large share of nonfinancial corporate debt. This calls for caution when doing cross-country comparisons.
[2]Including nonprofit institutions serving households.

Figure 2.5. Stock Price Index

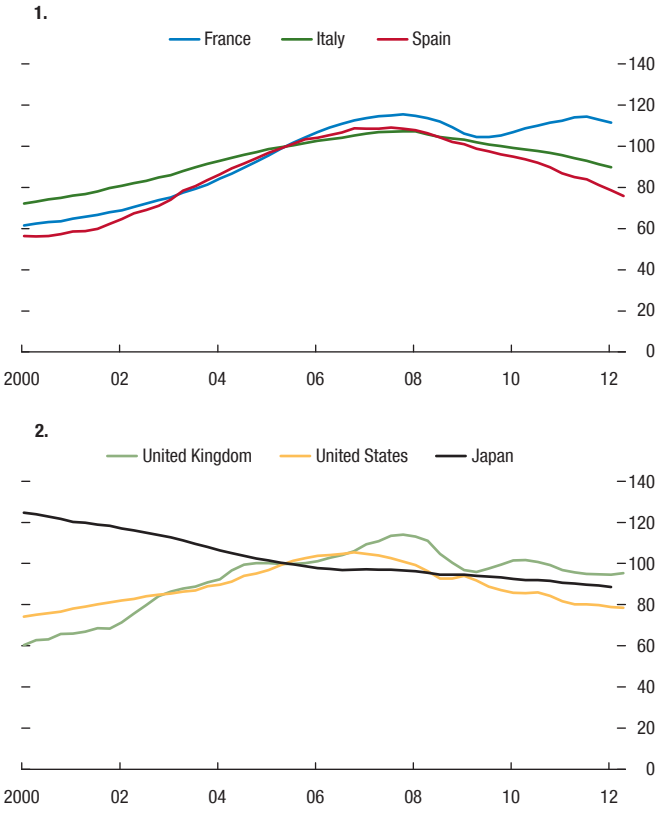
(2005 = 100)



Source: Morgan Stanley Capital International.
Note: Global comprises advanced and emerging market economies.

Figure 2.6. Real House Price Index

(2005 = 100)



Sources: Organization for Economic Cooperation and Development; and IMF, *International Financial Statistics*.
Note: Deflated by consumer price inflation.

policies includes addressing the restrictions mentioned in the previous section (mainly by alleviating debt overhang) and easing various other constraints to free up the supply of credit.

Policies aimed at alleviating balance sheet problems include the following:

- *Corporate debt restructuring:* To ease the debt overhang in the corporate sector, which has depressed loan demand, many governments have taken a leading role in corporate debt restructuring through state-owned banks and through asset management companies that took over the assets of distressed banks. In some countries, corporate bankruptcy rules were modified and speedier out-of-court resolution programs were introduced.

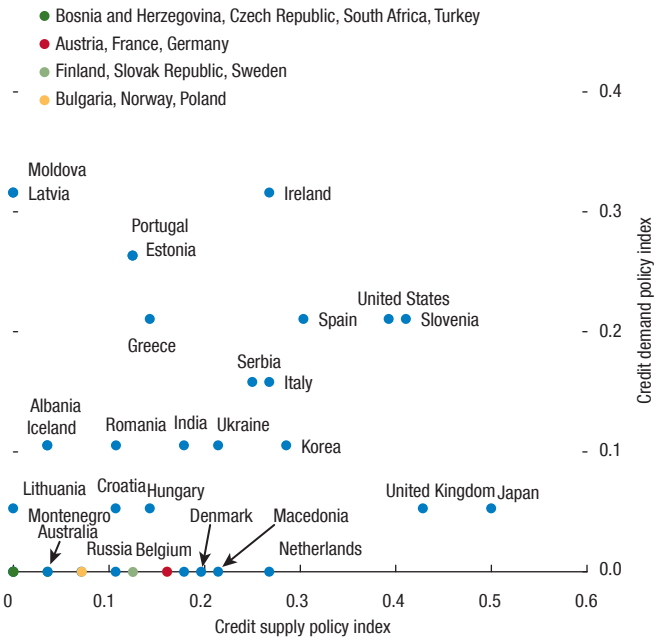
- *Household debt restructuring:* Applying strategies similar to those used in corporate debt restructuring, some governments have sought to ease household debt overhang by implementing household debt restructuring programs, most importantly for "underwater" mortgages (that is, the loan balance is higher than the home value). In some countries, personal bankruptcy rules were modified, and out-of-court resolution programs were implemented.
- *Bank restructuring:* In the recent past, many governments have recapitalized banks (both directly and through incentives for private investors), implemented programs to purchase distressed bank assets, and provided guarantees for existing bank assets.[9] Many countries increased the coverage of deposit insurance to avoid deposit drains, which threatened to force banks to shrink their loan books.

Other policies fall into several broad categories:

- *Monetary policies:* Central banks have expanded their monetary policy toolkits to enhance the demand and supply of credit in addition to using traditional tools such as changes in the policy rate. For example, the ECB's "fixed-rate full allotment" policy (in which banks' bids for liquidity from the central bank are fully satisfied), as well as its long-term (three-year) refinancing operations, were aimed in part at supporting credit. Many central banks have eased collateral constraints for banks, in part by accepting a wide range of private assets. Some have adopted policies of direct credit easing through purchases of corporate bonds, mortgage bonds, and other private sector assets. A few central banks have engaged in indirect credit easing by making available special lending facilities to promote bank lending.
- *Fiscal programs:* Many national treasuries have sought to promote expansion of corporate and mortgage loans through direct extension of loans and through subsidies or guarantee programs for new loans. These programs have often been implemented through state-owned or state-sponsored institutions.
- *Financial regulations:* Prudential regulators have instituted measures designed to ease bank balance sheet restrictions that have made banks unwilling or unable to extend new loans. In some countries (particularly in the European Union), regulators have relaxed capital requirements for loans to SMEs. Some countries have implicitly or explicitly allowed forbearance on recognition of nonperforming loans.
- *Capital market measures:* To promote the diversification of financing options for firms, several governments have made efforts to lower barriers to corporate bond issuance for SMEs and to promote securitization markets for SME loans and household debt (Box 2.1).

[9]See further discussions on restructuring programs in Landier and Ueda (2009) for banks, Laeven and Laryea (2009) for households, and Laryea (2010) for firms.

Figure 2.7. Relative Number of Credit Supply and Demand Policies Currently in Place



Source: IMF staff estimates.
Note: The indices are computed by dividing the number of policy measures currently in place to support the supply of or demand for credit in each country by the total number of possible measures in the list of all policy measures in Appendix Table 2.1 (excluding "stress test," "coverage enhancement of deposit insurance," "other policies to enhance credit supply," and "other policies to mitigate debt overhang"). EU-wide fiscal programs (e.g., through the European Investment Bank and the European Bank for Reconstruction and Development) are counted with half weights for the European Union member countries that do not have national fiscal programs.

Most countries have relied on a variety of policies to support both credit demand and credit supply, recognizing that these are often complementary. Figure 2.7 and Table 2.3 list the various credit-supporting policies implemented in 42 countries. The policies are limited to those directly targeting credit market constraints and do not include more general fiscal and monetary policies (including quantitative easing—that is, direct purchases of government bonds) that have also underpinned credit activity. In addition, the indices in Figure 2.7 refer only to the number of different measures currently in place; they do not account for the size of the programs or their effectiveness. Despite this somewhat narrow scope, the data yield the following main conclusions:

Box 2.1. Policies to Diversify Credit Options for Small and Medium Enterprises in Europe

This box explores options for diversifying credit creation for small and medium enterprises (SMEs), which have traditionally been constrained in their credit channels.

Options for access to credit are much more restricted for SMEs than for larger firms. Larger companies have benefited from historically low costs of funding and ample liquidity through a variety of credit channels. Conversely, SMEs have virtually no access to bond markets and continue to face higher interest rates and restricted access to bank credit. Although the availability and conditions of external financing appear to have improved in the last year or so—including for bank loans, bank overdrafts, and trade credit—these improvements have been less obvious for SMEs than for larger companies. In a recent survey by the European Central Bank, for example, "access to finance" was the second most important concern mentioned by SMEs, on average, throughout the euro area, although the magnitude of the concern differed by country—38 percent of SMEs in Greece reported this as their biggest concern, 25 percent in Spain, and 24 percent in Ireland, while only 8 percent of SMEs in Germany and Austria viewed access to finance as a primary issue (ECB, 2013).

SMEs were also hit harder by the crisis. There is evidence (Iyer and others, 2013) that the magnitude of the reduction in credit supply was significantly higher for firms that (1) are smaller (as measured by both total assets and number of employees); (2) are younger (as measured by the age of incorporation); and (3) have weaker banking relationships (as measured by the volume of their bank credit before the crisis). Regulation may also play a role. Some studies (OECD, 2012; Angelkort and Stuwe, 2011) suggest that Basel III implementation could lead banks to reduce their lending to SMEs. This problem is likely to be larger in countries with bank-based financial systems and less-developed financial markets.

Improving the availability of credit to the corporate sector in general, and SMEs in particular, is essential to supporting the economic recovery. The following policy measures may help achieve this goal.

- *Advancing the securitization agenda, including by:*
  - *Developing primary and secondary markets for securitization of SME loans:* Of the total euro area securitized bond market of €1 trillion at the end of 2012, only some €140 billion was backed by SME loans. This contrasts with the much larger stock of bank loans to SMEs, which is estimated to be approximately €1.5 trillion.
  - *Addressing the asymmetric treatment of securitized assets vis-à-vis other assets with similar risk characteristics:* Currently, securitized assets are often treated less favorably by investors and central banks. For example, the haircut imposed by the ECB on asset-backed securities is 16 percent, much more than on other assets of similar risk—such as covered bonds with a similar rating—that are also accepted in liquidity facilities and direct purchases. Aside from the differences in the legal frameworks governing securitized assets and covered bonds, there are important inconsistencies in capital charges that provide incentives for covered bond issuance and bank cross-holdings of covered bonds, at the expense of securitizations with the same credit rating and duration risk (Jones and others, forthcoming).
  - *Introducing government guarantees for SME securitizations (covering credit and sovereign risk):* Guarantees could encourage private investment in these securities by offsetting some of the informational asymmetries and SME credit risk, especially from investors that can only buy securities with certain minimum credit ratings. The effect on lender incentives and the fiscal cost of these guarantees should be appropriately recognized (see the main text).
  - *Including SME loans in the collateral pool for covered bonds:* Currently, only mortgage, municipal, ship, and aircraft loans are eligible collateral for covered bond issuance; extending eligibility to SME loans will improve their attractiveness.
  - *Improving risk evaluation for SME securities by regulating and standardizing information disclosure:* More uniform information disclosure would reduce investors' uncertainty about the quality of SME securities and thus would tend to reduce SMEs' cost of bond and commercial paper issuance.
- *Encouraging development of factoring of SME receivables:* By facilitating the sale of account receivables, SMEs can finance working capital. If this form of financing is underdeveloped, then better credit information and quality of credit bureau data will improve assessment of borrowers' ability to pay.
- *Encouraging companies to lend to each other:* Larger companies could provide financing to their smaller suppliers (for example, via faster payment cycles).

The authors of this box are David Grigorian, Peter Lindner, and Samar Maziad.

Box 2.1 *(continued)*

- *Paving the way (including through appropriate regulation) for market-based credit guarantee programs and the development of small-bond markets:* Government-backed partial credit guarantee and mutual guarantee programs (similar to microfinance) could support expanded credit to SMEs (Honohan, 2010; Columba, Gambacorta, and Mistrulli, 2010). Italy's introduction of fiscal incentives for the issuance of minibonds by unlisted firms in 2012 provides an example.
- *Tax incentives for banks that expand credit to SMEs:* These incentives could take the form of lower tax rates on earnings from SME lending. However, any tax subsidies should be carefully designed so as not to encourage excessive risk taking by banks or weaken loan underwriting standards, or create opportunities for tax avoidance, which will be very hard to reverse later. Also in this case, the effect on lender incentives and the fiscal cost of these guarantees should be appropriately and transparently recognized.
- *Facilitating establishment of "direct lending" funds targeting SMEs that have difficulty getting other types of financing:* These funds could include direct financing by distressed-debt firms, private equity firms, venture capital firms, hedge funds, and business development corporations.

The relative effectiveness of these policies in providing credit to SMEs and their attendant costs would need to be evaluated on a country-by-country basis. The authorities should ensure that these measures are sufficiently targeted to address the root causes of lack of credit to SMEs. They must also minimize moral hazard and financial stability risk by ensuring adequate risk management practices are in place and requiring banks to hold a portion of securitized SME-backed assets on their balance sheets to be sure they have a sufficient financial interest in monitoring the loans.

- Figure 2.7 suggests that some countries have chosen to target only one side of the market, usually focusing more on policies to boost credit supply. However, countries that have not used targeted demand-side policies—including the core euro area and the Nordic countries—have still relied to a considerable extent on more general fiscal and monetary policies to support credit demand.
- Emerging market economies in central and eastern Europe have implemented relatively fewer policies to support credit, perhaps because some have less monetary and fiscal policy room. Some institutions (including the European Investment Bank and the European Bank for Reconstruction and Development) are providing support for credit supply policies in several of these countries.

Are Current Policies on Target?

Given limited policy resources, policymakers should target the constraints on the demand or the supply of credit that can be effectively addressed by government intervention. To facilitate the usefulness, timing, and sequencing of the various policies, it is helpful to identify the factors that underlie credit demand and credit supply. Depending on how these factors influence lending activity, one or more could be the target of government policies.

This chapter takes a stepwise approach to identifying underlying constraints affecting credit markets. As a first step to target policies, it proposes to distinguish between demand and supply constraints, which can be useful to narrow the policy options that may be effective. Moreover, if the sensitivity of supply or demand to interest rates can be determined, policymakers may be able to discern which policies are likely to be most effective in increasing credit volume. In a more challenging second step, the chapter attempts to identify the specific factors that may constrain credit demand or supply. In countries for which sufficient data are available for this second step, results from such an analysis could further narrow the set of credit-supporting policies that are likely to be most effective. Last, the chapter uses other information gleaned from country-specific sources to add to the overall assessment.

The analytical results should be interpreted with caution. The factors that determine credit supply and demand are technically difficult to identify. The analysis is further complicated by a lack of appropriate data, even in the advanced economies considered here. Still, this exercise provides a useful framework for assessing the appropriate targeting of policies and offers a tentative and preliminary assessment of their effectiveness for countries where sufficient data were available. Further refinement of this framework would be useful, and would greatly be facilitated by the availability of

Table 2.3. Credit Policies Implemented since 2007

	Enhancing Credit Supply					Supporting Credit Demand	
	Monetary Policy[1]	Fiscal Programs on Credit	Supportive Financial Regulation[2]	Capital Market Measures	Bank Restructuring[3]	Corporate Debt Restructuring	Household Debt Restructuring
Euro Area							
Austria	Y				Y		
Belgium	Y	Y		Y	Y		
Estonia	Y					Y	Y
Finland	Y						
France	Y			Y	Y		
Germany	Y	Y			Y		
Greece	Y	Y			Y	Y	Y
Ireland	Y	Y			Y	Y	Y
Italy	Y	Y	Y	Y	Y	Y	Y
Netherlands	Y	Y		Y	Y		
Portugal	Y	Y			Y	Y	Y
Slovak Republic	Y						
Slovenia	Y	Y	Y		Y	Y	Y
Spain	Y	Y		Y	Y	Y	Y
Other Advanced Europe							
Denmark	Y	Y			Y		
Iceland		Y			Y	Y	Y
Norway	Y	Y					
Sweden	Y						
United Kingdom	Y	Y		Y	Y		Y
Non-European Countries							
Australia	Y						
India	Y	Y	Y	Y	Y	Y	
Japan	Y	Y	Y	Y	Y	Y	
Korea	Y	Y	Y	Y	Y	Y	Y
South Africa							
United States	Y	Y		Y	Y	Y	Y
Non-Euro-Area Central, Eastern, and Southeastern Europe							
Albania			Y			Y	Y
Bosnia and Herzegovina					Y		
Bulgaria			Y				
Croatia	Y	Y	Y			Y	
Czech Republic							
Hungary	Y	Y					Y
Latvia					Y	Y	Y
Lithuania		Y					Y
FYR Macedonia	Y	Y	Y				
Moldova	Y					Y	Y
Montenegro		Y					
Poland		Y					
Romania		Y	Y			Y	
Russia	Y	Y	Y		Y		
Serbia	Y	Y	Y		Y	Y	
Turkey							
Ukraine	Y	Y			Y	Y	

Source: IMF staff.

