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Have Long-term Financial Trends Changed the Transmission of Monetary Policy?

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ABSTRACT/RÉSUMÉ

Have long-term financial trends changed the transmission of monetary policy?

This paper addresses the question of whether and how long-term financial trends may have modified the transmission mechanism from monetary policy decisions to economic activity. The focus is on long-term changes, abstracting from the disruptions created by the 2007-08 financial turmoil which are temporarily affecting the transmission mechanism. The first series of findings is that a number of factors have worked to strengthen the transmission of monetary policy, including more competitive financial markets, higher household indebtedness, greater diversity in the supply of financial products, greater financial integration and more responsive asset pricing mechanisms. However, other factors appear to have simultaneously gone in the direction of weakening transmission of domestic policy, including greater external financial influences, lower exchange-rate pass-through and a broad-based shift towards fixed-rate assets and liabilities. On balance, monetary policy appears to remain a powerful tool for guiding aggregate demand, but a number of changes that have worked to support the strength of transmission have also increased risks to financial stability.

JEL codes: E40, E43, E44, E50, E52, E58.

Keywords: interest rates; monetary policy; transmission; financial markets; regulation; asset prices; house prices; financial innovation; financial development.

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Les tendances de fond des marchés financiers ont-elles modifié la transmission de la politique monétaire ?

Cette étude aborde la question de savoir dans quelle mesure les tendances de fond des marchés financiers ont pu modifier la transmission de la politique monétaire. L'accent est porté sur les changements de long-terme en faisant abstraction des modifications temporaires du mécanisme de transmission qui résultent des troubles financiers observés en 2007-08. Une première série de résultats indique que plusieurs facteurs ont joué dans le sens de renforcer la transmission de la politique monétaire. Ces facteurs incluent l'intensification de la concurrence sur les marchés financiers, l'accroissement de l'endettement des ménages, la diversification de l'offre de produits financiers et la plus grande réactivité des prix des actifs. Cependant, d'autres facteurs ont agi de manière concomitante dans le sens de réduire la puissance du mécanisme de transmission de la politique monétaire intérieure. Ces facteurs incluent l'accroissement des influences financières extérieures, la plus faible transmission des mouvements de change et le plus grand recours aux emprunts et titres à taux fixe. Au final, il apparaît que la politique monétaire demeure un outil puissant d'orientation de la demande agrégée, mais une partie des changements qui ont préservé la force du mécanisme de transmission se sont effectués au prix de risques accrus pour la stabilité financière.

Classification JEL : E40, E43, E44, E50, E52, E58.

Mots-clefs: taux d'intérêt ; politique monétaire ; transmission, marchés financiers, réglementation, prix d'actif, innovation financière, développement financier.

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HAVE LONG-TERM FINANCIAL TRENDS CHANGED THE TRANSMISSION OF MONETARY POLICY?

by

Boris Cournède, Rudiger Ahrend and Robert Price[1,2]

1. Introduction and main findings

1. Whether as the result of good fortune or policy skill, the macroeconomic environment changed dramatically over the three decades from the mid 1970s to the mid 2000s. Output volatility declined markedly and inflation fell to remarkably low levels and became more stable and less persistent. In the same period, rapid and deep changes transformed the financial sector and therefore the environment in which monetary policy is operating. The present study discusses on how these developments may have modified the channels through which monetary policy affects activity and prices.

2. The focus is on long-term changes, abstracting from the disruptions created by the 2007-2008 financial turmoil which are temporarily affecting the transmission of monetary policy. In particular, at the time of writing, the tightening of credit standards triggered by financial market stress may have offset the easing of US monetary policy in terms of effective financial conditions for private borrowers. Despite the low level of the Federal Funds rate, banks have been constrained in their ability to expand lending activity by difficult funding conditions in money markets and by the need to replenish their equity capital following large write-downs on their assets. While this process of consolidation is speeded up by wider credit spreads, in the short run it means that monetary policy is temporarily less effective.

3. The document starts by summarising the main findings and policy implications. A second section describes the underlying forces that have been reshaping the environment in which monetary authorities are operating. The paper then focuses on how these changes may have modified transmission channels that operate through interest rates (third section), credit effects (fourth section) and asset prices (fifth section). A concluding section briefly comments on the changing link between monetary policy and inflation. Box 1 and Diagram 1 lay out the definitions of the transmission channels which are used throughout the document.

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2. The authors are grateful for helpful comments given by Andrew Dean, Balász Egert, Jørgen Elmeskov, Ekkehard Ernst, Stéphanie Guichard, Peter Hoeller, Randall Jones, Vincent Koen, Jean-Luc Schneider and other members of the Economics Department. They have been heavily reliant on statistical assistance given by Debra Bloch and Catherine Lemoine, and also on secretarial assistance from Veronica Humi, Susan Gascard, Sandra Raymond and Paula Simonin. The usual disclaimer applies.

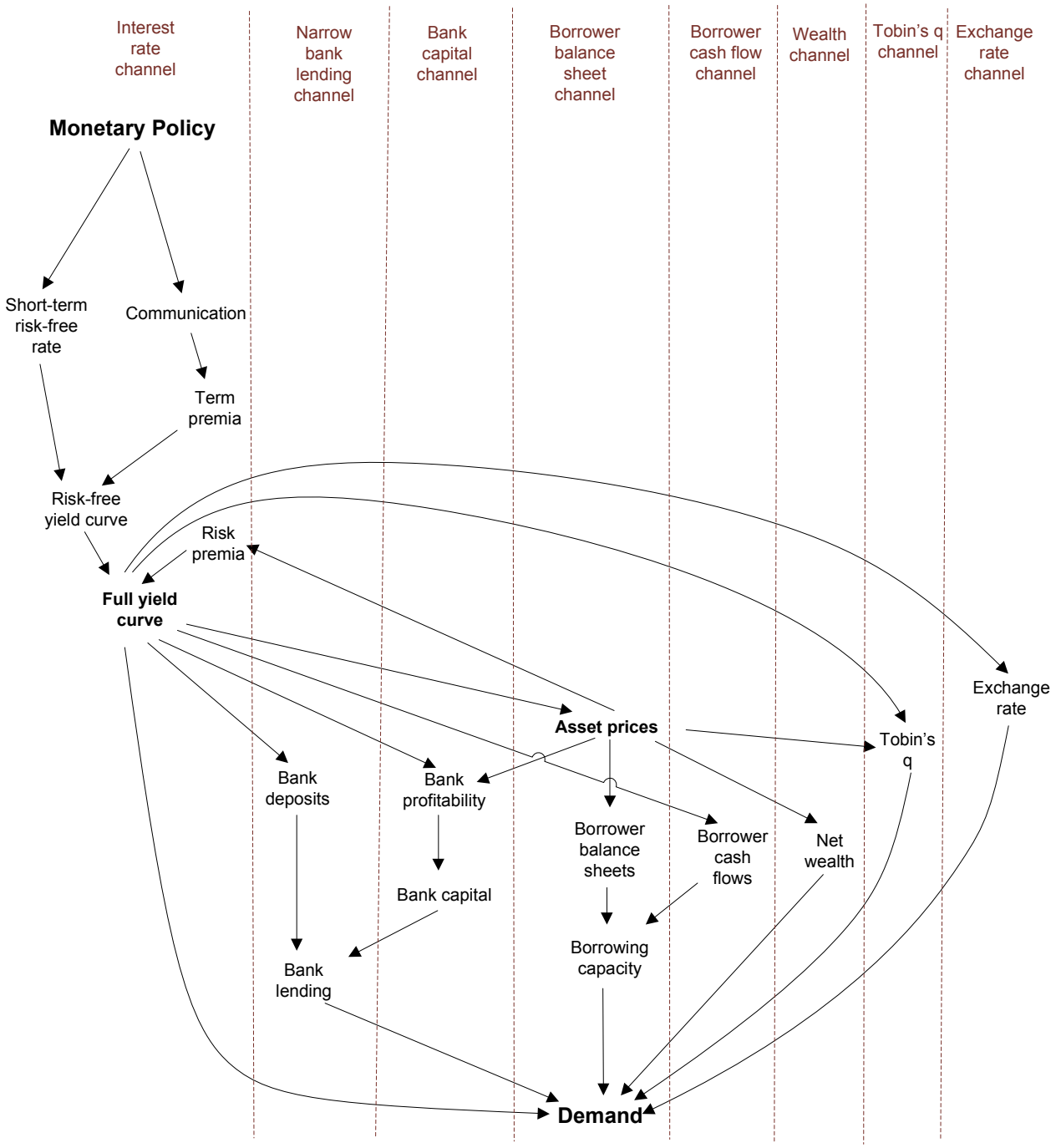
Box 1. **Defining the transmission channels of monetary policy to activity**