Note: This table lists the various types of policies countries have implemented since 2007, based on Appendix Table 2.1, without consideration of the scope, duration, or effectiveness of those policies. "Stress test" and "coverage enhancement of deposit insurance" are excluded from the policies supporting credit demand. EU-wide fiscal programs (e.g., through the European Investment Bank and the European Bank for Reconstruction and Development) are not included although they are available for firms in the EU member countries (and in some non-EU European countries).

[1]Monetary policy measures that may ease constraints to credit supply, such as direct and indirect credit easing as well as widening of collateral eligibility for private sector assets (see also Appendix Table 2.1).

[2]Measures include a reduction in risk weights for small and medium enterprise loans when calculating banks' capital adequacy ratios, forbearance of nonperforming loans, and countercyclical macroprudential regulations. In the United Kingdom, the authorities have recently relaxed liquidity requirements for banks.

[3]This category includes ad hoc public assistance to banks that may not have been initiated to counter undercapitalization (in or out of crisis situations) but were intended to improve credit supply. For India, the "Y" includes an ongoing government contribution to the equity capital of banks that is a consequence of the partial government ownership of banks, for which the relevant statute does not allow their ownership stake to go below 51 percent. Such contributions are a regular feature of the Indian banking system.

expanded and more detailed data (beyond the imperfect proxies that are used in this analysis) that could more clearly identify the constraints to credit demand and supply.

Disentangling Credit Supply and Demand

Data from bank lending surveys can help distinguish between demand and supply factors that underlie credit developments. Identifying supply and demand shocks typically requires an exogenous source of demand and supply variation (Ashcraft, 2005), an exogenous instrument (Peek and Rosengren, 2000), or matched borrower-bank data (Jiménez, Ongena, Peydró, and Saurina, 2012). In the absence of such data, the analysis here relies on answers to bank lending surveys conducted by central banks in the euro area and the United States.[10] For these surveys, bank loan officers are asked for their views about the various factors affecting credit demand and credit supply using questions on credit demand conditions and changes in lending standards. Although the survey responses are qualitative (for example, credit is assessed as having "tightened considerably or somewhat," "eased considerably or somewhat," or "no change"), they can be assigned a numerical value to obtain a quantitative index. The approach in this chapter assumes that the responses from loan officers in the bank lending surveys are good proxies for unobserved demand and supply.[11]

The approach determines how much credit growth can be attributed to demand or supply factors (Annex 2.2). Demand factors are proxied by the fraction of banks reporting in the survey that they observed an increase in demand for loans minus the fraction that observed a decrease. Supply factors are proxied by a measure of lending standards from which the influence of factors that are not related to bank balance sheets is statistically removed. These factors should be removed because lending standards reported in surveys may not reflect "pure" shifts in credit supply but instead may respond to changes in factors such as borrowers' credit worthiness, the economic outlook, and uncertainty, which also affect loan demand conditions. After cleansing the raw data to arrive at a better measure of "pure" supply factors, credit growth can be decomposed into demand and supply influences. These influences are computed using the estimated coefficients from a regression of credit growth on the demand index and the adjusted lending standards (Table 2.4).[12]

Table 2.4. Determinants of Credit Growth

	Euro Area Corporate Loans	Euro Area Mortgage Loans	United States Commercial and Industrial Loans
Credit Growth ($t-1$)	0.511***	0.331**	0.628***
	(0.134)	(0.138)	(0.112)
ΣDemand Index ($t-i$)	0.030**	0.014**	0.009
	(0.013)	(0.007)	(0.125)
ΣPure Supply Index ($t-i$)	–0.040**	–0.052**	–0.126**
	(0.011)	(0.021)	(0.062)

Source: IMF staff estimates.

Note: Regressions include a lag of the dependent variable and four lags of the demand indicator and the "pure" supply indicator (see Annex 2.2) as well as seasonal dummies. For the euro area, Arellano and Bond (1991) regressions with robust standard errors are in parentheses. The euro area estimation covers 2003:Q1–2013:Q1 and includes Austria, France, Germany, Italy, Luxembourg, the Netherlands, Portugal, and Spain. For the United States, an ordinary least squares regression is estimated for the period 1999:Q1–2013:Q1. ** and *** denote significance at the 5 and 1 percent levels, respectively.

The results of this decomposition show that both demand and supply factors are important in explaining credit developments in both the euro area and the United States but that their relative influence varies over time.

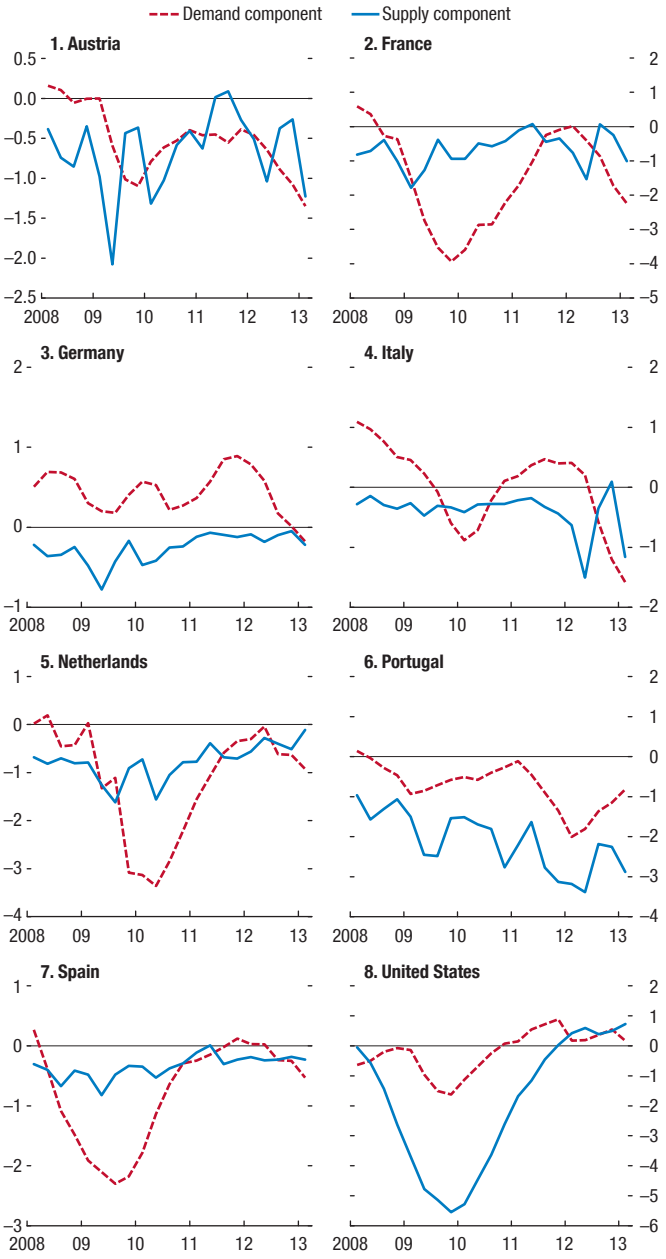
- *Corporate credit* (Figure 2.8): Demand factors had a negative effect in late 2009 in Austria, France, the Netherlands, and Spain. Most countries saw deteriorating demand conditions in the most recent period, including Germany, where demand conditions had been relatively favorable since the start of the crisis. Supply factors have had a negative effect throughout the period in most countries (with particularly strong negative effects in Portugal), but eased in most euro

[10]In the euro area, the ECB conducts the quarterly Bank Lending Survey (www.ecb.europa.eu/stats/money/surveys/lend/html/index.en.html), and in the United States, the Federal Reserve conducts the quarterly Senior Loan Officer Opinion Survey on Bank Lending Practices (www.federalreserve.gov/boarddocs/snloansurvey). Data series that are long enough for this analysis are available for Austria, France, Germany, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the United States. The surveys include questions such as, "How has the demand for loans changed at your bank over the past three months?" and "How have your bank's credit standards changed over the past three months?"

[11]Although this analysis provides useful insight, it still suffers from potential bias. For example, reporting bias is a concern: surveyed banks may try to please their supervisors and fail to report true credit supply conditions. Despite this problem, an emerging literature makes use of survey data to shed light on the determinants of credit growth, and there is evidence that it contains useful information. For example, Lown and Morgan (2006) and De Bondt and others (2010) show that the surveys have predictive power for output and credit growth in the United States and in the euro area, respectively.

[12]Unfortunately, the reasons provided in the survey as explanations for changes in demand do not allow for a straightforward classification between supply and demand factors as is the case for the supply questions and hence cannot be used to perform the same technique to "cleanse" the data as done for the supply side.

Figure 2.8. Decomposing Credit Growth: Corporate Loans



Sources: European Central Bank, Bank Lending Survey; Federal Reserve, Senior Loan Officer Survey; and IMF staff calculations.
Note: Demand and supply components are constructed using the estimates in Table 2.4. The demand component is the fitted values constructed recursively using the lags for the demand index and setting the "pure" supply index to zero. The supply component is constructed analogously.

area countries in the first half of 2012, likely as a result of the long-term refinancing operations of the ECB. More recently, demand constraints appear to outweigh supply constraints in France.

- *Mortgage credit*[13] (Figure 2.9): The negative effect of demand factors in 2009 and 2010 on mortgage credit in a number of countries was more moderate than on corporate loans, and demand recovered in 2011 and 2012 before turning down again more recently (except in Austria and Germany). Most countries saw a double-dip in supply constraints, with a temporary relaxation around 2010. However, most recently (and in contrast to developments for corporate loans), supply constraints for mortgage loans eased in 2013 in a number of countries, most markedly in France, Italy, and Portugal.

Identifying Factors Constraining Credit

This section offers a more detailed set of tools to identify the factors constraining credit by estimating the underlying determinants of credit demand and credit supply. Two approaches are employed: (1) an estimation of the country-specific structural determinants of bank credit supply and demand; and (2) a firm-level panel estimation of factors that affect manufacturing firms' borrowing. Both approaches focus on credit to firms.

Evidence from a structural model of bank lending

This approach estimates supply and demand equations for aggregate bank lending for major countries that have had weak credit growth.[14] The exercise has extensive data requirements and presents challenging econometric issues (Box 2.2). As a result, reliable results were obtained only for corporate loans in France, Japan, Spain, and the United Kingdom.[15]

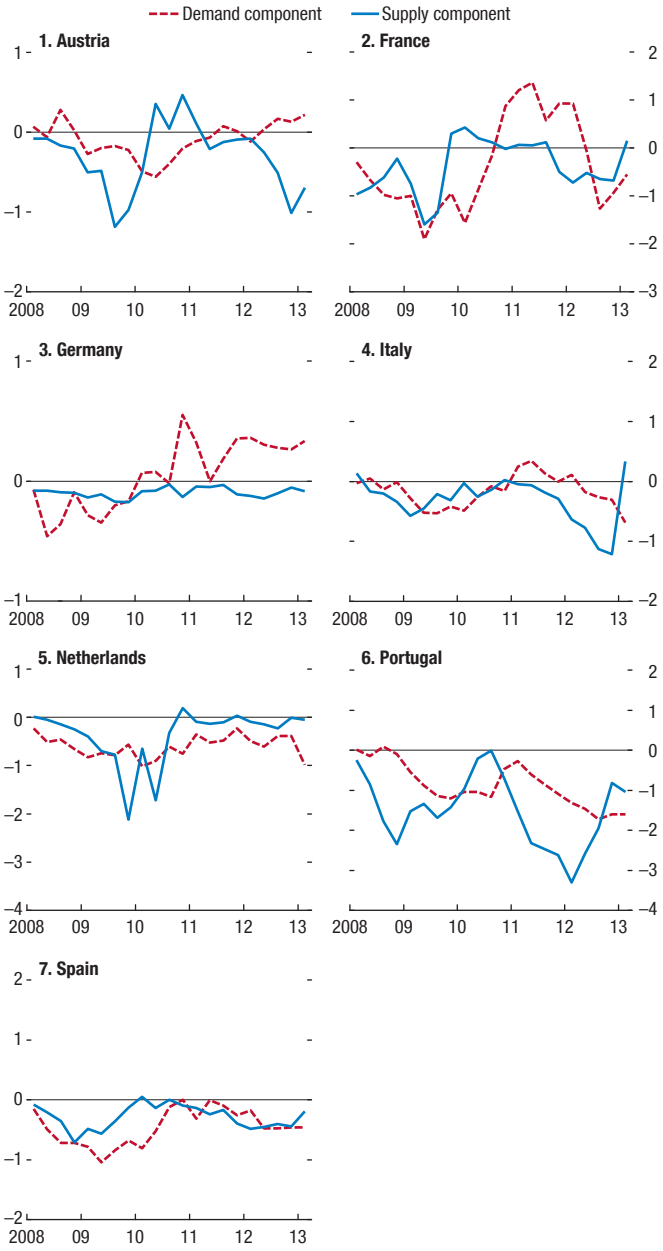
Because shifts in demand and supply cannot be observed directly, the analysis uses "shifters" that are meant to affect only one, but not the other, side of the market, thus allowing demand and supply to be

[13]The analysis of mortgage lending does not include the United States because of a break in the mortgage lending standards series in 2007 and because the Senior Loan Officer Survey does not include questions regarding the reasons for tightening or easing lending standards for mortgages.

[14]See Annex 2.3 for details of the model's design.

[15]France and Japan were included in the estimation, although bank credit growth to the private sector (nonfinancial corporations and households alike) was not identified as weak according to Table 2.1. Still, bank credit in Japan was identified as weak until the third quarter of 2012, and bank credit to nonfinancial firms in France (ECB data) declined in the last quarters of 2012. In addition, both countries implemented credit-supporting policies.

Figure 2.9. Decomposing Credit Growth: Mortgage Loans



Sources: European Central Bank, Bank Lending Survey; and IMF staff calculations.
Note: Demand and supply components are constructed using the estimates in Table 2.4. The demand component is the fitted values constructed recursively using the lags for the demand index and setting the "pure" supply index to zero. The supply component is constructed analogously.

identified separately. This econometric technique is commonly used but is difficult to implement because it requires accurately identifying variables associated with either demand or supply, but not with both. The variables chosen that affect only supply (thereby tracing out and identifying the demand curve) include the cost of bank funding and basic balance sheet variables (the bank's capital-to-asset ratio).[16] On the demand side, the variables include the rate of capacity utilization and a proxy for the availability of market financing.[17]

The supply and demand equations include several variables to capture more directly some of the market constraints previously discussed. In particular, the nonfinancial firms' debt-to-equity ratio aims to capture the effect of debt overhang on credit demand (and serves as an indicator of credit risk from the viewpoint of banks on the supply side). Although the growth of the stock market index is correlated with the value of firms' collateral (a supply-side constraint), it may also increase firms' preference for equity financing (affecting credit demand). The presumed relationships and reasons for choosing the specific variables are discussed in Annex 2.3.

The estimated supply and demand equations for bank credit are well identified overall. For all countries, one or more of the demand and supply shifters is significant in the regression, identifying the demand and supply equations for these countries (Table 2.5). On the supply side, lower funding costs (proxied by deposit rates) tend to increase the supply of bank loans. The amount of capital a bank holds relative to its total assets yields a counterintuitive negative sign in France and Spain. These results should probably not be given too much weight, because they may reflect an inaccurate proxy for bank capital, a scaling down of lending by banks that are building up their capital buffers, or ongoing major bank restructuring in Spain.[18] Additional results (see below) show a positive relationship between bank capital and lending by banks. On the demand side, in most cases, capacity utilization has the expected positive effect on firms' demand for loans,

[16]Unfortunately, a better proxy—regulatory capital—is not available.