To distinguish among the different ways through which monetary policy influences activity, the paper uses definitions based on what has become a widely shared classification of the transmission channels.[1] More precisely, the following definitions are used:

- The *interest rate channel* relates the demand for borrowing (typically for business investment, home building and consumer durable expenditure) to movements in real interest rates induced by changes in the monetary stance. At a conceptual level, the interest rate channel is concerned with how movements in policy rates encourage or discourage households to substitute present for future demand, directly or through the firms they own. The interest rate channel includes the effects of monetary policy on term premia through its communication and on risk premia through feedbacks from asset prices (see Diagram 1).
- Broadly defined, credit channels refer to ways in which monetary policy decisions may affect the supply of credit:
  - *Bank lending effects* can arise when some firms or some categories of household expenditure depend on bank lending for their financing (or other funding sources are imperfect substitutes).
    - The *narrow bank lending channel* is in operation when adjustments to the monetary stance prompt changes in deposits. Changes in deposit levels can influence the supply of bank credit because *i)* banks are required or wish to hold a certain fraction of reserves to guarantee the liquidity of deposits and *ii)* banks' other funding sources are imperfect substitutes for deposits.
    - Monetary policy can also affect credit supply through the *bank capital channel* when changes in the policy stance have an effect on bank capital (by modifying profitability or the market values of bank assets) and therefore on bank lending in the presence of capital adequacy requirements. Effects can be present even when capital adequacy requirements are not apparently binding because banks typically want to maintain a cushion of capital above the required minimum (Masschelein, 2007).
  - *Borrower balance-sheet effects* arise because monetary policy can influence the net worth of households and firms. Such changes have an effect on consumption and investment because lenders, as they have imperfect information on borrowers, will extend credit more easily when their clients have healthier balance sheets. *Collateral effects* relate to the particular – but important in practice – case where the borrower balance sheet channel works through changes in the amount of high-quality assets that can be pledged to secure credit.
  - Similarly, *cash flow effects* arise because cash flow is another variable watched by lenders and influenced by monetary policy.
- Monetary policy also influences asset prices that have a bearing on activity:
  - *Wealth effects* can arise when adjustments to the monetary stance result in asset price movements that lead households to revise their own assessed level of permanent income and to modify consumption accordingly.
  - Monetary policy can have an impact on investment by firms and households by modifying the relative cost of new to existing capital (*Tobin's q*). Monetary policy influences both the cost of new capital, which is determined by interest rates, and the price of existing capital, which is measured by the share prices.
  - The effects of monetary policy on the *exchange rate* have consequences for export and import competitiveness, inflation, as well as wealth, balance sheets and cash flow and thus for activity.

1. See for instance Mishkin (2007b). A difference here is the inclusion of the bank capital channel akin to van den Heuvel (2002).

Diagram 1. The transmission channels of monetary policy



4. The first finding is that a number of factors are working to give monetary policy more influence on activity:

- The interest rate channel of monetary policy is likely to have strengthened as competitive markets provide households and firms with access to a wider array of credit products, relieving credit constraints for many borrowers and causing banks to adjust interest rates more rapidly in response to policy rates.

- Higher household indebtedness, new ways of borrowing against housing collateral and more reliance on market prices in the valuation of corporate assets all work to reinforce the balance sheet channel of monetary policy.

- Easier access to finance should amplify the response of corporate investment to changes in the monetary stance via shifts in the price of new relative to existing capital.

- Greater international financial integration implies that valuation effects can magnify or dampen competitiveness effects depending on whether a country is in a net debtor or creditor position and whether it borrows in its own currency.

- The much expanded volume of asset holdings and more responsive asset pricing work to strengthen the wealth effects of monetary policy.

5. Second, and at the same time, other factors have gone in the direction of weakening transmission:

- From a conceptual point of view, transmission should weaken as labour, product and financial markets gradually become more complete and more efficient.

- The combination of a shift towards fixed-rate assets and liabilities and a looser link between short and long rates is likely to have reduced cash flow effects on borrowers.

- Financial globalisation implies that asset prices are increasingly influenced by global monetary conditions.

- The pass-through from exchange rate changes to import prices has declined.

6. Third, there are areas where the effect of financial trends is ambiguous. On the one hand, the greater reliance on funding sources other than banks has evidently limited the scope of the bank lending channel. On the other hand, developments such as the use of fair values in the calculation of bank capital appear to be reinforcing bank lending effects. Overall, such effects are likely to remain important, especially since firms that rely on bank financing are also often those that are most constrained financially. However, with the internationalisation of banking, bank lending effects may be increasingly influenced by global relative to local monetary conditions.

7. On balance, monetary policy appears to remain a powerful tool for stabilising the economy. While highly tentative and calling for further research, this conclusion is consistent with a wide body of empirical studies which have found that monetary policy has proved an effective stabilisation instrument across the OECD area in recent decades.[3] However, while stronger transmission to activity in principle is good news for monetary authorities, inflation has become less responsive to output.