[17]Although finding one shifter each for the supply and demand side is theoretically enough to identify the model empirically, the potential endogeneity of some shifters complicates proper identification.

[18]Despite the increase in system-level capitalization (including injection of public capital), lending continues to contract, which may reflect in part the deleveraging requirements imposed on banks that receive government aid.

Box 2.2. Challenges in the Structural Estimation of Credit Supply and Demand

This box draws attention to some limitations related to the estimation of a structural model of supply and demand for bank lending, and discusses attempts to overcome them.

Data measurement issues

Measurement issues affect both the dependent and the explanatory variables and constrain the estimation of the determinants of credit supply and demand.

- Because of a lack of data on new bank loans gross of repayments, the analysis uses as the dependent variable net transaction flows or the changes in the stock of bank loans. This underestimates the actual volume of new loans, because repayments will offset some new loans.
- Among the explanatory variables, bank-specific variables, such as the capital-to-asset ratio, are derived from monetary and financial statistics usually provided by central banks. They do not correspond to regulatory ratios and may not accurately capture the constraints weighing on banks' ability to lend. Many variables were considered in the supply equation as alternatives or in addition to the capital ratio of banks, in particular the price-to-book ratio, changes in the level of capital, the deposit-to-total-liabilities ratio (to capture the extent of funding constraints), the ratio of nonperforming loans to total loans (as a proxy for the quality of bank assets), the stock market index for the financial sector, and banks' z-score. Few came out as statistically significant to allow for a proper identification of the demand curve. One reason for this lack of significance could be heterogeneity of the banking sector, with weaker banks behaving very differently from stronger ones, masked by the averages.

Identification challenges

Endogeneity issues complicate the proper identification of the supply and demand equations. For example,

- Most variables in the analysis are more or less jointly determined. For instance, future GDP (and therefore GDP forecasts) depend on the amount of credit granted by banks today. To alleviate the resulting endogeneity, most regressors are lagged by one period.
- Potential endogeneity is a major challenge for finding variables that can separately identify credit supply and demand (which the chapter calls "shifters"). A number of criteria were used to decide whether the model was properly identified: (1) at least one of the shifters in each equation is statistically significant at the 5 percent level, and the shifters on each side are jointly significant; and (2) the coefficients on the lending rates in both the supply and demand equations are of the expected sign, so that the resulting supply curve has a positive slope and the demand curve has a downward slope. A Hausman test based on the comparison of the two-stage and three-stage least squares estimators was further used to verify the exogeneity of shifters.

Potential structural breaks

With the exception of the United Kingdom, the sample period considered in the analysis covers both the precrisis and crisis periods, raising the question of whether the relationships in the estimation have changed over time and are robust to changes in the sample period. For example,

- Restricting the sample to the period before or after 2008 prevents a proper identification of the model in most cases because of the resulting large reduction in the number of observations. The estimation therefore assumes that the coefficients do not change over the full sample period. Alternative specifications (not reported) allowed some coefficients to change before and after September 2008 by including a dummy variable for the period after September 2008 and interaction terms between that dummy and some variables in the model, such as the lending rate or the capital ratio of banks. In most cases, the coefficients on the interaction terms were not statistically significant.

The author of this box is Frederic Lambert.

Table 2.5. Structural Determinants of the Supply and Demand of Bank Lending to Firms in Selected Countries

	Expected Signs	France	Spain	United Kingdom	Japan
Supply Equation					
Lending Rate	+	2,082.0***	5,962.4***	7,296.1***	2,957.2
GDP Forecasts	+	462.5	1,993.3***	2,534.1**	106.8
Standard Deviation of GDP Forecasts	–	–5,879.6	3,300.1	6,752.2	496.9
Inflation	–	666.5	541.8	–587.7	511.8*
Growth of Stock Market Index	+	–5,121.1	–1,753.6	–9,427.0	–3,309.6
Lagged NFCs' Debt-to-Equity Ratio	–	–176.4***	–41.9	240.8*	–3.9
Lagged NFCs' Profitability	+	–444.4	–1,979.9***	1,242.7	2,621.3**
Corporate Spread (investment grade)	–	n.a.	n.a.	n.a.	68.1***
Constant		38,351.8***	80,127.5***	–87,380.5**	–12,031.7**
Supply Shifters					
Deposit Rate	–	–16,850.2**	–28,978.5***	–11,077.6**	–6,314.8**
Lagged Banks' Capital Ratio	+	–2,183.3**	–923.1**	642.9	604.1
Bank CDS Spread	–	n.a.	n.a.	2.8	n.a.
F Statistics for Supply Shifters		4.780	23.348	6.147	4.371
P Value		0.092	0.000	0.105	0.112
Demand Equation					
Lending Rate	–	–2,009.0	–2,012.1***	–228.1	–1,573.2
GDP Forecasts	+	1,318.3	3,009.8***	1,026.1	152.7
Standard Deviation of GDP Forecasts	–	–3,405.0	6,501.2*	8,024.9	514.1
Inflation	+	1,613.5*	1,042.9**	–2,251.7	491.2*
Growth of Stock Market Index	–	–5,312.6	799.5	–11,785.1	–3,307.7*
Lagged NFCs' Debt-to-Equity Ratio	–	–207.0***	–48.4	195.6	–5.7
Lagged NFCs' Profitability	–	–150.5	–805.8***	475.1	975.2
Corporate Spread (investment grade)	+	n.a.	n.a.	n.a.	37.7***
Constant		19,447.3	30,449.0*	–94,991.7**	–7,645.0*
Demand Shifters					
Lagged Capacity Utilization	+	319.4*	233.4	866.5**	34.4*
Market Financing (average over past year)	–	–1,539.3**	–13,084.5***	–103.2	279.3**
F Statistics for Demand Shifters		4.482	27.784	6.258	5.590
P Value		0.106	0.000	0.044	0.061
Number of Observations		122	122	53	117
Sample Period		2003:M2–2013:M3	2003:M2–2013:M3	2008:M8–2012:M12	2003:M5–2013:M1

Source: IMF staff estimates.

Note: CDS = credit default swap; NFC = nonfinancial corporation; M = month; n.a. = not applicable. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively. The dependent variable is the net flow of bank loans to NFCs. NFCs' profitability is computed as the ratio of NFCs' gross operating surplus to gross value added. NFCs' market financing is the average ratio of NFCs' debt in the form of securities to total debt over the past year.

while the availability of market financing has the opposite effect, as expected. This analysis provides no strong evidence that firms' high current debt or low profitability is holding back the demand for credit, except maybe in France and Spain.[19] Similarly, in contrast to ongoing discussions in some policy circles, the dispersion of growth forecasts (a measure of uncertainty about future growth) does not appear to play a large role for either the supply of or demand for bank loans in this analysis.

Evidence from firm-level data

Additional evidence on specific factors that constrain credit emerges from data on firm indebtedness. These data allow for a richer analysis that takes into account the different characteristics of individual firms. Fairly comprehensive firm-level data are available from corporate balance sheets of exchange-listed firms that show total debt as a share of total assets. The change in the debt-to-asset ratio corresponds to net borrowing; therefore, the determinants of the changes in the corporate debt-to-asset ratio can shed light on the factors that constrain corporate credit.

The analysis uses annual data for 1991–2012 to conduct firm-level panel regressions to explain changes in the debt-to-asset ratio for the manufacturing sectors in France, Italy, Japan, Spain, the United Kingdom, and the United States.[20] Explanatory variables are the following:

- The firm's own debt-to-asset ratio, to capture debt-overhang effects that would constrain the willingness or ability of firms to take on additional debt. It also reflects the riskiness of firms, which would make banks less willing to lend to them;

[19]However, the results from the firm-level regressions show stronger results for firms' current debt levels.

[20]Firm-level balance sheet data are from the IMF Research Department's Corporate Vulnerability Utility, based on Thomson Reuters data. House price data are from the Organization for Economic Cooperation and Development and national sources. Credit includes bank credit and other forms of credit. All explanatory variables are lagged by one period to mitigate possible simultaneity problems.

Table 2.6. Firm-Level Regressions of Changes in Debt-to-Asset Ratio for Manufacturing Firms

	France	Italy	Spain	United Kingdom	Japan	United States
Return on Assets (%)	–0.058	–0.083**	–0.113**	0.018	–0.057***	–0.020***
Debt-to-Asset Ratio (%)	–0.357***	–0.303***	–0.313***	–0.395***	–0.234***	–0.371***
Average Banking Sector Liability-to-Asset Ratio (%)	0.031	–0.294***	–0.765***	0.019	0.213***	–0.558***
Real Household Consumption Growth Rate (%)	0.314***	0.167*	0.120	0.264***	–0.256***	0.212***
House Price Index (2010 = 100)	0.001	0.004	0.072***	0.016*	0.037***	–0.002
Observations	4,613	1,621	961	7,819	30,581	33,358
Number of Firms	393	146	74	693	1,929	2,739
F Statistic *P* Value	0.00	0.00	0.00	0.00	0.00	0.00
R Squared	0.17	0.15	0.17	0.20	0.12	0.18

Sources: IMF, *International Financial Statistics* and Research Department, Corporate Vulnerability Utility, based on Thomson Reuters data; national sources; Organization for Economic Cooperation and Development; and IMF staff estimates.

Note: Firm-level panel estimation is conducted with firm-fixed effects for each country using 1991–2012 data for the manufacturing sector. The dependent variable is the change in the debt-to-asset ratio (%). The manufacturing sector is defined as Division D of the Standard Industrial Classification (SIC), and the banking sector is defined as SIC 2-digit codes 60 (banks) and 61 (credit institutions) as well as four-digit code 6712 (bank holding companies). The coverage of firms is incomplete in 2012. All the explanatory variables are lagged by one period. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on robust standard errors clustered at the firm level.

- The firm's return on assets, to capture the ability of firms to fund investment projects internally as well as their creditworthiness;[21]
- The average liability-to-asset ratio of the banking sector in each country, to capture banks' balance sheet constraints to making additional loans (a higher ratio implies a more leveraged bank);
- Real household consumption growth, to capture consumer demand, a major driver of economic growth; and
- Real house prices, as a proxy for the value of loan collateral.[22]

The regression results show that the factors constraining corporate credit growth vary by country, but higher corporate debt levels, lower bank capital, and collateral constraints can play a role (Table 2.6).[23] Corporate debt levels matter for credit to manufacturing firms in all countries investigated: firms with higher debt levels (an indication of possible debt overhang) tend to take on less additional debt. Credit to firms in Italy, Spain, and the United States is also affected by the liability-to-asset ratio in banks: higher ratios (corresponding to higher leverage and lower bank equity) are associated with lower debt in firms, suggesting that weaker banks lend less to firms. In Japan, Spain, and the United Kingdom, the results suggest that higher collateral values make it easier for firms to take on more debt. Finally, higher consumption growth is supportive of credit growth in most countries, except in Spain and Japan.

Figure 2.10 shows the importance of each factor in explaining recent deviations of corporate credit growth from each country's average during 1992–2013. Credit has been restricted by bank capital in Spain (and in Italy most recently) and by debt overhang in Italy and Spain. Tepid consumer demand has slowed credit growth in France and Italy and also in the United Kingdom and the United States at the beginning of the crisis. Low real estate prices have been an important factor constraining credit in Japan.

Are Credit Policies on Target? Some Examples

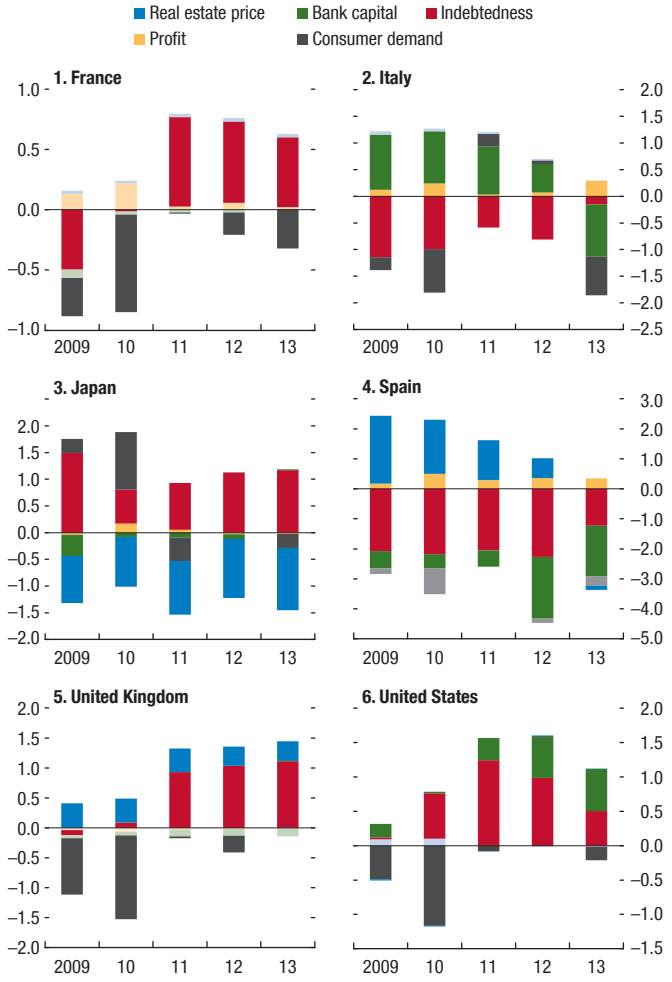
The results from the analyses in the previous sections can be used to evaluate whether specific policies implemented in countries with weak credit growth are effectively targeting the specific factors that constrain credit growth (Figure 2.11). The analysis using bank lending surveys provides a first indication of the relative importance of supply and demand factors. The structural model and the firm-level analysis identify the specific factors that may constrain credit and how their influence has changed over time. The estimated demand and supply equations shed light on the potential effectiveness of specific policies on credit volume, which depends on the relative sensitivity of demand and supply to changes in the lending rate. For example, if credit demand appears relatively insensitive to changes in the interest rate (its coefficient is close to zero or not significantly different from zero), government measures aiming to increase the supply of loans would lower the lending rate but would likely not lead to a substantial increase in the demand. If the objective

[21]A drawback of this approach is that it does not distinguish between supply and demand. Here it is assumed that low profitability means firms would demand more external financing through loans. However, persistent low profitability may also cause banks to see the firm as less creditworthy, restricting supply. This latter effect is, however, partially absorbed by firm-fixed effects.

[22]The land price index is used for Japan.

[23]The sample includes only exchange-listed firms, which may bias downward the role of some constraints for firms with less easy access to finance, such as SMEs.

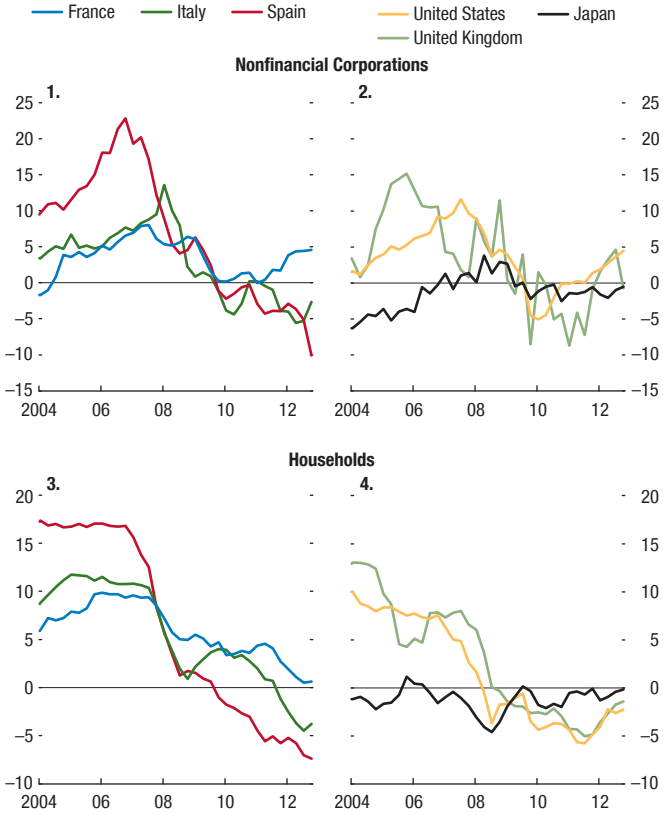
Figure 2.10. Decomposition of Change in Debt-to-Asset Ratios for Firms



Sources: IMF, *International Financial Statistics,* and Research Department, Corporate Vulnerability Utility, based on Thomson Reuters data; national sources; Organization for Economic Cooperation and Development; and IMF staff estimates.
Note: The components add up to the deviation of the predicted change in the debt-to-asset ratio in each year from the average change in the debt-to-asset ratio over the period 1992–2013. A positive (negative) value means that the factor contributes to a positive (negative) change in the debt-to-asset ratio. Light colors indicate insignificant factors.

Figure 2.11. Real Total Credit Growth, by Borrowing Sector

(Percent; year over year)



Sources: Bank for International Settlements; and IMF staff estimates.
Note: Total credit includes private sector borrowing (loans and debt instruments) from domestic banks and all other sources ("other credit"), such as other domestic nonbanks and foreign lenders (see BIS, 2013).

of policy is to increase the volume of lending, measures that address demand-side frictions—corporate debt overhang, for example—would be more effective.

A preliminary assessment of policies for the major countries follows. This assessment is preliminary because policies take some time to make an impact, and a number of policies have been implemented only relatively recently. In addition, as indicated previously, the technical analysis contains various weaknesses, so some of the assessment is based on the previous analyses of others (including from within the IMF and outside). Clearly, the empirical work would benefit from further refinement, including by using more detailed data that could more effectively identify the constraints to credit, but it was not available for the research in this chapter. For a more explicit analysis of funding costs in several European countries and their potential effect on lending, see Chapter 1.

France

For France, the results from the bank lending survey, the firm-level analysis, and the credit model show a substantial negative effect from demand factors. Supply factors appear to play a lesser role, perhaps in part because of the extensive supply-oriented policies that were implemented. The French government helped ease credit supply by setting up state-sponsored agencies to undertake refinancing operations and recapitalize banks. As a euro area member, France also benefited from the ECB's efforts to support the supply of credit (including the widening of collateral eligibility). The firm-level analysis identifies weak consumption growth as a major factor in weak credit. This relationship likely reflects the strong role that household consumption has played in sustaining growth in the precrisis period, and the adverse impact of uncertainty and rising unemployment on consumption in the latter period. By contrast, debt overhang in households does not appear to be an impediment to consumption and credit growth, as discussed in the 2013 IMF Article IV Staff Report for France (IMF, 2013c). Therefore, further policy actions, if needed, could usefully focus on creating conditions for stronger growth and employment, rather than on boosting credit directly.

Italy

The Italian government has adopted a wide range of policies, particularly to ease the corporate debt overhang and help households adjust during a period of large fiscal consolidation, but the most important factor restraining credit currently appears to be the capital position of banks. On the demand side, corporate and personal bankruptcy laws were amended to speed up restructuring procedures. A temporary moratorium on debt-service payments was implemented for both corporate and household debt, although this action may have created other distortions because banks did not have to classify these loans as nonperforming. To address supply constraints, the Italian government provided guarantees for corporate and mortgage loans and launched an initiative to promote the development of a corporate bond market. Some measures were taken in 2009 to support the recapitalization of the banking sector and one bank received additional support this year.[24] Finally, Italy has also benefited from the ECB's policies supporting credit supply. Bank lending survey results point to a large role for bank balance sheet constraints in the tightening of lending standards at the beginning of 2012 and again more recently. The firm-level analysis confirms that low bank capital has played an important role most recently. It also shows that debt overhang in firms may also play a role in restricting credit to firms. Other authors have confirmed the importance of bank capitalization, including Del Giovane, Eramo, and Nobili (2011), who use confidential bank-level data in their analysis. Albertazzi and Marchetti (2010) present evidence, based on bank-firm matched data, that low bank capitalization and scarce liquidity dampened lending following the collapse of Lehman Brothers. Also, Zoli (2013) finds that funding costs of banks with lower capital ratios are more sensitive to changes in sovereign spreads. These various analyses would suggest that measures that encourage banks to increase their capital would be useful. In particular, further provisioning and write-offs could be encouraged by increasing tax deductibility of loan loss provisions and by expediting judicial process of corporate and household debt restructuring.

Spain

Debt overhang in banks, firms, and households is the key factor constraining credit volume in Spain. The bank lending survey shows that Spain saw a substantial tightening of credit supply in 2009. The firm-level analysis suggests that this tightening was in part due to constraints on bank capitalization. The decomposition of interest rates in Chapter 1 (see Figure 1.50) also suggests that the financial position of banks and sovereign stress have contributed to higher interest rates (and therefore lower loan volumes). Corporate debt overhang also played a role, restricting credit demand. Jiménez and others (2012) underline the importance of supply constraints for Spain using bank-firm matched loan-level data and provide evidence that banks' capital and liquidity ratios matter for their ability to extend loans to firms. To ease these constraints, the government has helped guide a major restructuring of the banking sector, including through a significant recapitalization program (see IMF, 2013e and 2013f). Also, Spanish state-sponsored institutions have been providing direct loans to firms and guarantees for corporate

[24]While direct capital injections were not undertaken to a large extent, the Italian government encouraged the issuance of special bank bonds (Tremonti bonds), which were purchased by the government. These bonds are used as regulatory capital with special terms that allow banks to forgo the payment of interest if they are unprofitable.

loans. In addition, the government has been taking steps to promote SME bond and equity financing and to address debt overhang in firms and households, including through resolution programs for heavily indebted households and amendments to bankruptcy rules. In view of the analysis in this chapter, further useful steps to ease credit constraints could include additional reforms to ensure efficient and timely resolution of corporate and household debt (see IMF, 2013g), as well as reforms to further ease bank funding costs, such as additional steps toward a full banking union (see the discussion in Chapter 1).

Japan

The firm-level analysis suggests that declining collateral values have been a particular constraint to credit intermediation in Japan. Policies in Japan since 2008 have largely focused on credit support measures to SMEs, including public credit guarantees and credit subsidies and direct credit provision by public financial institutions. Many of these measures had already been put in place in the early 2000s when Japan experienced a slowdown and a banking crisis. As noted in Japan's 2012 Financial Sector Assessment Program Update (IMF, 2012b), although these credit policies have largely sheltered incumbent firms from a tightening of financing conditions and have prevented widespread SME bankruptcies, reliance on public credit guarantees in SME lending tends to weaken banks' incentives to undertake rigorous credit assessments and reduces incentives for restructuring, and entails fiscal costs that may begin to outweigh benefits. In addition to the measures specifically geared toward SMEs, the Bank of Japan also established several lending facilities at low interest rates to encourage bank lending and lending toward growth sectors. Further measures would be useful, including (1) phasing out the full-value credit guarantees; (2) increasing the availability of risk capital for start-ups through asset-based lending; and (3) implementing a structural reform of lending practices based on fixed-asset collateral.

United Kingdom

The U.K. authorities adopted a number of measures to boost credit, but their effectiveness has yet to be demonstrated. This could be due to the relatively short period during which they have been in place. The Bank of England widened collateral eligibility and purchased limited amounts of corporate bonds and commercial paper. The Treasury provided temporary guarantees for bank assets to mitigate banks' funding problems (through the Credit Guarantee Scheme and Asset Protection Scheme). The Bank of England and the Treasury jointly implemented a Funding for Lending Scheme in mid-2012 (expanded in April 2013) to lower funding costs and to provide incentives for new lending. Although these measures appear to have helped ease funding conditions and some lending rates, it is less clear that credit volumes have increased as a result. This in part reflects still-ongoing deleveraging by major banks with weak asset quality or insufficient capital buffers. However, preliminary econometric results in this chapter suggest that the demand for additional loans is relatively insensitive to changes in lending rates. If this were to be confirmed through additional, more detailed analysis (including over a longer time period), then policies that support credit demand may be more effective in boosting credit volumes.[25]

United States

The constraints that the U.S. corporate loan market witnessed in the early stages of the crisis appear to have dissipated. The analysis of lending surveys shows that the United States saw a substantial tightening of corporate lending standards as a result of credit supply constraints and the weaker economic outlook in 2008 and 2009. Both supply and demand factors have improved since then, and total credit growth to nonfinancial corporations has turned positive. The improving housing market may improve access to finance for SMEs given that they often use housing as collateral (IMF, 2013i). Large purchases of mortgage-backed securities by the Federal Reserve, combined with mortgage securitization through government-sponsored enterprises, have helped alleviate supply-side constraints in the mortgage market (Box 2.3). However, the still-negative growth rate of credit to households (driven by housing debt) may call for further measures. Some demand-side policies have been implemented: to ease household debt overhang, loan modification programs were introduced in 2009, and subsidies and tax incentives were provided to

[25]Credit supply and demand equations for the United Kingdom were estimated for the post-2008 period only. Empirical analysis by Aiyar, Calomiris, and Wieladek (2012) on the precrisis period with confidential bank-by-bank data finds that the lending behavior of banks was sensitive to changes in capital requirements. The 2013 IMF Article IV Staff Report for the United Kingdom (IMF, 2013h) also suggests the need for strengthening banks' balance sheets and capital buffers as a prerequisite for a durable credit recovery.

Box 2.3. The Effect of the Liquidity Crisis on Mortgage Lending

This box examines the credit supply impact resulting from the exposure of U.S. banks to market liquidity risk through wholesale funding, based on Dagher and Kazimov (2012).

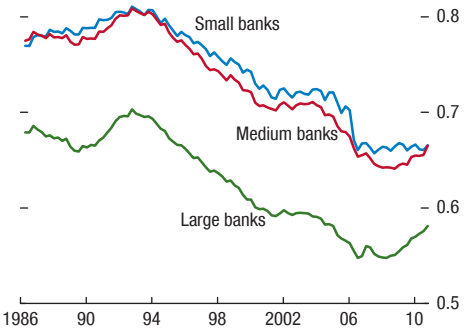
In the two decades leading up to the global financial crisis, U.S. banks reduced their reliance on traditional retail deposits, as shown by a drop in their average ratio of core deposits to assets (Figure 2.3.1).[1] Banks have increased their flexibility by moving away from traditional deposits and into market (or "wholesale") funding, but they are now more vulnerable to swings in market funding, as became apparent when wholesale funding liquidity dried up in the third quarter of 2007. The empirical literature on this topic provides evidence that banks that relied more on short-term wholesale funding reduced their lending more during the crisis than other banks. However, this literature has relied only on aggregate data, which makes the task of disentangling demand and supply effects very challenging.

Dagher and Kazimov (2012) make use of loan-level data on mortgage applications available through the Home Mortgage Disclosure Act, combined with bank financial data from the Reports of Condition and Income collected by the Federal Deposit Insurance Corporation. The data allow for an analysis of banks' decisions to reject loan applications while controlling for a host of applicant, bank, and geographical characteristics. Bank characteristics include the ratio of core deposits to assets, size, liquidity, leverage, and banks' reliance on securitization. By focusing on a homogeneous category of credit and studying bank decisions rather than the volume of credit, this approach greatly reduces the potential for demand factors to confound the supply effects. The regression compares the effect of bank characteristics on the decision to reject a loan in 2008 with the crisis year (2007) and with the pre-crisis years 2005 and 2006.

The results show that banks with a higher reliance on core deposits in 2007 increased their rejection rate less during the crisis.[2] The analysis also shows that the relative reduction in credit by wholesale-funded banks was more severe for so-called jumbo loans, which cannot be sold to government-sponsored enterprises (GSEs). This suggests that the reduction in lending was likely associated with liquidity challenges in banks. Indeed, the regressions indicate that banks that relied more on securitization through GSEs continued to lend more because such securitization offered a stable source of liquidity for mortgage financing for banks.

Therefore, the results indirectly suggest that the Federal Reserve's purchases of mortgage-backed securities, to the extent that they contributed to improving the liquidity of mortgage loans, helped ease supply constraints in mortgage lending.

Figure 2.3.1. U.S. Banks' Core Deposits-to-Assets Ratio



Sources: Federal Financial Institutions Examination Council, *Consolidated Reports of Condition and Income*; and IMF staff estimates.
Note: Computed as the ratio of demand deposits plus fully insured time deposits to total assets. Small, medium, and large banks are designated according to total assets for lower third, middle third, and top third, respectively.

The author of this box is Jihad Dagher.

[1]The core deposit ratio is a commonly used measure of the extent to which banks rely on traditional insured deposits as a source of funding. It is computed as the ratio of transaction deposits plus fully insured time deposits to total assets.

[2]Specifically, a 1 standard deviation (14 percentage point) increase in the core-deposit-to-asset ratio is associated with a 3.7 percentage point relative decrease in the rejection rate.

encourage banks to restructure debt instead of pursuing foreclosure.

Other countries

Data limitations and econometric challenges prevented a similar analysis in this chapter for other countries, but the general analytical framework can be used elsewhere. The use of better data (including supervisory data connecting individual banks to borrowers) could reveal the factors underlying weak credit developments on a country-by-country basis and pinpoint the policies that would most effectively revive credit activity.[26] In most cases, measures to stimulate loan demand and loan supply will both work; however, their respective effectiveness will depend on the relative sensitivity of credit demand and supply to changes in interest rates and on the other factors that underlie these curves.

Designing Effective Policies for Reviving Credit Markets

Appropriate policies to boost credit activity differ by country. The analysis shows that the causes of slow credit growth differ by country, even for countries that are closely linked (as in the euro area), and may be connected to specific factors that affect the demand for credit (the profitability of firms, their capacity utilization, or debt overhang), or to "pure" credit supply factors (the cost of funds for banks or the level of bank capital), or to both (GDP growth or economic uncertainty). The set of policies that are likely to be effective will differ too and should be identified using a thorough analysis of the underlying constraints in the particular country. Such policies may also target sectors that face particular credit challenges, such as SMEs (see Box 2.4 for policies in Korea). In that context, it may be particularly helpful to promote diversification away from bank credit to increase the options for finance (see Box 2.1). Evidence from previous crises also indicates that swift and comprehensive policy action leads to better outcomes (as in the Nordic countries in the early 1990s; see Box 2.5).

In many cases, demand- and supply-oriented policies are complementary, but the relative magnitude and sequencing of those policies is important. For example, the restructuring of household and corporate debt may negatively affect bank balance sheets. Hence, to restart credit, the restructuring of this debt must go hand in hand with more general repair of banks' balance sheets. Sometimes credit policies can be reinforcing. For example, policies to boost aggregate demand may be expected to boost the demand for credit, but the resulting improved economic outlook may also strengthen banks' balance sheets and relax credit supply constraints. Sequencing is also important: policies to ease credit supply constraints may be appropriate initially, but once they take hold, credit demand may become the constraining factor and additional policy measures may be necessary to boost credit demand. Finally, policymakers should attempt to determine whether constraints are temporary or require a more permanent form of intervention. Most obviously, emergency measures implemented in times of crisis to counter acute market distortions may not be warranted during more tranquil times and should be only temporary.

Credit policies can usefully underpin financial stability by preventing a deeper downturn than otherwise and by sustaining an economic recovery, but as with the use of unconventional monetary policy, policymakers should also recognize the limitations of credit policies. Most policies will be effective only to the extent that they can target underlying constraints to credit demand or supply. Ill-targeted measures may have adverse or conflicting effects. For example, the direct provision of credit by government-sponsored institutions can lead to a suboptimal allocation of capital and significant credit risk if loans are awarded on a noncommercial basis. Also, for countries in which the deleveraging process in banks is seen as an essential element for bringing the financial sector back to health, policymakers may need to accept a period of slower credit growth or a decline in credit. Finally, because policies take time to have an impact, there should be no rush to judgment as to their effectiveness and the need for additional measures.

The potential effectiveness of policies in the near term should be balanced with potential risks to financial stability in the longer run. If multiple policies to enhance credit would be effective, relatively more effort should be placed on those policies likely to have the least detrimental effect on medium-term financial stability. Risks fall into several broad categories:

- *Credit risk:* Policymakers should keep in mind that some policies, while potentially effective in supporting credit, may provide adverse incentives that

[26]Such data are typically confidential and were not available for the analysis in this chapter.