8. Moreover, a number of changes that have worked to reinforce transmission also increase risks to financial stability. The stronger balance sheet impact comes with amplification effects that are potentially destabilising (Ahrend *et al.*, 2008; Plantin *et al.*, 2005; Shin, 2006). In this regard, monetary authorities, who are also generally entrusted with promoting financial stability, might want to consider exchanging slightly weaker transmission for greater stability. For instance, the use of valuation techniques that are not overly sensitive to asset price cycles could limit balance sheet amplification effects. Besides, if the regulatory or market response to the financial turmoil observed in 2007-2008 were to result in a sustained

3. See the references given throughout the text – especially Angeloni *et al.* (2003) – and the recent study by Gambetti *et al.* (2008) who find that US monetary policy transmission was as powerful in 2003 as it was in 1986.

roll-back of securitisation and the "originate-to-distribute" model, some of the changes in transmission documented in this study would be partly reversed.

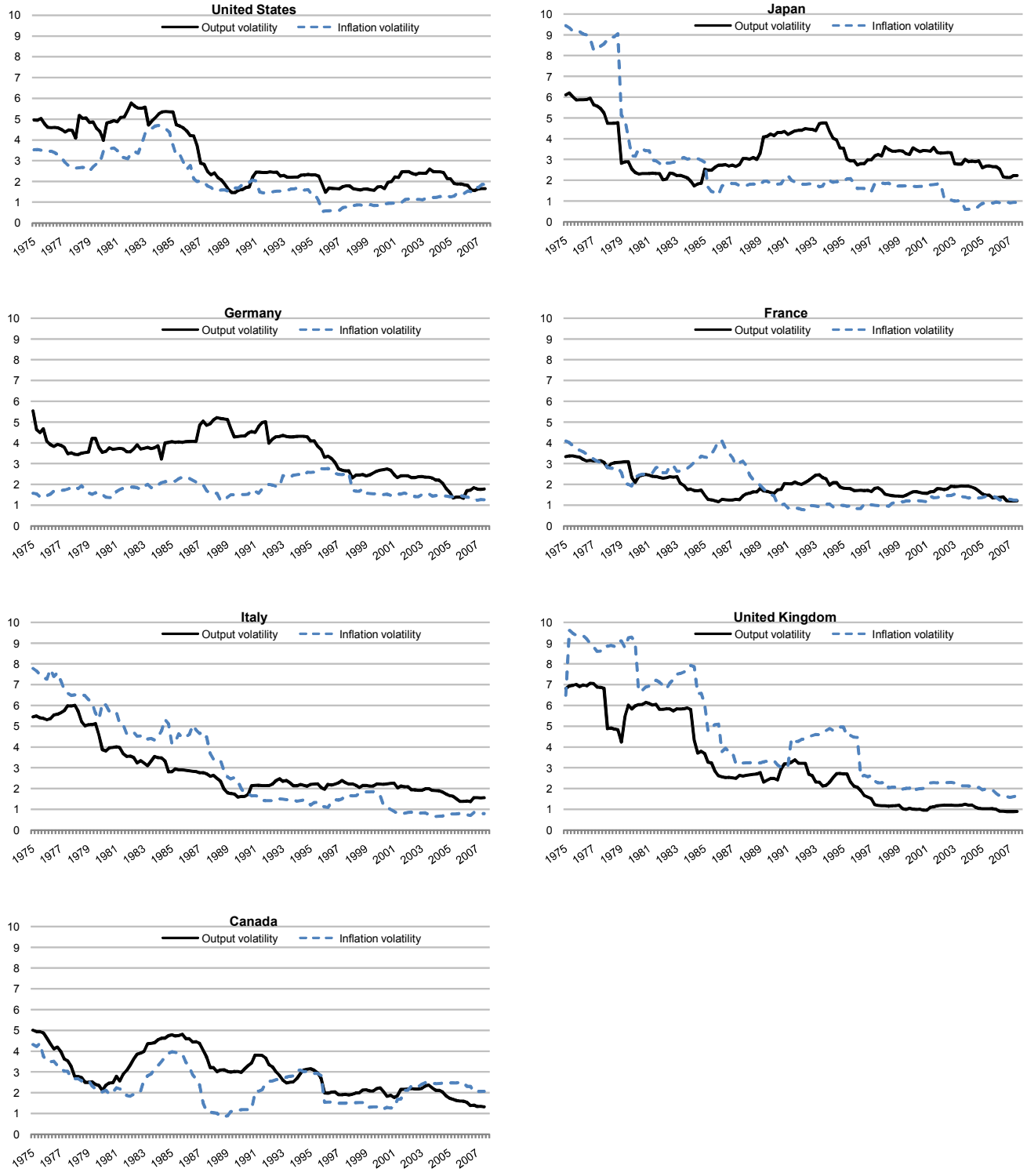
2. Forces at play

Greater macroeconomic stability has provided fertile ground for financial innovation

9. As public authorities strengthened monetary frameworks over the past two and a half decades, macroeconomic stability improved markedly. The volatility of output and inflation has fallen significantly from the peaks reached in the late 1970s-early 1980s (Figure 1). The decline in economic volatility was helped by trade openness, more efficient inventory management, greater flexibility in product and labour markets and the fact that the shocks hitting OECD economies have become milder (McConnell and Perez Quiros, 2000; Coppel and Cotis, 2005; Canova *et al.,* 2007), but improvements in the conduct of monetary and fiscal policies have also been key factors (Dalsgaard *et al.*, 2002; Giannoni *et al.*, 2007; Sommer and Spatafora, 2007; Gali and Gambetti, 2007; Benati and Surico, 2007). Better monetary management is estimated to have been quantitatively more important than milder shocks or enhanced inventory management, especially when accounting for lower inflation volatility (Ahmed *et al.,* 2004).

10. As a consequence of deregulation and advances in information technology, financial innovation has flourished in the environment of greater macroeconomic stability. In particular, stable and low inflation has created favourable conditions for derivative markets to grow because lower overall price volatility cuts the cost of hedging individual positions. The markets for derivatives have swelled by several orders of magnitude over the past two decades (Figure 2). Securitisation has become increasingly important in OECD countries (Figure 3). The deepening of secondary markets has facilitated the emergence of credit products that can suit a widening range of borrowing needs. Modern financial markets have enabled many solvent households to access consumption and investment possibilities they were previously denied because of credit constraints.