Box 2.4. Policy Measures to Finance Small and Medium Enterprises during Crises: The Case of Korea

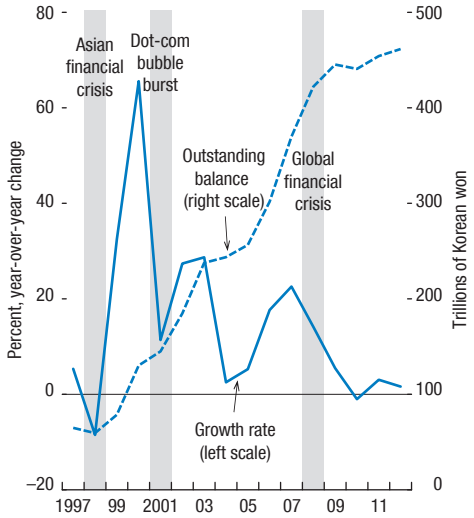
This box demonstrates how Korean authorities responded to crisis-related shocks forcefully and promptly to contain a possible credit crunch for small and medium enterprises (SMEs).

SMEs have been important contributors to economic output, employment, and balanced regional development in Korea. SMEs represented 99.9 percent of the total number of firms and 86.9 percent of the total labor force in 2011. They contributed 48 percent to GDP in 2011 and 69.8 percent of new job creation during 2008–10. More than half of SMEs are located outside the Seoul metropolitan area, contributing to regional economic development.

An economic crisis often constrains financial access for SMEs, but lending to SMEs continued to grow during economic crises in Korea (Figure 2.4.1).[1] Financial crises have a negative impact on SMEs' profitability and creditworthiness in many countries. Financial intermediaries typically tighten credit conditions, thus worsening SMEs' access to finance (OECD, 2013). In contrast, SME loans in Korea recorded positive growth in the year following crises.[2]

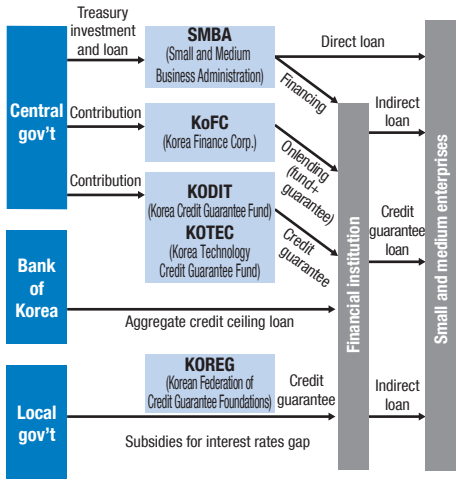
During the Asian crisis, the Korean authorities responded with a host of financial support programs for SMEs (Figure 2.4.2). First, the authorities ramped up existing credit guarantee programs by more than 90 percent on an annual basis (Figure 2.4.3), through the Korea Credit Guarantee Fund (KODIT), the Korea Technology Credit Guarantee Fund (KOTEC), and the Korean Federation of Credit Guarantee Foundations (KOREG).[3] Second, the Bank of Korea raised its aggregate credit ceiling and decreased preferential interest rates on loans by commercial banks to SMEs to provide an additional incentive for SME lending

Figure 2.4.1. Outstanding Balance and Growth of SME Loans



Sources: Financial Supervisory Services; and IMF staff calculations.
Note: SME = small and medium enterprise.

Figure 2.4.2. Financial Support Programs for SMEs



Sources: Yi (2012); and IMF staff modifications.

The authors of this box are Heedon Kang and Yitae Kim.

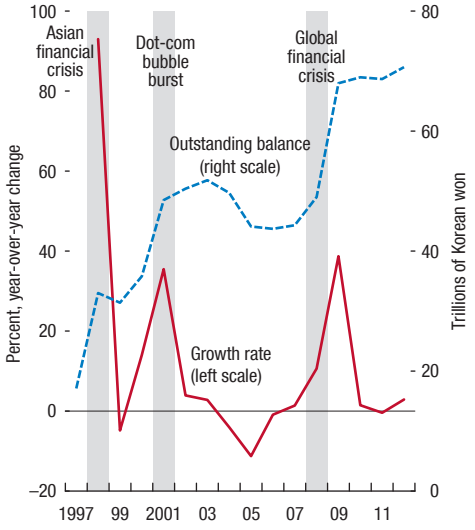
[1]Korea was affected by the 1997–98 Asian financial crisis, the bursting of the dot-com bubble in 2001, the credit card crisis in 2003, and the global financial crisis. The credit card crisis related mainly to household financial conditions, but the other three crises significantly affected the business environment for SMEs.

[2]Bank financing remains the most important source of external financing for SMEs (83.3 percent) in Korea, followed by public lending (10.6 percent). Equity and bond financing accounted for 1.1 percent and 3.2 percent, respectively, in 2011.

[3]The funds facilitate loans by extending credit guarantees to SMEs that lack tangible collateral but have good growth potential. Three agencies support different types of SMEs: the KODIT provides guarantees mostly for non-information-technology-oriented start-ups and exporting SMEs; the KOTEC focuses on information-technology-oriented SMEs; and the KOREG supports regional SMEs.

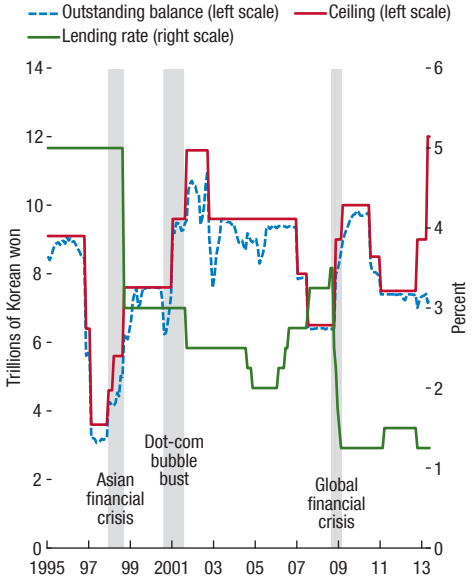
Box 2.4 *(continued)*

Figure 2.4.3. Outstanding Balance and Growth of Credit Guarantees for SME Loans



Sources: Korea Technology Credit Guarantee Fund (KOTEC); Korea Credit Guarantee Fund (KODIT); Korean Federation of Credit Guarantee Foundations (KOREG); and IMF staff calculations.
Note: SME = small and medium enterprise.

Figure 2.4.4. Aggregate Credit Ceiling Loans



Source: Bank of Korea.

(Figure 2.4.4).[4] Third, the Small and Medium Business Administration increased its policy lending to SMEs by more than 60 percent.

A successful experience during the Asian crisis led the authorities to repeat prompt policy responses in later crises.[5] The quick recovery in Korea after the Asian crisis is generally attributed in large part to accommodating macroeconomic policies, a favorable external environment, and a recovery in exports supported by sharp depreciation of the Korean won. However, specific policies to support SMEs also contributed, and so the authorities were quick to implement similar policy measures when the dot-com bubble burst in 2001 and when the global financial crisis erupted in 2008.

The policy measures were instrumental in the prevention of many disorderly SME bankruptcies, which helped stem job losses. Although SMEs were financially stressed and many went bankrupt at the outset of the Asian financial crisis, the number of bankruptcies started to fall dramatically in 1999 (Figure 2.4.5); during later crises, these policies successfully prevented the bankruptcy of solvent SMEs with temporary liquidity shortages. Job losses also reversed quickly in 1999 and did not occur during other crises (Figure 2.4.6).[6] Empirical studies show that supportive programs had strong profit-enhancing effects, especially for innovative start-up SMEs, whose market access is limited despite their higher growth potential (Kang and Jeong, 2006; Kim, 2005).[7]

Although such policy measures can be seen as effective in easing access to finance for SMEs, they can give rise to unintended consequences, such as missed opportunities for restructuring and high fiscal costs. SME financing support programs can undermine

[4]Aggregate credit ceiling loans (ACCLs) are extended by the Bank of Korea to commercial banks based on their SME loan performance, up to a ceiling set by the Monetary Policy Committee. The lending rates on ACCLs are kept lower than the policy rate to encourage banks to lend to SMEs.

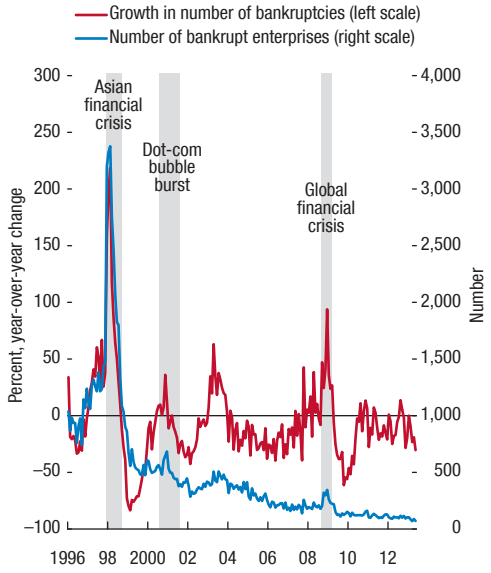
[5]The Korea Finance Corporation was established in October 2009; one of its purposes is to assist SMEs by supplying funds to financial institutions for onlending.

[6]Bankruptcy data disaggregated by enterprise size are not available.

[7]The Bank of Korea enhanced its support for commercial bank loans to innovative start-up SMEs by increasing the ACCL ceiling by 3 trillion won and lowering preferential interest rates from 1.25 percent to 0.5 percent. The Korea New Exchange (KONEX), a new stock market for SMEs, opened July 1, 2013.

Box 2.4 *(concluded)*

Figure 2.4.5. Number and Growth of Bankrupt Enterprises



Sources: Bank of Korea; and IMF staff calculations.

Figure 2.4.6. Growth in Number of Employees

(Percent; year-over-year change)

Sources: Bank of Korea; and IMF staff calculations.

creative destruction of nonviable SMEs. Despite the authorities' strong commitment to reducing the programs' scale, in the wake of the Asian financial crisis there has been an underlying upward trend. This trend is particularly strong in the credit guarantee program, suggesting that political economy considerations may have played a role, which has resulted in a buildup in government contingent liabilities. Nevertheless, the policies so far have aided credit provision to SMEs and supported the Korean economy.

raise financial stability risks, most importantly by affecting credit risk in banks. For example, an attempt to encourage lending to SMEs by changing prudential rules (such as reducing prudential risk weights) could jeopardize financial stability if the resulting risk weights do not appropriately account for the risks embedded in those exposures. Some policies have tolerated or encouraged forbearance on loan payments by distressed firms, which could lead to the practice of "evergreening," whereby banks delay or fail to recognize loans as nonperforming.[27] Government guarantees of loans also affect lender incentives because they may lead banks to relax their screening and monitoring of borrowers. In addition to increasing risks in banks, these incentive effects may lead to a misallocation of capital.

- *Liquidity risk:* Central bank provision of ample liquidity to banks, in part to encourage credit extension, may weaken liquidity management and discourage repair of private bank funding markets, leaving banks overly reliant on central bank funding.
- *Market risk:* Authorities have directly intervened in credit markets to lower interest rates and ease financing conditions.[28] Although appropriate for boosting growth in the current environment, when

[27]For risks associated with recent unconventional monetary policies (including the possibility of evergreening), see Chapter 3 of the April 2013 GFSR.

[28]As an additional risk, low interest rates tend to reduce interest margins, lowering bank profitability.

Box 2.5. Lessons from the Nordic Banking Crises

This box discusses the policy responses of the Nordic authorities to the financial crises of the late 1980s and early 1990s, noting the importance of taking decisive action to avert a lengthy recovery of credit growth.

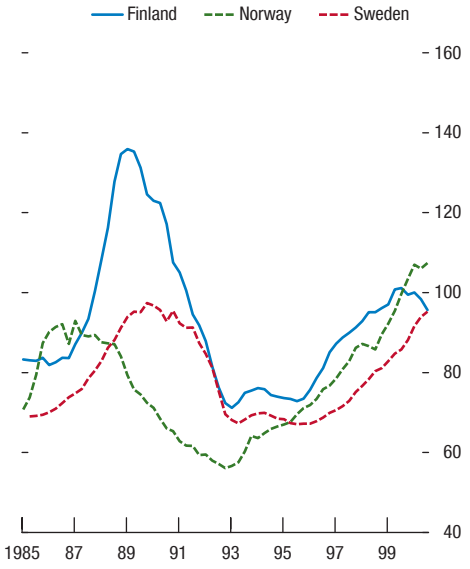
Banking crises struck Norway in 1988 and Finland and Sweden in 1991. Although the episodes varied, each was precipitated by significant financial liberalization and procyclical macroeconomic policies, which triggered rapid credit growth, asset price inflation, and elevated private sector indebtedness (Figures 2.5.1 and 2.5.2). Corrections to real estate prices, rising bankruptcies, and credit losses followed various external shocks (for example, oil price declines, the collapse of the Soviet Union, and the European Exchange Rate Mechanism crisis).[1]

Sufficient macroprudential measures were absent in the run-up to the crises. This was in contrast to Denmark, which successfully avoided a crisis. While financial liberalization also began earlier, Danish banks were better capitalized, in part due to favorable tax treatment of provisions and stricter requirements. Inadequate regulation of large exposures also allowed substantial risks to accumulate in the other Nordic financial systems.

Once the crisis hit, responses varied:

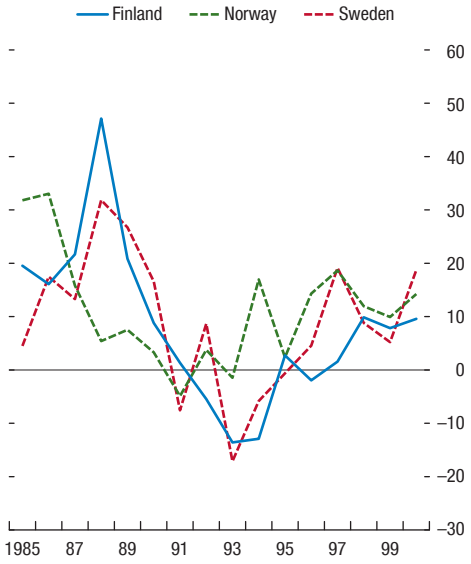
- In *Norway*, an independent fund was established to provide capital when losses threatened to deplete capital at two of the four largest banks. The government eventually took ownership of both, alongside the largest bank.
- In *Finland*, following the takeover of the failed central savings bank, Skopbank, a fund was established to inject capital into the banking system together with blanket guarantees.
- In *Sweden*, one of the two largest banks that failed to meet regulatory capital requirements, Nordbanken, was merged with another bankrupt bank and subsequently broken up into a "bad" and "good" bank. Government capital was injected into the failed banks and to fund the "bad" bank. Blanket guarantees were also issued.

Figure 2.5.1. Real House Price Index in the Nordic Countries
(Quarterly index; historical average = 100)



Source: IMF staff calculations.
Note: Historical average refers to the average price computed over the period 1980 to 2012.

Figure 2.5.2. Lending Growth by Banks
(Percent)



Source: Organization for Economic Cooperation and Development.

The author of this box is Ruchir Agarwal.

[1]Average loan loss provisions over 1990–93 came to 3.4 percent of total loans for Finland, 2.7 percent of total loans for Norway, and 4.8 percent of total loans for Sweden. See Drees and Pazarbasioglu (1998) for a comprehensive treatment of the Nordic banking crisis.

Box 2.5 *(continued)*

Conditional government support and government takeover were a critical part of the resolution. The Nordic governments protected taxpayers by wiping out most of the incumbent shareholders and forcing banks to write down losses before injecting funds. In Finland and Sweden, "bad" assets were transferred to asset management companies that operated independently and with limited regulatory constraints, while the "good" banks focused on core banking tasks, facilitating credit within the system. Unlike the Finnish and Swedish governments, the Norwegian government did not extend its role as "owner of last resort" by guaranteeing bank liabilities and setting up a "bad bank" to deal with nonperforming loans. Since then, each government has maintained a portion of bank ownership.[2]

Decisive policy actions with little political uncertainty were crucial. While lending contracted in the region, a serious credit crunch was avoided. Credit recovered by the mid-1990s due to sound institutions that enabled orderly restructuring and strong governments with the trust of the public to act in their best interest.

[2]Nordbanken eventually grew through regional mergers into the pan-Nordic bank, Nordea, in which the Swedish government's stake was 13 percent until July 2013, when it was reduced to 7.1 percent. The Norwegian government maintained a stake of 34 percent in Norwegian bank DNB as of December 2012. In addition, Solidium Oy, set up initially to manage Skopbank's industrial holdings and still fully owned by the Finnish government, retains a 3 percent share in Nordea through its holdings of the Sampo group.

central banks exit from their intervention, interest rates will eventually rise. If such a rise is more abrupt than expected (as in the adverse scenario in Chapter 1), banks may face substantial capital losses on holdings of fixed-rate securities. In addition, interest rate increases could lead to losses in the loan book as banks pass on their higher cost of funds to borrowers (through, say, variable-rate loans), who may struggle to make higher loan payments.

- *Risk of moral hazard:* Government financial support carries the chance that financial institutions will take more risks than they otherwise would, anticipating that the government will again intervene and bail them out if they face trouble. Policy design should take into account such "moral hazard" and build in incentives for beneficiaries of government intervention to behave prudently so as not to jeopardize public funds. Recent efforts to introduce such incentives are ongoing (FSB, 2011; IMF, 2012c).

Mitigation of these risks may not be necessary or appropriate while the economy is still weak, as it could run counter to the objectives of the credit policies; still, policymakers will need to remain cognizant of these potential risks. In principle, the appropriate supervisory response to increased risks is to put prudential measures in place for mitigation, including enhanced credit risk management, adequate loss provisions, and robust liquidity and capital requirements. However, some credit-enhancing policies are in fact designed to increase risk taking by lenders—for example, changing risk weights for loans to certain sectors. Offsetting prudential measures would undo the effects the policy is trying to achieve. Other policies also serve to enhance financial stability, either directly—for example, by improving the financial position of banks—or indirectly—for example, by improving confidence—so that the extreme downside risks that were present in the crisis are ameliorated. Still, in some cases, there could be tension between supporting credit and raising financial stability risks. If, in such circumstances, the authorities choose to promote credit, then it would suggest that increased credit risk in banks is accepted as part of the cost of credit-supporting policies. Nevertheless, policymakers need to continually weigh the near-term benefits against the longer-run costs of policies aimed at boosting credit.

Credit-enhancing policies raise similar issues of a possible trade-off between objectives in the context of the broader agenda for financial reform. This important and ambitious policy agenda includes more robust capital and liquidity standards for banks under Basel III, enhanced monitoring for shadow banks and other nonbank financial intermediaries, and implementation of macroprudential frameworks. The goals of this

broader policy agenda are to improve the quality and quantity of capital, foster better liquidity management and more accurate asset valuation, and develop and implement more effective macroprudential tools. Overall, these measures should make banks stronger and thus help sustain their role in credit markets in the medium term. Still, in the short term, some regulatory changes may restrain bank lending; for example, enhanced capital requirements may make it more difficult for banks to increase lending. Therefore, putting offsetting measures in place until these short-term constraints are eased may be useful; for example, authorities may wish to urge banks to raise capital so that enhanced capital requirements do not lead to less lending by banks.

In addition to financial stability risks, the potential fiscal costs of policies should be considered.[29] Some measures may raise credit activity but may impose a substantial fiscal cost, including in the form of contingent liabilities. Costs can include potential losses on assets purchased by the central bank, loan losses in state-sponsored institutions engaged in direct lending to firms and households, and the carrying cost (interest) on funds used to recapitalize banks, among others. Contingent liabilities could include expanded deposit insurance and loan guarantees given by the public sector. Some policies, such as adjustments in basic regulation or legal changes, do not incur substantial direct fiscal costs.

[29]See IMF (2010) for estimates of the fiscal costs associated with financial sector support measures during the 2008 crisis for G20 countries.

Better data are crucial for improving the analysis of factors underlying weak credit. The investigation in this chapter was hampered significantly by a dearth of appropriate data, even for the major advanced economies. Policymakers should aim to expand the scope of available data, in particular information that would allow for identification of factors that may constrain loan demand and loan supply. For example, access to disaggregated loan data with information on borrowers and lenders would facilitate the examination of shifts in the supply of credit by effectively controlling for demand, as that data would allow matching of data from borrowers applying for loans at multiple banks. Data from credit registries could be useful in this regard. In addition, more extensive use of lending surveys with better-directed questions would allow for improved analysis. These recommendations are important also for policymakers in emerging markets, who could then apply the framework developed in this chapter.

In sum, measures to stimulate private credit should be designed with care. Policies to boost lending in the short term can be beneficial, but can also carry costs and potential risks to future financial stability if poorly designed or targeted. For prudent policymaking in this area, authorities should (1) identify the constraints to loan demand or supply that can be addressed with government intervention; (2) align the policies with the identified constraints; (3) be mindful of interactions with other policies, including regulatory measures; (4) keep in mind direct and contingent costs of these policies to the government; (5) assess potential longer-term financial stability implications of such policies; and (6) if warranted, establish appropriate prudential measures to mitigate such stability risks.

Annex 2.1. Previous Findings in the Literature on Credit Constraints

Economic theory suggests that financial intermediation suffers from potential intrinsic difficulties in the efficient allocation of scarce credit. Two important difficulties involve (1) a maturity mismatch between long-term borrowers and short-term creditors, and (2) an informational asymmetry between creditors and borrowers. Informational asymmetries occur when a borrower's misbehavior is not observed (moral hazard); when borrowers' risk types are not observed (adverse selection); or when information can be obtained but with some costs (costly state verification). The literature has shown that, despite these market failures, efficient allocation of credit can still be achieved, and permanent government intervention is not necessary (Townsend, 1979; Prescott and Townsend, 1984a, 1984b; Bisin and Gottardi, 2006; Allen and Gale, 2004).[30]

However, in recessions, these market failures may amplify credit contractions. The financial amplification mechanisms and their key factors described below have been confirmed empirically for past major recessions. Preliminary evidence also suggests that these mechanisms are at work in the current recession (see Table 2.7, under the heading *Identifying Amplification Frictions*).

- *Collateral constraints:* Requiring collateral (an asset) from a borrower to secure a loan is appropriate behavior by a lender to help mitigate informational asymmetry. Using collateral to obtain a loan eases the borrower's liquidity constraint (a form of maturity mismatch), because liquidity is obtained from a less liquid asset. A drop in the value of collateral as a result of asset price declines (in stock or bond markets, for example) shrinks the loan that can be obtained with that collateral, tightening credit supply. A similar mechanism affects interbank markets: lower collateral prices would lower the amount banks will lend to each other in interbank markets, restricting bank funding and again tightening credit supply. On a macroeconomic level, this may further lower asset prices (Kiyotaki and Moore, 1997; Gertler and Karadi, 2012; Geanakoplos, 2010). Moreover, when households face tightened collateral constraints, they may increase precautionary saving (by lowering consumption). Although more saving eases credit supply constraints, lower consumption dampens credit demand. These mechanisms may slow economic recovery (Guerrieri and Lorenzoni, 2011).
- *Debt overhang:* Debt overhang can affect credit demand and credit supply. Highly indebted firms may not pursue otherwise profitable business opportunities (Myers, 1977), thus lowering credit demand. Similarly, more highly indebted households may choose not to take out loans, even though doing so could increase their overall current and future well-being. Thus, an economy-wide debt overhang can slow growth and deflate asset prices (Adrian and Shin, 2013), negatively affecting collateral values (and thus further constraining credit creation). Debt overhang can also affect credit supply when the overhang is in banks: highly leveraged banks may have difficulty obtaining funding (for example, in the interbank markets) and thus lack the liquidity to make additional loans.
- *Relationship banking:* Informational asymmetry can ease when banks and their borrowers have ongoing business relationships, which allow banks to know their customers and keep borrowers from misbehaving in order to obtain loans in the future (Townsend, 1982; Sharpe, 1990; Rajan, 1992). However, in a severe recession, many of those relationships may disappear because of the actual (or potential) bankruptcies of banks and firms. Banks respond by raising the risk premium they charge on loans, in essence tightening the supply of credit.

During normal times, the government's role in mitigating intrinsic market failures is limited. The government cannot acquire better information on borrowers or change maturity preferences. Still, structural policies can be pursued to increase information flows (for example, by instituting or improving a credit registry or enhancing accounting standards and public disclosures) or to promote alternatives to bank credit, such as a corporate bond market or securitization.

But when market failures amplify severe downturns, government intervention has a clearer role. In such situations, the government can use its credit rating, generally higher than that of the private sector, to ease credit constraints. For example, a central bank could lend directly to firms (Gertler and Karadi, 2012), thus taking over the financial intermediation role. It

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[30]Exceptions are government intervention through deposit insurance and microprudential regulation. The former prevents bank runs that may result from maturity mismatches and the latter prevents excessive risk taking by banks, including as a result of deposit insurance.

Table 2.7. Previous Findings in the Literature

Category/Paper	Country/Region	Year	Methodology	Data	Key Findings
Creditless Recovery					
Calvo, Izquierdo, and Talvi (2006)	31 emerging markets	1980–2004	Descriptive charts	Country-level data	Quick recovery is often observed without credit.
Claessens, Kose, and Terrones (2012)	44 countries	1960–2010	Regression of duration of recession	Country-level data	Creditless recovery is slower, in particular after asset price bust.
Abiad, Dell'Ariccia, and Li (2011)	48 countries	1964–2004	Panel regression	Industry-level data	Creditless recovery is slower, especially for industries relying on external finance.
Sugawara and Zalduendo (2013)	96 countries	1965–2011	Probit regression (takes value of 1 for creditless recovery)	Country-level data	Creditless recovery is not rare, 25 percent of all episodes. About half occurred in 2009–10. Creditless recovery is slower but only during the first two years.
Identifying Amplification Frictions					
Collateral Constraints					
Gan (2007a)	Japan	1994–98	Natural experiment, panel regression	Bank-firm matched micro data, loan level	Firm's collateral (land) value matters for investment (0.08 elasticity) and loan amounts.
Jermann and Quadrini (2012)	United States	1984–2010	Structural estimation, dynamic stochastic general equilibrium	Flow of funds	Estimates key parameter values of DSGE model with financial frictions (i.e., stochastic collateral constraint). Finds importance of stochastic collateral constraint to explain actual data.
Guerrieri and Lorenzoni (2011)	United States	2000–10	Calibration, dynamic stochastic general equilibrium	County-level data	Households' collateral constraints can explain low interest rates and slow recovery during recession with credit crunch because households increase precautionary savings after loss of borrowing capacity.
Fraser (2012)	United Kingdom	2001–09	Panel regression	SME firm-level data	Compared with precrisis, in 2007–09, more SMEs are asked for collateral when applying for loans. The ratio of loan amount to collateral value has declined. Higher margins and fees are paid. Yet more loan applications are rejected.
Debt Overhang					
Hennessy (2004)	United States	1992–95	Structural estimation, investment theory	Firms with bond ratings	Corporate debt overhang is confirmed.
Gan (2007b)	Japan	1994–98	Natural experiment, panel regression	Bank-firm matched micro data, loan level	Banks' exposure to real estate (i.e., nonperforming loans) affects new lending.
Jiménez and others (2012)	Spain	2002–10	Panel regression	Bank-firm matched micro data, loan level	Banks' capital ratio and liquidity ratio matter for loan provision to firms.
Donovan and Schnure (2011)	United States	2007–09	Panel regression	County-level data	Inefficient lock-in effect may arise: Underwater households cannot move, so labor market mismatch could worsen. Household movements indeed declined within a county, but out-of-county migration was not affected much, suggesting effects on the labor market were small.
Lee, Sameen, and Martin (2013)	United Kingdom	2007–12	Panel regression	SME firm-level data	Innovative small firms find it harder to access finance than other small firms.
Kalemli-Ozcan, Kamil, and Villegas-Sanchez (2010)	Six Latin American countries	1990–2005	Panel regression/crisis event study	Firm-level data	In a twin (currency and banking) crisis, exporters should demand credit to take advantage of improved competitiveness, but they suffer from collateral constraints and banking sector distress. Similar exporters with higher foreign ownership have much larger investment, confirming importance of bank liquidity/capital channel.
Relationship Banking					
Petersen and Rajan (1994)	United States	1988–89	Panel regression	U.S. SMEs firm-level data	Bank relationship is important for quantity of firm-level credit.
Peek and Rosengren (2000)	United States	1990s	Natural experiment	U.S. state-level activity data and Japanese bank-level data	State-level real activities are affected by distressed Japanese banks through their branches.
Ashcraft (2005)	United States	1988, 1992	Natural experiment	U.S. county-level activity data	County-level real activities are affected by sudden bankruptcy of banks.
Karaivanov and others (2010)	Spain	2000–06	Structural estimation, general equilibrium model with moral hazard	Bank-firm matched micro data	Moral hazard is not a problem in bank-firm relationship but explains data well for firms that do not rely on banks but on trade credit.
Ongena, Peydró, and van Horen (2013)	Eastern Europe	2008–09	Natural experiment, cross-section regression	Bank-firm matched micro data	Firms that had relationship with western European banks suffered more.
Albertazzi and Marchetti (2010)	Italy	Six months post Lehman	Natural experiment, cross-section regression	Bank-firm matched micro data	Low bank capitalization and scarce liquidity matter. While larger low-capital banks reallocated loans away from riskier firms, smaller low-capital banks seem to "evergreen" loans.
Caballero, Hoshi, and Kashyap (2008)	Japan	1993–2002	Panel regression	Firm-level regression/theoretical exposition	With subsidized loans, unviable firms (zombies) survive. Banks have incentives to evergreen loans, e.g., to circumvent the capital ratio requirement with regulatory forbearance. Increase in the number of zombies depresses investment and employment growth and lowers productivity.