Figure 1. Volatility of output and inflation in the G7 countries [1]

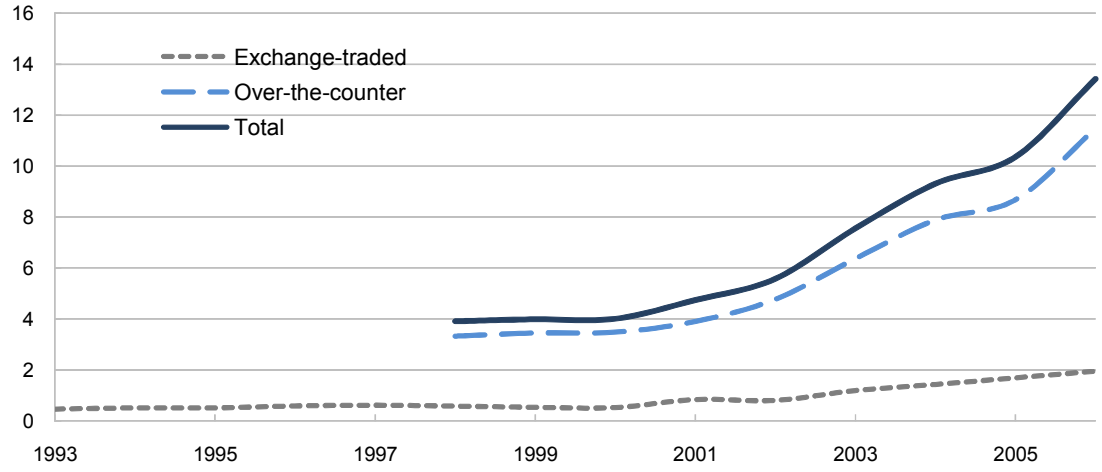


1. Volatility is measured as the standard deviation of quarterly annualised growth over the past 5 years and expressed in percentage terms.
Source: OECD Economic Outlook database.

11. The events of the second half of 2007 have shown, however, that some problems have accompanied the growth of the "originate-to-distribute" model. In cases such as the US subprime mortgage market in 2006-07, the possibility of passing on most (or all) of the credit risk to buyers of derivatives has led some originators to extend loans to borrowers who were not creditworthy. In principle, market solutions to these problems can be found. For instance, in the aftermath of the 2007-2008 credit market turmoil, derivative buyers may require greater transparency and prices that better reflect credit quality. Nevertheless, the problems may prompt a regulatory reaction which could result in securitisation being rolled back. This again would undo some of the effects, described below, of financial innovation on monetary transmission.

Figure 2. Notional value of derivatives [1]

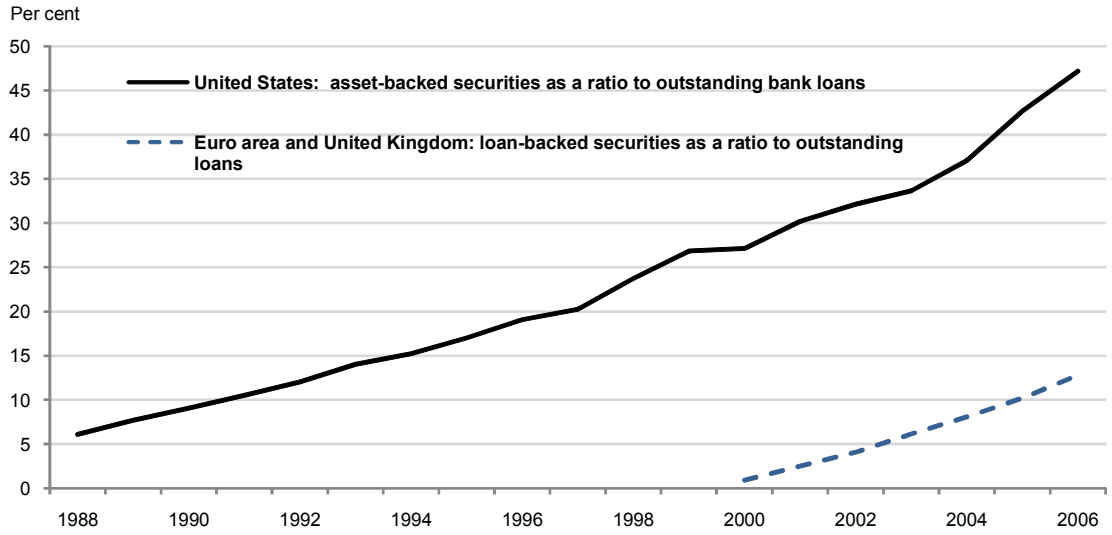
Outstanding amounts at year end, as a ratio of nominal OECD GDP



1. Foreign exchange, interest rate, equity, commodity, credit and other derivatives.

Source: BIS Quarterly Review, September 2007

Figure 3. The rise of securitisation

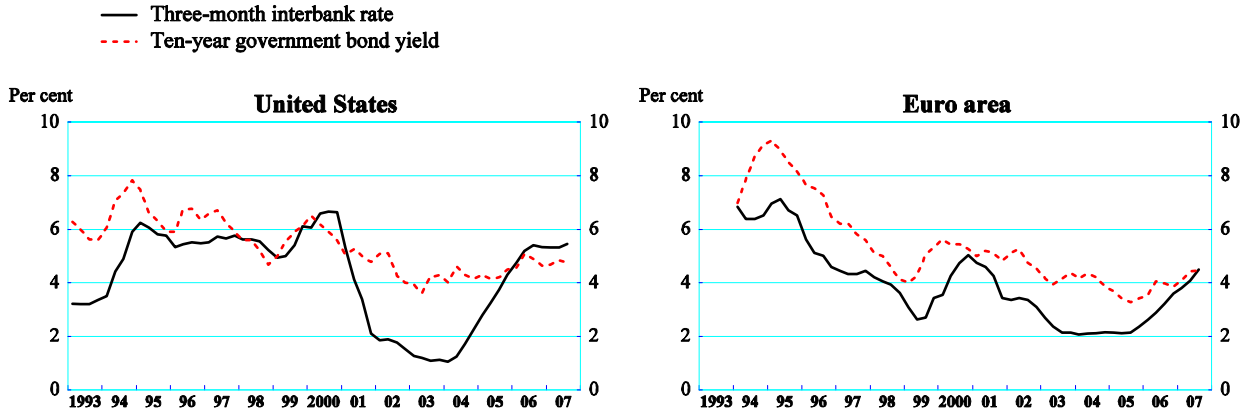


Source: ESF Securitisation Forum; Datastream; OECD calculations.

Long-term interest rates seem to have acquired a life of their own

12. A distinctive feature of the recent period has been the weak response of long- to short-term interest rates in the United States and the euro area in the 2004-2007 tightening cycle (see Figure 4 and Ahrend *et al.,* 2006). OECD calculations indicate that this development could be part of a broader trend (see Box 2 and Figure 5). Starting from low levels in the 1960s, the responsiveness of long- to short-term rates increased in the 1970s with the shift to a high inflation regime. In the United States and (albeit to a lesser extent) the United Kingdom, long-term rate responsiveness decreased again starting in the mid 1980s as inflation was brought back in check. These US and UK historical sequences are consistent with the view that the loosening of the link between long- and short-term rates can be interpreted as a manifestation of the success of monetary authorities in establishing their credibility (Krozner, 2007; Ahrend *et al.,* 2006). Why the responsiveness of long-term interest rates has shown few signs of diminishing in Japan and the euro area is less clear.

Figure 4. Short and long-term interest rates in the United States and the euro area



Source: OECD Economic Outlook 82 database.