(Continued)

Table 2.7. Previous Findings in the Literature *(continued)*

Category/Paper	Country/Region	Year	Methodology	Data	Key Findings
Alternative Credit Sources					
Klapper, Laeven, and Rajan (2012)	Global Fortune 500	2005	OLS	Transaction-level data	Trade credit is widely used in the world.
Chari, Christiano, and Kehoe (2008)	United States	2001–08	Descriptive charts	Flow of funds	Bank credit lines are used well during episodes of sudden malfunctioning of security market.
Ivashina and Scharfstein (2010)	United States	2000–08	Descriptive charts	Various micro data	New loans dwindled about 80 percent from the peak in 2008:Q4, but credit line drawdowns increased. Given bank funding strains, credit line drawdowns further constrained banks from making new loans.
Chari (forthcoming)	United States	1952–2012	Descriptive charts	Flow of funds	Total available funds seem sufficient to cover investment, but aggregate data may provide misleading picture of true financing needs.
Carbó-Valverde, Rodríguez-Fernández, and Udell (2012)	Spain	1994–2008	Demand/supply disequilibrium MLE	SME firm-level data	SMEs' use of trade credit increased after onset of crisis.
Jiménez and others (2011)	Spain	1999–2009	Panel regression	Bank-firm matched micro data, loan level	Securitization of real estate loans did not affect credit for nonreal-estate firms in general but increased credit for first-time borrowers.
Deutsche Bundesbank (2012)	Germany	1991–2010	Descriptive charts	Country-level data	German firms became less reliant on bank lending.
Credit Supply and Demand					
IMF, GFSR (2011–13)	Europe	2008–13	Descriptive charts	Country-level data	Abnormally low credit supply and high risk premium were observed.
IMF (2013b)	21 CESEE countries	2001–11	Panel regression	Bank-level data	In the credit slowdown during 2008–11, macroeconomic conditions played a particularly large role in 2009. In 2010 and 2011, however, the large factor was banks' own weakened fundamentals and their more conservative way of responding to these fundamentals.
IMF (2013a)	18 OECD countries	1980–2009	Aggregate country panel regression	Country-level data	High levels of sovereign, corporate, and household debt are detrimental to growth.
IMF (2012a)	Ireland	2002–12	Panel regression	Country-level data/bank lending survey	Weak lending is mostly demand driven (3 to 4 bps increase in quarterly lending growth with one unit increase in demand factor in the survey), although supply factors play a role in mortgage lending and pockets of SME lending.
IMF (2013d)	Portugal	2007–12	Descriptive charts	Country-level data	Firms' rapid deleveraging is mainly voluntary, driving deleveraging by banks. However, according to the INE Investment Survey, credit conditions have tightened significantly in some segments.
OECD (2013)	OECD countries	2007–12	Descriptive charts/statistics	Country-level data	Overall, SME access to finance in 2011 and early 2012 was tight but appears stabilized. Still, conditions vary widely across countries.
Zoli (2013)	Italy	2006–12	VAR/system of equations	Country-level data	News on sovereign crisis affects Italian banks' CDS and bond spreads. Banks with lower capital ratios and higher nonperforming loans show more sensitivity. In turn, corporate loan rates are affected by sovereign risks, with 30 to 40 percent pass-through. Both demand and supply factors from bank lending surveys explain quarterly credit growth significantly.
Lam and Shin (2012)	Japan	2000–12	Descriptive charts	Various country level data	Credit growth is low, especially for SMEs. A reason appears to be the existence of many unviable SMEs, partly as the result of credit support policies.
Lown and Morgan (2006)	United States	1968–84 1990–2000	VAR	Country-level data/bank lending survey	Bank lending standards (U.S. Senior Loan Officer Opinion Survey) are found to be important in explaining actual loan amount and real output.
Gilchrist and Zakrajsek (2012)	United States	1973–2010	VAR	Country-level data	Constructs a better credit spread index based on corporate bond spread: the excess bond premium. This time-varying premium explains most of GDP growth.
Hempell and Sørensen (2010)	Euro area	2003–09	Panel regression	Country-level data/bank lending survey	Bank loan growth is explained by both supply and demand factors covered by the Bank Lending Survey. The credit supply factor is stronger in the crisis period in quarterly growth rate of bank lending to firms (2 bps vs. 1 bp beforehand). Demand factor is about 1 bp.
Hristov, Hülsewig, and Wollmershäuser (2012)	Euro area	2003–10	VAR	Country-level data	Uses sign restrictions to identify aggregate supply and demand and loan supply shocks. Loan supply shocks are found to be significant. The loan supply shock was quite large in 2008:Q4, but is close to zero by 2010:Q2. Heterogeneity among countries has also been reduced.

(Continued)

Table 2.7. Previous Findings in the Literature *(concluded)*

Category/Paper	Country/Region	Year	Methodology	Data	Key Findings
Ciccarelli, Maddaloni, and Peydró (2013)	Euro area	2002–11	VAR	Country-level data/bank lending survey	Uses bank lending survey outcomes as credit supply and demand shocks. Monetary transmission is affected through the credit channel only in distressed countries. The transmission stems from impaired bank balance sheets for 2008–09 (only) and from weak credit demand for 2008–11. The former effect is also smaller, implying monetary policy was effective for the former but not for the latter.
Beer and Waschiczek (2012)	Austria	2002–11	Bayesian model averaging	Country-level data/bank lending survey	Loan amounts are mostly demand driven (about 90 percent) and credit supply plays a negligible role.
Del Giovane, Eramo, and Nobili (2011)	Italy	2002–09	Panel regression	Bank lending survey/bank-level data	Both credit supply and demand play a role. For 2007–09, the credit supply factor lowered loan amounts 2.3 to 3.1 percent, of which one-quarter is attributed to banks' weak capital positions and the other to increased perception of borrowers' credit risk.
Blaes (2011)	Germany	2003–10	Panel regression	Bank lending survey/bank-level data	Bank lending has been both supply and demand driven, even in the crisis period. At the peak between 2009:Q3 and 2010:Q1, credit supply factors in bank lending surveys explain 35 to 40 percent of bank lending, equivalent to about a 0.5 percent dampening of quarterly loan growth.
Lacroix and Montornès (2010)	France	2003–10	OLS	Country-level data/bank lending survey	Bank lending is explained by both supply and demand factors in the bank lending survey. For business loans, each factor contributes about half of the loan growth deviation from the sample mean during the crisis period. However, from 2008:Q2 to 2009:Q2, supply factors were stronger, but demand factors became stronger since.
Bassett and others (2012)	United States	1992–2011	VAR/panel regression	Country-level/loan level data/ bank lending survey	Constructs a cleaner credit supply measure: a lending survey component that is unexplained by macro and bank-level factors. Credit supply effects become larger than when using only the bank lending survey.
Bank of England (2013)	United Kingdom	2007–13	Descriptive charts	Country-level/bank lending survey	The overall availability of credit to the corporate sector has increased recently. However, demand remained mixed, likely due to a lack of confidence among firms. As for households, the amount of new secured credit increased significantly recently.
Amiti and Weinstein (2013)	Japan	1990–2010	Decomposition of loan movements	Bank-firm matched micro data	Loan movements are decomposed into bank, firm, industry, and common shocks. The bank supply shocks explain 40 percent of aggregate loan and investment fluctuations.

Source: IMF staff.

Note: bp = basis point; CDS = credit default swap; CESEE = central, eastern, and southeastern Europe; DSGE = dynamic stochastic general equilibrium; INE = Instituto Nacional de Estatística; MLE = maximum likelihood estimation; OECD = Organization for Economic Cooperation and Development; OLS = ordinary least squares; SMEs = small and medium enterprises; VAR = vector autoregression.

can also loosen collateral rules to ease the liquidity constraints that result from declines in collateral values. Treasuries can use their superior credit status similarly, for example, by extending subsidized loans via state-sponsored institutions. In addition, governments can remedy debt overhang by facilitating debt restructuring—for example, through bank recapitalization, purchases of nonperforming assets, or reforms of laws related to bankruptcy. These government interventions also help preserve relationships between banks and clients, easing another potential market failure.

The market itself may also find ways to ease credit constraints. In some countries, credit from alternative sources has likely mitigated increased market friction during the recent recession (see Table 2.7, under the heading *Alternative Credit Sources*). For example, when the money and corporate bond markets did not function well after the collapse of Lehman Brothers, it appears that existing bank credit lines were used more intensively in the United States, although perhaps by crowding out new loans (Chari, Christiano, and Kehoe, 2008; Ivashina and Scharfstein, 2010). In another example, credit-constrained SMEs in Spain increased their use of trade credit (Carbó-Valverde, Rodríguez-Fernández, and Udell, 2012).

Previous studies have also looked at credit market developments in various countries (see Table 2.7, under the heading *Credit Supply and Demand*). Some studies have found that credit supply appeared to constrain credit growth in many countries, in particular during late 2008 and 2009 (Hempell and Sørensen, 2010; Del Giovane, Eramo, and Nobili, 2011). Others also found low credit demand from 2008 to date in a number of (mostly advanced) economies (Ciccarelli, Maddaloni, and Peydró, 2013).

Annex 2.2. Determinants of Bank Lending Standards

European Central Bank and Federal Reserve survey results indicate that lending standards for corporate and mortgage loans tightened considerably in late 2008 for most countries (Figures 2.12 and 2.13). Conditions eased during 2010, but during the past two years some European countries experienced a second round of tightening in lending standards. In the United States, corporate lending standards have not seen further strains since 2008–09.

The surveys ask loan officers for the reasons behind tightened lending standards, which allows the construction of a variable that reflects mostly supply constraints. Responses on the tightness of lending conditions may not necessarily reflect "pure" constraints on the supply of credit, such as bank liquidity and capital. The responses could also reflect effects on the standards from changes in borrowers' creditworthiness, the economic outlook, economic uncertainty, and the like. Aside from potentially affecting the willingness of banks to make loans, these factors are also related to loan demand conditions. The influence of these factors can be statistically removed from the lending standards variable (following Valencia, 2012) to obtain a measure of lending standards that more closely reflects the ability of banks to supply credit—that is, connected to bank balance sheet constraints.

To find the determinants of bank lending standards, a regression is run with the overall credit standards index as a dependent variable and the reasons for tightening as explanatory variables. The results for the euro area are shown in Table 2.8.[31] The sample includes Austria, France, Germany, Italy, Luxembourg, the Netherlands, Portugal, and Spain. Regressions are also run in which the real GDP forecast and stock market volatility are included instead of answers related to the economic environment, as more direct proxies for the latter. This specification corresponds to the second and fifth columns in Table 2.8, for corporate and mortgage loans, respectively.[32] Balance sheet constraints (capital

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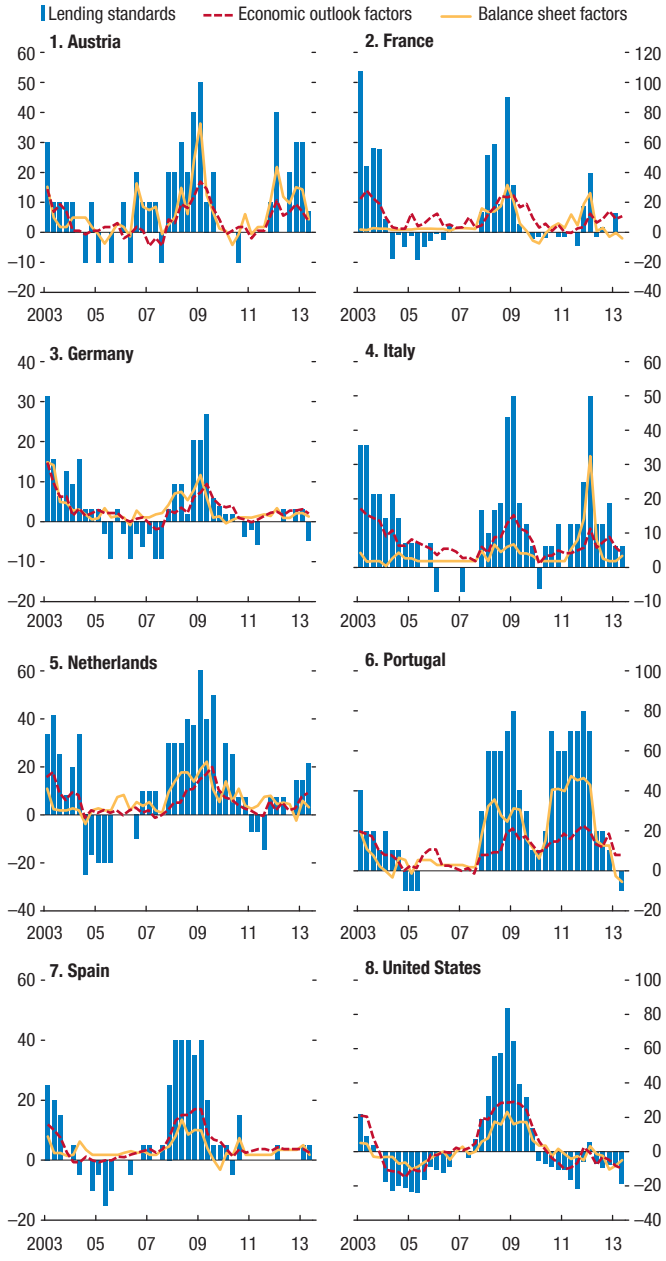
[31]The specifications for corporate and mortgage loans differ because the available options included in the surveys to justify the tightening or easing in lending standards for corporate and mortgage loans differ.

[32]We also include a specification augmented with the expected behavior of demand taken from the survey because banks may change lending standards based on an expected change in demand behavior. The variable is not significant.

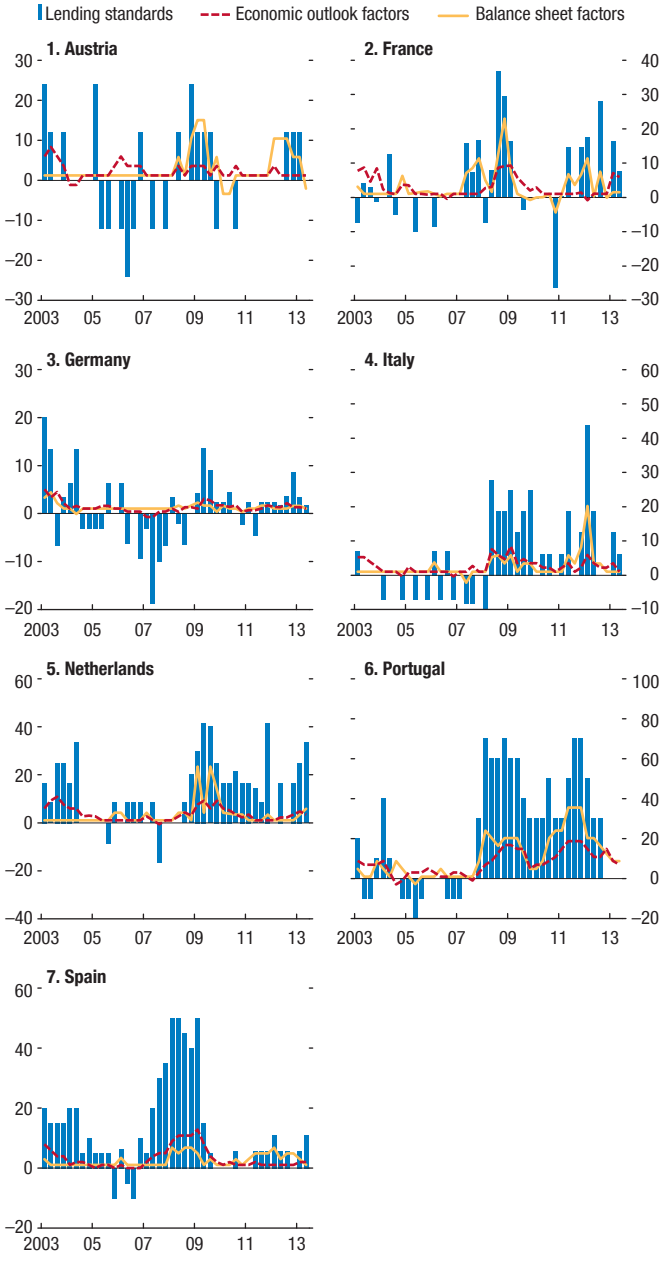
Figure 2.12. Decomposing Lending Standards: Corporate Loans



Sources: European Central Bank, Bank Lending Survey; Federal Reserve, Senior Loan Officer Survey; and IMF staff calculations.

Note: Y-axes have different scales. For European countries, lending standards correspond to enterprises and are measured as weighted net percentages. For the United States, lending standards correspond to commercial and industrial loans to large and middle-market firms and are measured as unweighted net percentages. Economic outlook and balance sheet factors are constructed using the first specification in Table 2.8 (Table 2.9 for the United States). Economic outlook factors are the fitted values constructed using the responses to general economic activity and industry and firm outlook (general economic activity for the United States) and setting all other coefficients to zero. Analogously, balance sheet factors are the fitted values constructed using the responses to capital and liquidity position and access to market financing (capital position for the United States).

Figure 2.13. Decomposing Lending Standards: Mortgage Loans



Sources: European Central Bank, Bank Lending Survey; and IMF staff calculations.
Note: Y-axes have different scales. Lending standards correspond to mortgage loans and are measured as weighted net percentages. The results for France are weighted by the share of the outstanding loans issued by each bank in the French Bank Lending Survey sample in the total outstanding loans issued by all the banks in the sample. Economic outlook and balance sheet factors are constructed using the first specification in Table 2.8. Economic outlook factors are the fitted values constructed using the responses to general economic activity and setting all other coefficients to zero. Analogously, balance sheet factors are the fitted values constructed using the responses to cost of funds.

and liquidity position, access to market financing for corporate credit, and cost of funds for mortgage loans) are significant. Competition from other banks turns out to be significant for both types of credit. The general outlook and housing prospects are also significant. Table 2.9 shows the results for the United States. The capital position and economic outlook are significant in this case.

Using the coefficients from the first stage, measures of lending standards are constructed in which the influence of non-balance-sheet factors is removed. Fitted values of the dependent variables are constructed using the coefficients on the balance sheet factors: capital position, market financing, liquidity (for corporate loans), and the cost of funds (for mortgage loans), while all other coefficients are set to zero. The capital position is used for the United States.

Figures 2.12 and 2.13 show the resulting decomposition of lending standards for corporate loans and mortgage loans, respectively, into demand and supply factors for major countries for which long data series are available (with different y-axis scales, as appropriate). In general, the figures show that lending standards are, in fact, affected to a considerable extent by the economic outlook, which also affects loan demand. The supply factors related to bank balance sheet constraints come into play in specific periods during the crisis and its aftermath. For example, for corporate loans, supply factors restricted lending standards at the start of the financial crisis in France, Germany, and the United States and also came into play in early 2012 in France and Italy as financial strains increased in the euro area.[33] For mortgage loans, balance sheet constraints also restricted lending standards at the beginning of the crisis in most European countries shown and again in 2012 in Austria, France, Italy, and Portugal.

The next step is to determine how credit growth is affected by the demand and supply effects measured by the adjusted survey responses. Credit growth is assumed to depend partly on past credit growth (to capture momentum or "persistence" effects) and partly on loan demand and supply conditions as measured

[33]The analysis does not show supply factors playing a significant role in recent years for Spain. Because the survey shows only changes in lending standards, it may be that the level is already quite tight. Alternatively, this may be the result of reporting bias (with banks adjusting their survey responses to downplay funding strains).

Table 2.8. Euro Area: Determinants of Bank Lending Standards

Dependent Variable: Overall Lending Standards, 2003:Q1–13:Q2							
	Corporate Loans				Residential Mortgage Loans		
	(1)	(2)	(3)		(4)	(5)	(6)
Capital Position	0.112	0.308***	0.112	Cost of Funds	0.384***	0.679***	0.363***
	(0.085)	(0.062)	(0.084)		(0.087)	(0.097)	(0.099)
Access to Market Financing	0.317*	0.436***	0.317*	Competition from Other Banks	0.234**	0.217	0.230**
	(0.141)	(0.092)	(0.143)		(0.089)	(0.126)	(0.093)
Liquidity Position	0.243**	0.175	0.243**	Competition from Nonbanks	–0.231	–0.261	–0.237
	(0.093)	(0.102)	(0.090)		(0.177)	(0.243)	(0.163)
Competition from Other Banks	0.179***	0.271**	0.179***	General Economic Activity	0.197***		0.193***
	(0.034)	(0.095)	(0.038)		(0.037)		(0.036)
Competition from Nonbanks	–0.256	–0.357	–0.256	Housing Market Prospects	0.274**		0.260**
	(0.252)	(0.338)	(0.247)		(0.106)		(0.095)
Competition from Market Financing	0.557*	0.775	0.557*				
	(0.263)	(0.425)	(0.252)				
General Economic Activity	0.125*		0.125*				
	(0.062)		(0.062)				
Industry or Firm Outlook	0.128*		0.128				
	(0.061)		(0.068)				
Collateral Risk	0.338		0.338				
	(0.230)		(0.231)				
Stock Market Volatility		0.521***				0.374**	
		(0.131)				(0.134)	
Expected Real GDP Growth		1.663**				1.336	
		(0.542)				(1.748)	
Expected Behavior of Demand			0.001	Expected Behavior of Demand			–0.033
			(0.035)				(0.041)
Observations	336	287	336		336	287	336
R Squared	0.767	0.710	0.767		0.617	0.540	0.619
Number of Countries	8	7	8		8	7	8

Source: IMF staff estimates.

Note: Variables measured as weighted net percentages (share of banks that report a significant or moderate tightening, mutiplied by 1 and 0.5, respectively, minus the share of banks that report a significant or moderate easing, mutiplied by 1 and 0.5, respectively). Sample includes Austria, France, Germany, Italy, Luxembourg, the Netherlands, Portugal, and Spain. Fixed effects regressions with robust standard errors are in parentheses. ***, **, and * indicate significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Table 2.9. United States: Determinants of Bank Lending Standards

Dependent Variable: Overall Lending Standards, 1999:Q1–2013:Q2	
	United States Commercial and Industrial Loans
Capital Position	0.601**
	(0.270)
Economic Outlook	0.290***
	(0.085)
Liquidity in Secondary Market	0.049
	(0.161)
Competition from Other Banks	0.039
	(0.031)
Tolerance for Risk	0.036
	(0.093)
Observations	58
R Squared	0.899

Source: IMF staff estimates.

Note: Variables are measured as unweighted net percentages (share of banks reporting a significant or moderate tightening minus the share of banks reporting a significant or moderate easing). Ordinary least squares regressions with robust standard errors are in parentheses. ***, **, and * indicate significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

by the decomposition of the lending standards variable from the surveys.[34] Formally, the regression

$$Credit\ growth_t = \alpha + \beta Credit\ growth_{t-1} + \gamma_i Demand\ factors_{t-i} + \delta_i Supply\ factors_{t-i} + \varepsilon_t \quad (2.1)$$

is estimated using quarterly data for the period 2003:Q1–2013:Q1 for European countries and 1999:Q1–2013:Q1 for the United States. The subscript i indicates lags of the variables. Several lags could be included, adding more terms to the equation. ε is a random error term.

The coefficients found in the regressions, shown in Table 2.4 in the main text for the euro area and the United States, can be used to calculate how much of the recent evolution in corporate and mortgage credit growth can be explained by demand and supply factors (see Figures 2.8 and 2.9 in the main text). The demand component is the fitted values constructed recursively using the lags for the demand index and setting the "pure" supply index to zero. The supply component is constructed analogously.

[34]Demand factors are measured by the net fraction of banks that report in the survey that they observe an increase in demand for loans.

Annex 2.3. A Model of Bank Lending

A simple model of credit markets consists of two equations: a supply equation for new loans and a demand equation.[35] Both the supply of and demand for bank loans are functions of the lending rate and other variables. In the familiar price-quantity plot (Figure 2.14), the supply curve slopes upward and the demand curve slopes downward: banks will supply more loans if the interest rate is higher, and borrowers will demand fewer loans if the rate is higher. The lending interest rate adjusts to clear the market—that is, to equalize demand and supply.[36] The magnitude of the reduction in the equilibrium quantity of new bank loans associated with an increase in lending rates depends on the sensitivity (or elasticity) of both credit demand and supply to interest rates.

Changes in other determinants of the volume of loans will shift these curves. For example, if banks' funding costs rise, they will tend to supply fewer loans at an unchanged interest rate, so the supply curve will shift left. If the determinants of demand do not change, then the equilibrium interest rate will rise and the volume of loans will fall. Similarly, if the demand for loans contracts (as a result of a reduction in economic activity, for instance), then the demand curve will shift downward. In the new equilibrium, the lending rate will fall, as will the volume of loans.

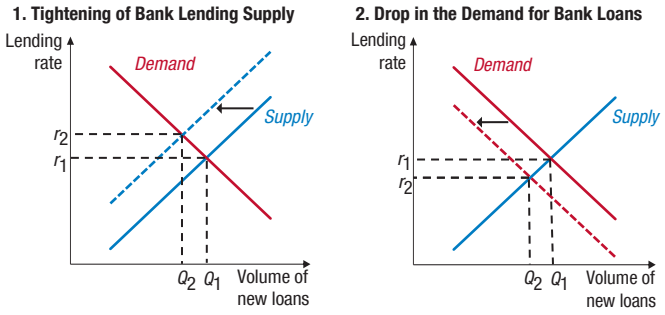
The shifts in the demand and supply curves cannot be observed directly, but if underlying factors can be found that shift one and not the other, the supply and demand equations can be traced out—or "identified"—separately. Those variables are referred to as "shifters" because they move one or the other curve, as in Figure 2.14. Finding shifters is an econometric challenge owing to the many variables that affect both curves, and if both curves shift simultaneously, neither one is identified. The proper identification of the model is further complicated by the potential endogeneity of shifters.

There are several potential shifters for the supply curve. As suggested earlier, the cost of funding for banks (proxied by the deposit rate and by banks' credit default swap spreads)[37] is a shifter—presumably it does not affect the demand for loans by borrowers. The banks' capital-to-total-assets ratio (banking regulations impose certain capital requirements on banks, affecting their ability to lend) is another supply shifter.[38]

Potential demand shifters are also included in the model. The rate of capacity utilization affects firms' decisions to invest and consequently their demand for credit. The availability of other sources of financing, especially market financing, will also determine firms' demand for bank loans, to the extent that debt issuance and bank loans are substitutes from the firm's point of view.[39]

Other variables affecting both the supply of and demand for bank lending are included in both equations. Table 2.5 in the main text includes a column

Figure 2.14. Effects of a Tightening of Lending Supply and a Drop in Lending Demand



Source: IMF staff illustration.

The author of this annex is Frederic Lambert.

[35]Theoretically, repayments of previously granted loans should not be deducted from new loans. However, because data on gross flows of bank loans are not available, the empirical analysis uses net transaction flows or changes in stocks as a proxy for new loans.

[36]Market failures, such as maturity mismatches and informational asymmetries, will add certain surcharges (or premiums) to the risk-free short-term interest rate (for example, a term premium and a risk premium). Equilibrium interest rates contain such premiums.

[37]Credit default swap spreads affect the cost of wholesale funding for banks, but are available only for a few banks in each country (which may not necessarily be representative of that country's entire banking sector) and have been available only for the past few years. These data were used only when the resulting sample reduction did not prevent a proper identification of the model.

[38]The results for Japan, Spain, and the United Kingdom are robust to using the bank price-to-book ratio instead of the capital-to-asset ratio. However, this variable, which is more volatile than the ratio based on accounting data and reflects the condition of listed banks only, does not allow for proper identification of the model in the case of France.

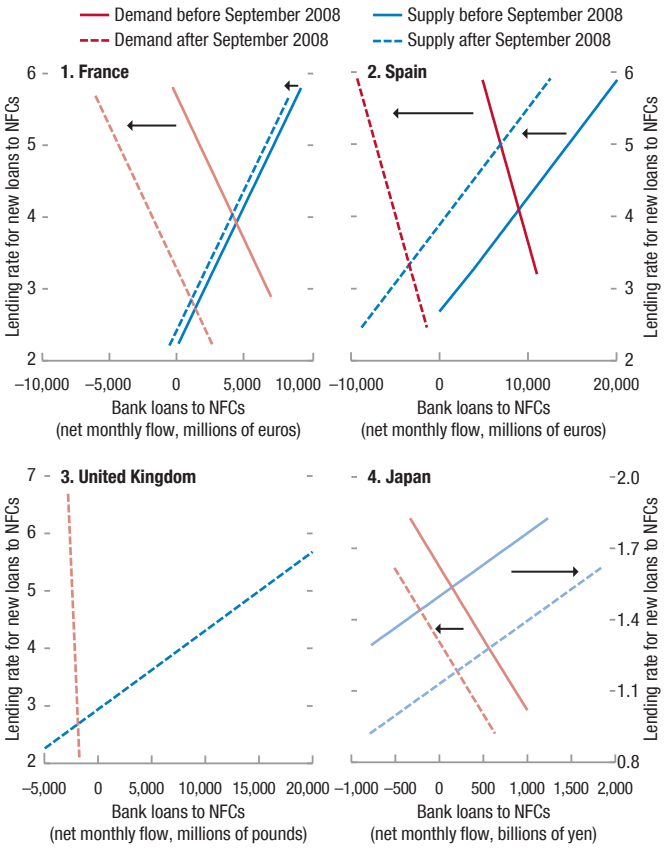
[39]The availability of other financing is proxied by the average outstanding debt securities issued by nonfinancial firms as a share of total nonfinancial corporate debt. It is computed over the previous four quarters to limit the endogeneity bias that may result from firms' recourse to capital market financing in response to a contraction in the supply of bank loans, while still capturing recent progress in the development of corporate bond markets.

with the expected influence (sign) of each variable on either the supply or demand, or both.

- GDP forecasts are expected to be positively related to both loan supply (higher future output implying a greater ability of borrowers to repay) and loan demand (higher expected output encouraging firms to borrow to invest).
- An increase in economic uncertainty (represented by the standard deviation of the GDP forecast) has the opposite effect. Inflation is expected to negatively affect the supply of loans and positively affect demand because it reduces the real value of debt over time.
- Growth in the stock market index (covering financial and nonfinancial firms) is used as a proxy for changes in the value of collateral that firms can use to secure loans; higher collateral value should imply a higher willingness of banks to lend. In addition, higher stock values make it easier for banks to raise new capital for lending. It also makes it easier for firms to raise new capital for investment without having to borrow. The variable should thus be positively associated with the supply of loans but negatively with the demand for loans.
- The debt-to-equity ratio and profitability of firms, along with corporate spreads, are used to capture the quality of the pool of borrowers: higher debt to equity and higher corporate spreads should be associated with reduced lending from banks, while higher firm profitability should increase credit supply. Higher debt may also reduce the demand for additional loans (the debt overhang effect discussed earlier), whereas higher profitability increases the amount of resources available for self-financing, thus limiting the need for bank lending. Higher corporate spreads indicate a higher market funding cost, which should lead firms to prefer bank credit, thereby raising bank credit demand.

The system of two equations is estimated on country-level data by three-stage least squares. The sample period varies depending on the country. The longest period covers a little more than 10 years, from February 2003 to March 2013. All variables are monthly except those relating to debt of nonfinancial corporations, profitability, and capacity utilization, which are quarterly and are linearly interpolated. The lending rate is "instrumented" by all other variables in the system. The potential endogeneity of other regressors is dealt with by lagging some of the variables by one period. Yet endogeneity issues remain. For example,

Figure 2.15. Fitted Supply and Demand Curves for Bank Loans to Firms



Source: IMF staff.
Note: NFC = nonfinancial corporation. The plots show the fitted supply and demand curves before and after the collapse of Lehman Brothers in September 2008, using the coefficients estimated over the full sample period from Table 2.5 and assuming that the explanatory variables equal their means over the two separate periods. Light shades of red and blue indicate that the slope is not statistically significant.

GDP forecasts and changes in the stock market index (which reflect markets' expectations about the future) are likely affected by the ability of firms to get funding to finance their activities.

Because finding appropriate demand and supply shifters at a monthly or quarterly frequency is a challenge, data availability restricted the sample of countries significantly. For some countries, conceptually appropriate demand shifters could be identified, but adequately long time series of sufficient frequency could not be found. Highlighting the technical challenge of identification, even in some cases in which data were available, the shifters were not significant in the regressions or other econometric problems emerged. In the end, results were obtained for France, Japan, Spain, and the United Kingdom.

The plots of the estimated demand and supply curves as functions of the lending rate show how the curves shifted after September 2008 (Figure 2.15). The plots are constructed using the coefficients estimated over the full sample period and the means of the explanatory variables over the two separate periods, as is typically assumed for fitted relationships.[40] Because of a shorter sample period for the United Kingdom, the supply and demand curves are plotted only for the period following the Lehman Brothers bankruptcy (October 2008–December 2012). Because of the way the curves are constructed, the shifts reflect only changes in the average value of the explanatory variables before and after the crisis and not changes in the relationships between the variables. As with all econometric estimations, these curves are estimated with error and should be viewed as purely indicative of the direction of movement.[41]

- The *demand curves* shift downward in France, Japan, and Spain, indicating that the decline in lending was due in large part to a drop in lending demand. For the United Kingdom, data availability restricted the estimation to the postcrisis period.
- The *supply curve* also shifts left in Spain and, to a much lesser extent, in France, suggesting that part of the decline in lending in those countries reflects less willingness or ability of banks to lend. This result broadly confirms the analysis of the survey data. The rightward shift of the supply curve in Japan can be interpreted as reflecting improvement in the Japanese banking sector after 2008 over the earlier part of the sample period (which reflects the aftermath of the Japanese banking crisis from the late 1990s through the early 2000s), along with the effect of credit support policies and the exceptional monetary policy measures announced since 2008.

[40]The analysis assumes that the slopes of both the supply and demand curves have remained the same over the full sample period (the elasticity of supply and demand to interest rates has not changed over time). The results of an alternative specification (not reported) allowing the elasticity to change before and after September 2008 did not contradict this assumption.

[41]In some cases, the coefficient on the lending rate is not significant, so the slope of the curve is particularly uncertain. These curves are shown with lighter shades in Figure 2.15.

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