13. In any case, the developments observed during the most recent tightening cycle reflect more than improved monetary policies. They may also reflect portfolio and saving-investment shifts in the private and (especially) external sectors, which have worked to depress long-term interest rates in the OECD area in the period when short rates were hiked (Ahrend *et al.*, 2006). Among such shifts, the demand for financial assets by large cohorts that prepare for retirement may have fuelled the demand for long-term bonds (Hu, 2006). In addition, emerging and commodity-exporting countries with large trade surpluses have been buying large amounts of OECD securities including bonds at a time when fixed-asset investment remained relatively weak in industrialised countries (OECD, 2007a). In addition, the observed decoupling could reflect the separation of fiscal responses from monetary ones, via improved fiscal responsibility and the adoption of fiscal rules: a factor which would have helped anchor inflation expectations.

Box 2. **Has the response of long- to short-term rates evolved over time?**

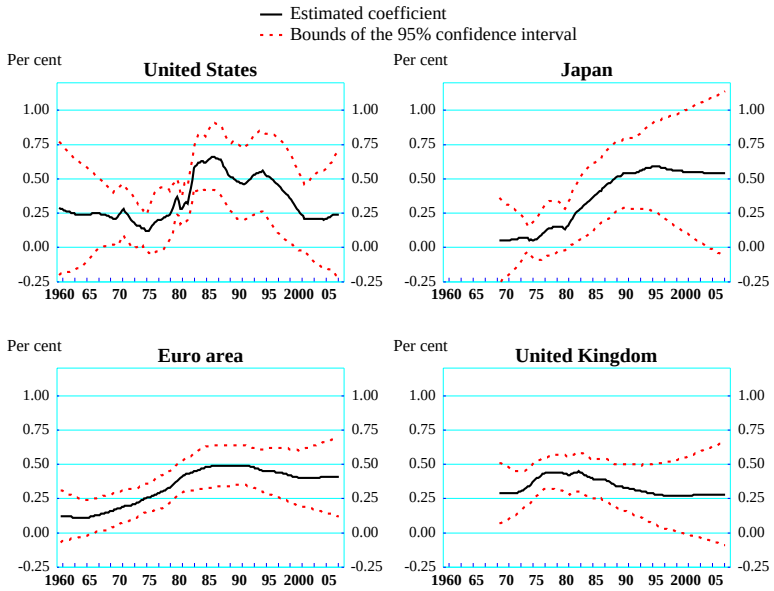
Regressions with time-varying coefficients have been conducted to look at how the response of long- to short-term interest rates has evolved over time in selected OECD economies. Equation [1] simply relates quarterly changes in long-term nominal interest rates on government bonds (Δl_t) to quarterly changes in three-month nominal interbank rates (Δs_t) and an intercept. Interest rates enter the equation in changes because these are stationary while the levels are not.[1] The regression coefficients are allowed to vary fairly freely over time, as the only assumption made is that they follow normal random walks, Equation [2]. The time-varying coefficients a_t^1 and a_t^2 are evaluated with the moment estimator proposed by Schlicht and Ludsteck (2006). In the equations below, the letters u_t, v_t^1 and v_t^2 denote normal error terms. This extremely simple equation is not aimed at offering anything close to a structural model of interest rates. Instead, the objective is simply to use concept-free statistical tools to check if the data exhibit changes in the co-movement between short and long rates.

$$\Delta l_t = a_t^1 + a_t^2 \Delta s_t + u_t \text{ with } u_t \sim N\left(0, \sigma^2\right) \quad [1]$$

$$a_t^1 = a_{t-1}^1 + v_t^1 \text{ and } a_t^2 = a_{t-1}^2 + v_t^2 \text{, with } v_t^1 \sim N\left(0, \sigma_1^2\right) \text{ and } v_t^2 \sim N\left(0, \sigma_2^2\right). \quad [2]$$

Figure 5 reports the results obtained for the United States, the euro area, Japan and Germany. The estimated responsiveness of long- to short-term interest rates increased in all four economies while they moved to high inflation regimes in the 1970s and early 1980s. In the United States, the taming of inflation was then followed by a fall in the estimated responsiveness of long to short rates from the late 1980s to the late 1990s, when the mid-point estimate was lying well below the lower bound of the 95% confidence band in 1985. The estimated coefficient also diminished in the United Kingdom, albeit to a lesser extent, as by 2000 it stood slightly below the lower bound of the 95% confidence band for 1980. Since 2000, mid-point estimates have become highly uncertain as confidence bands have widened considerably. This increased uncertainty, which goes beyond a statistical end-point problem, presumably reflects that powerful factors not directly related to short-term rates have been keeping a lid on long-term yields since the turn of the century (see main text).

Figure 5. Response of long to short rates.



Source: OECD calculations from OECD Economic Outlook 82 database.

1. With constant coefficients, the presence of co-integration between long and short rates would require estimating an error-correction model to avoid omitted variable bias. However, time-varying coefficients are poorly identified in error-correction specifications because the long-run dynamics of the system can be picked up by the time variation of the coefficients (including the short-run ones) as well as by the long-run parameters. For this reason, the model has been estimated in differences as specified in equation [1].

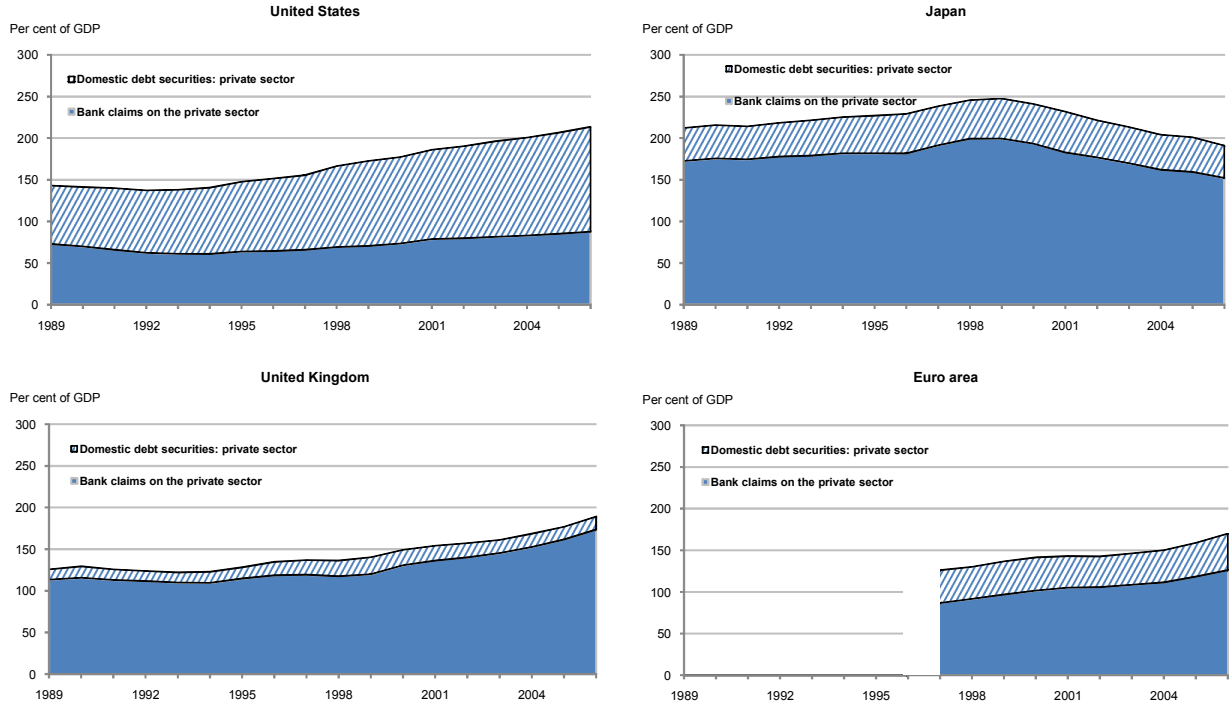
3. Impacts on the interest rate channel

Financial development mainly works to strengthen interest rate effects

14. A weaker response of long- to short-term interest rates should imply, all other things being equal, that the impact of monetary policy on the demand for loanable funds should be reduced. But all other things are not equal and several countervailing effects are at play.

15. Progress in financial development has reduced credit constraints for many borrowers, thereby giving interest rates more traction on their decisions. Improved access of households and firms to credit, as manifested in rising private credit-to-GDP ratios (Figure 6), appears to have contributed to the greater responsiveness of residential investment and consumer durable expenditure to changes in interest rates (Battellino, 2007). In addition to the quantitative aspect of greater financial depth, innovation in capital and credit markets has also been offering borrowers a wider array of products better tailored to their needs. The consequence of both the quantitative and qualitative elements of financial growth should be a stronger interest rate channel (Visco, 2007; Noyer, 2007).

Figure 6. Private credit markets



Source: IMF, BIS, Datastream.

16. Innovation and greater competition in banking appear to have led to a better transmission from short- and long-term capital market yields to bank lending rates. Following the creation of the euro area, which gave European capital markets greater depth and spurred innovation in European banking, the pass-through from capital market yields to bank rates has become faster at all maturities (de Bondt, 2005; de Bondt *et al.,* 2005). This trend suggests that increasing concentration in the banking sector has not offset competitive pressures stemming from deregulation and international financial integration over the past three decades (Padoa-Schioppa, 2001). Recent empirical evidence shows that, across countries and over time, more intense competition among banks is associated with a stronger and faster pass-through from policy to short-term bank lending rates (Gambacorta and Iannotti, 2007; Gropp *et al.,* 2007). The pass-through has also been found to be faster for categories of loans with greater secondary activity in the form of interest rate or credit derivatives (Gropp *et al.,* 2007).

17. At a fundamental level, however, more complete and efficient markets may be expected to reduce the impact of monetary policy on activity via the interest rate channel. Nominal interest rates can have an effect on output and employment because frictions prevent instant convergence to equilibrium values determined by the features of the real economy (Woodford, 2003). As labour, product and financial markets gradually become more flexible and more complete, this source of monetary policy influence should become progressively less important (King, 2005). Even so, reduced frictions are unlikely to have matched the above-mentioned factors militating in favour of a stronger interest-rate channel.

Box 3. **Publishing policy rate forecasts: benefits and challenges**

After the Reserve Bank of New Zealand, which started publishing projections of desired monetary conditions in June 1997, the Bank of Norway, the Swedish Riksbank and the Central Bank of Iceland have been issuing policy rate forecasts since November 2005, January 2007 and March 2007, respectively. Moving towards this new level of transparency is expected to deliver a number of benefits (Kahn, 2007; Ólafsson, 2007):

- Announcing an explicit policy path should enhance public confidence that the monetary authorities are committed to take the necessary steps to achieve their assigned goals.
- By communicating its preferred policy path for the coming years, the central bank should exert more influence over the pricing of assets with medium-term maturities. The experience of New Zealand suggests that publishing policy forecasts has given the Reserve Bank more control over the shape of the yield curve (Archer, 2005; Ferrero and Secchi, 2007).
- Publishing the policy path also enhances the accountability of the monetary authorities as the public can more readily appraise whether policy plans are aligned with goals.
- General availability of the central bank's projected policy path also enables the public to learn more about how the monetary authorities react to changes in the economic outlook, facilitating the co-ordination of expectations and reducing output and inflation fluctuations (Rudebusch and Williams, 2006).

Publishing projected policy rates nevertheless poses several challenges:

- The decision to communicate a preferred path is about much more than merely choosing to publish an existing output of the policy setting process. While policy makers always bear future developments in mind, procedures are in many cases arranged so that they reach an agreement on the current rate, but not necessarily on preferred future rates. In such cases, before they can publish their own interest rate forecasts, central banks have to revise their decision-making process (Giavazzi and Mishkin, 2006).
- Second, credibility must be preserved when new information leads the monetary authority to depart from its previously published path (Mishkin, 2004). To that end, communication must convince the public that any preferred path is contingent on a particular scenario unfolding and is not a firm commitment whatever the circumstances.
- Third, asset prices reflect the expected path of future interest rates as anticipated by market participants rather than the central bank. When a central bank bases its economic projections on its own preferred path of future interest rates, it should therefore in principle adjust asset prices accordingly. An important example is the exchange rate: because its current value is tied to market expectations of future short-term interest rates, it will not be fully consistent with a projection using a different interest rate path. Reflecting the inherent difficulties in doing so, central banks that publish their own interest rate forecast have not taken the step of adjusting asset prices.

Risk and term premia may have become more responsive to monetary policy

18. So far, the discussion has mainly focused on the interest rate effects of monetary policy that transit through their risk-free component. For households and firms, the risk and term premia embedded in the interest rates they are offered are just as important to their investment and saving decisions. At least

two institutional trends are likely to have reinforced the extent to which risk and term premia respond to the monetary stance and the cyclical position (Borio and Zhu, 2007).

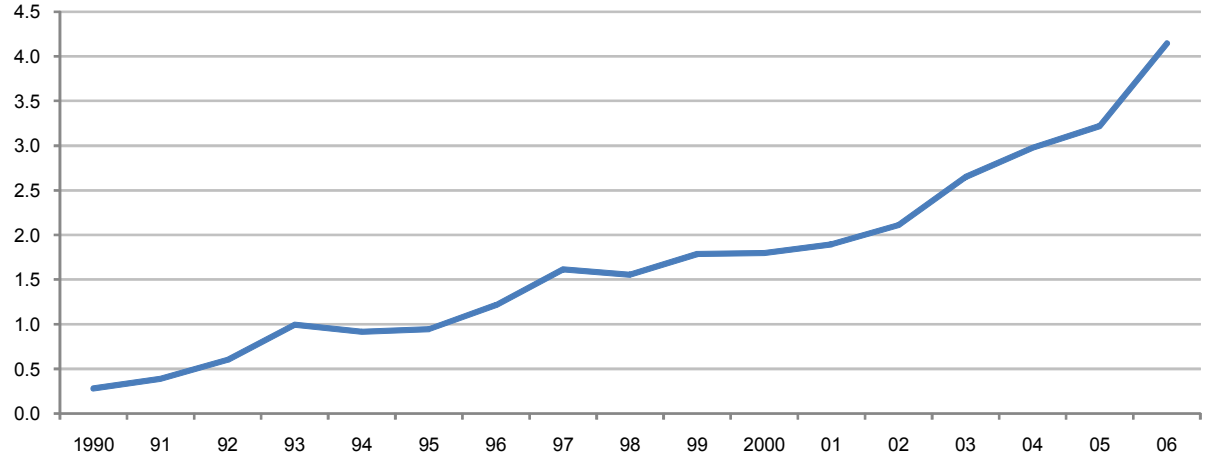
- First, successive regulations have increased the role of value-at-risk methodologies to determine capital and solvency requirements for banks and insurance companies. The definition of values at risk means that they decline when volatility falls (and rise when volatility increases). Through its impact on asset prices, the monetary stance influences volatility, estimated values at risk, the capacity of large investors such as banks and insurance companies to take on more risk and therefore risk premia across the markets.

- Secondly, however, monetary authorities can influence market perceptions of the probability distribution of future rate paths through their communication policies (Box 3). For instance, central banks that give clear indications about their future rate path are likely to drive down term premia. The announced "measured pace" of tightening by the US Federal Reserve in 2004-06 is one concrete example of a period during which monetary policy was highly predictable and term premia were very low (even if other factors were simultaneously compressing long-term rates – see Ahrend *et al.*, 2006).

19. The spread of highly leveraged institutions such as hedge funds (Figure 7) may also have contributed to amplifying the impact of the monetary stance on borrowing costs through its effects on risk and liquidity premia. In a period of monetary loosening, the low cost of short-term debt will encourage highly leveraged market participants to switch to high-yielding securities and relatively illiquid assets, thereby working to compress risk and liquidity premia (Rajan, 2007). Conversely, by inflating the cost of leverage, a shift to a tighter stance will prompt them to reduce their long positions in high-yield securities and relatively illiquid assets, which should go in the direction of increasing risk and liquidity premia.[4] However, because such institutions often operate on a global scale, their impact may be determined to a large extent by global financing conditions rather than solely by domestic monetary policy (see Weber, 2007 and Ahrend *et al.*, 2008).

Figure 7. Global hedge fund assets

As a percentage of nominal OECD GDP



Source: Visco (2007)

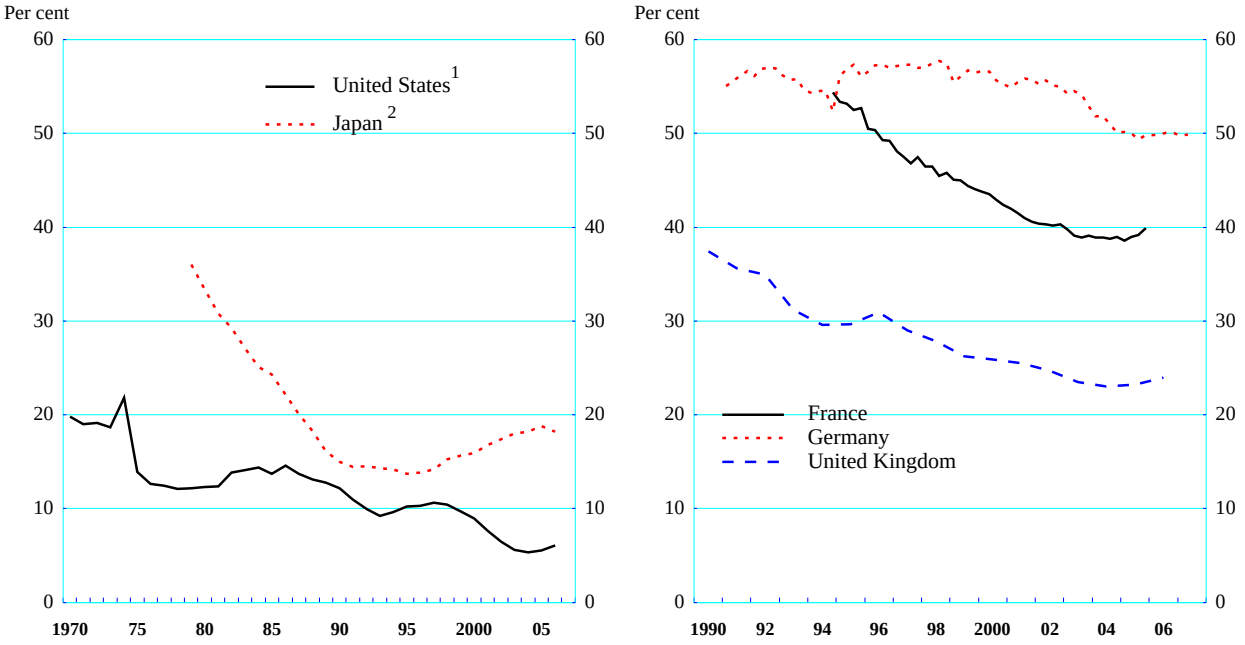
4. Recent experience suggests that this effect involves long lags: following the tightening cycle initiated in 2004-05, risk premia did not increase until mid-2007.

4. Consequences for credit channels

Bank lending effects have probably weakened...

20. While the diminishing role of bank credit in the financing of developed economies implies a reduced scope for bank lending effects, the share of bank loans in non-financial firm borrowing has generally been on a falling trend (Figure 8). Nonetheless, bank lending is still a key source of funding in France and Germany, where it amounts to more than a third of the total debt of non-financial firms.

Figure 8. Bank loans as a share of non-financial firms'debt



1. Bank loans excluding mortgages.
2. Loans by depository institutions.
Sources: US Federal Reserve Board, Bank of Japan, German Bundesbank, Bank of France, Thomson financial, Boutillier and Bricongne (2004) and OECD calculations.

21. The widespread relaxation of reserve requirements[5] appears to have reduced the extent to which shifts in deposits determine bank lending capacities (Estrella, 2001a). Furthermore, the availability of interest derivatives improves the substitutability among sources of bank funding. Banks can choose to delink their funding cost from fluctuations in short-term rates and the availability of deposits by hedging interest rate risk. Recent research confirms that monetary policy has little effect on lending by banks that hedge interest risk (Purnanandam, 2007). With the internationalisation of banking, however, the lending capacity of banks may be increasingly determined by global rather than domestic monetary conditions (Coricelli *et al.*, 2006).

22. As the range of what can be securitised expands, banks can increasingly manage their balance sheet independently of the amount of loans they have originated. As a result, reserve and capital adequacy requirements, which are essentially based on the balance sheet positions of banks, should have less bearing

5. Minimum reserve requirements were abolished in the mid 1980s in the United Kingdom and New Zealand, followed by Canada in 1994. They have been relaxed considerably in the United States, mainly during the first half of the 1990s. See for instance Bennet and Peristani (2002), Sellon and Weiner (1996,1997) and Demiralp and Farley (2005).

on the quantity of credit they can supply (Estrella, 2001b; ECB, 2004; Altunbas *et al*., 2007). Similarly, greater availability of instruments to buy or sell credit protection should enable banks to control their net exposure to credit risk independently of the amount of loans on their books. This effect would work to reduce the effect of risk-based capital adequacy requirements on the amount of loans banks can hold on their balance sheets. However, to the extent that market or regulatory responses to the 2007 financial turmoil result in a lower degree of securitisation, these changes could be reversed.

...but the bank lending channel remains important

23. Banks appear to have responded to the widening possibilities of transferring credit risk in line with the "seatbelt effect", whereby the typical outcome of new instruments to reduce risk from an activity is not less risk but an increase in that activity (Simonet, 1997). They ultimately maintained a broadly unchanged level of credit risk exposure by by expanding business (Cebenoyan and Strahan, 2004; Franke and Krahnen, 2005; ECB, 2004; Hirtle, 2007).[6] An implication is that, once the transition to larger balance sheets is complete, monetary policy will still act through bank lending channels because balance sheet constraints emanating from reserve or capital requirements still bite. Consistent with this view, Vrolijk (1997) finds that the parameters of monetary transmission show no visible link with the level of credit derivative activity.

24. Moreover, even with a high degree of securitisation, bank equity capital – and therefore bank lending capacities – remain affected by monetary policy, which exerts a significant influence on default rates. The reason is that securitisation does not fully shield banks from credit risk on the assets transferred. First, originators usually retain exposure to the first defaults on the loans they sell (Sprinzen *et al.,* 2005). In times of stress, this exposure will reduce profits and therefore equity capital. Second, large amounts of loan-backed instruments have been acquired by entities known as "conduits" which, while they are classified outside the banking sector, benefit from large contingency credit lines from the banks that set them up. The events of the second half of 2007 have demonstrated that, as conduits call on their credit lines, bank balance sheets can expand considerably in times of stress (ECB, 2007), lowering the amount of excess capital available to back new lending. For instance, one of the largest US banks saw its balance sheet exposure to collateralised debt obligations more than double between August and November 2007 as it had to honour a series of liquidity commitments.[7] Similarly, a large UK bank announced in November 2007 its decision to transfer complex debt instruments worth $45 billion (an amount equivalent to 40% of its equity capital) from its structured investment vehicles (SIVs) to its balance sheet. The aggregate exposure of the banking sector to conduits and other SIVs could not be quantified at the time of writing mid 2008. However, more evidence should become available over time as a result of the new reporting requirements foreseen under the "third pillar" of the Basel II framework.[8]

25. The ways in which banks implement the recently introduced International Financial Reporting Standards (IFRS) may also work to strengthen the bank capital channel.[9] As a general principle, the IFRS

6. Goderis *et al.,* (2007) also find a strong link between derivative issuance and portfolio expansion: banks issuing collateralised loan obligations on average experience a 50% increase in their target loan level.

7. *Financial Times*, 13 November 2007.

8. As from 2008 accounts, EU legislation implementing the Basel II accord (EU directives 2006/48/EC and 2006/49/EC) mandates credit institutions to report sources of risk exposure, including off-balance sheet vehicles, at least once a year (Bank of England, 2007).

9. Since January 2005, public companies are required to prepare financial statements according to IFRS in the European Union. This regime may evolve as the EU authorities are considering allowing public companies to choose between IFRS and US generally accepted accounting principles (GAAPs). Swiss-based multinationals must choose between IFRS and US GAAPs. Public companies cannot use IFRS in lieu of national principles in Japan and the United States (Deloitte, 2007). However, the US Securities and

approach requires that assets and liabilities be booked at market prices or, when prices are not available, at an equivalent estimated "fair value". In such a regime, because the *raison d'être* of banking is to fund longer-term assets with shorter-term liabilities, bank equity capital will be strongly influenced by the monetary stance, since assets will be more affected by valuation effects than liabilities. For instance, monetary tightening will lower the fair value of the portfolio of fixed-rate existing loans (as on average they were issued at lower rates), therefore reducing banking sector assets, while higher short-term rates push up funding costs. Other things being equal, equity capital shrinks as a result. When leverage is high, amplification effects can then kick in as asset sales by banks wishing (or having) to maintain a certain degree of excess capital further depress fair values for everyone (Shin, 2006). In this regard, the trend increase in leverage has probably contributed to reinforcing such amplification effects.

26. On balance, therefore, while some factors have worked to weaken bank lending effects, the bank lending channel appears to remain a powerful mechanism of transmission from monetary policy to activity. The main reason is that banks remain key players in the process of transforming low-risk savings into more risky investment. Despite the spread of derivatives, banks still retain some of the risks associated to the investments they are financing. However, the internationalisation of banking probably implies that bank lending effects are increasingly determined by the global rather than domestic monetary conditions.

The borrower balance sheet channel is likely to have strengthened

27. By requiring fair value accounting, the introduction of IFRS is also likely to have reinforced corporate balance sheet effects which arise because the net wealth position of a borrower influences its creditworthiness (see Box 1). The move to IFRS is a particularly significant change in countries such as France and Germany, where many categories of corporate assets were previously booked at historical rather than market prices (Biondi and Ragot, 2004; Bancel *et al.,* 2004). The fair value of an asset is sensitive to shifts in interest rates while their historical cost is not. Moreover, the company balance sheet channel is unlikely to be affected by the process of disintermediation, since a firm's net worth is as important for buyers of corporate bonds as for financial intermediaries, if not more. Indeed, balance sheet effects on businesses are still reckoned to be strong even in countries where disintermediation has gone comparatively far, as in the United Kingdom and the United States (Angelopoulou and Gibson, 2007; Benito and Young, 2007; Ashcraft and Campello, 2007).

28. The move from defined-benefit towards defined-contribution employee pension plans also works to strengthen the balance sheet channel of monetary policy on corporate investment. Under defined-benefit plans, lower interest rates have the effect of increasing the value of pension liabilities on firm balance sheets, thereby working to offset the otherwise favourable effect of lower rates on investment (Visco, 2005). Defined-contribution schemes insulate corporate balance sheets from that effect.

29. Financial innovation and low interest rates have enabled households to expand their balance sheets by taking on more debt (Figure 9). As a result, their net wealth position has become more sensitive to movements in asset prices (Girouard *et al.*, 2006). Moreover, the development of ways to borrow from net wealth (such as mortgage equity withdrawal) implies that the access of households to credit is more tightly linked to the health of their balance sheets. There is ample empirical evidence that these developments magnify household balance sheet effects (Kuttner and Mosser, 2002; Mishkin, 2007c; Benito *et al.*, 2006; Greenspan and Kennedy, 2005; Duval *et al.*, 2007). Private consumption has also been found to respond more strongly to changes in housing wealth in economies where mortgage markets are

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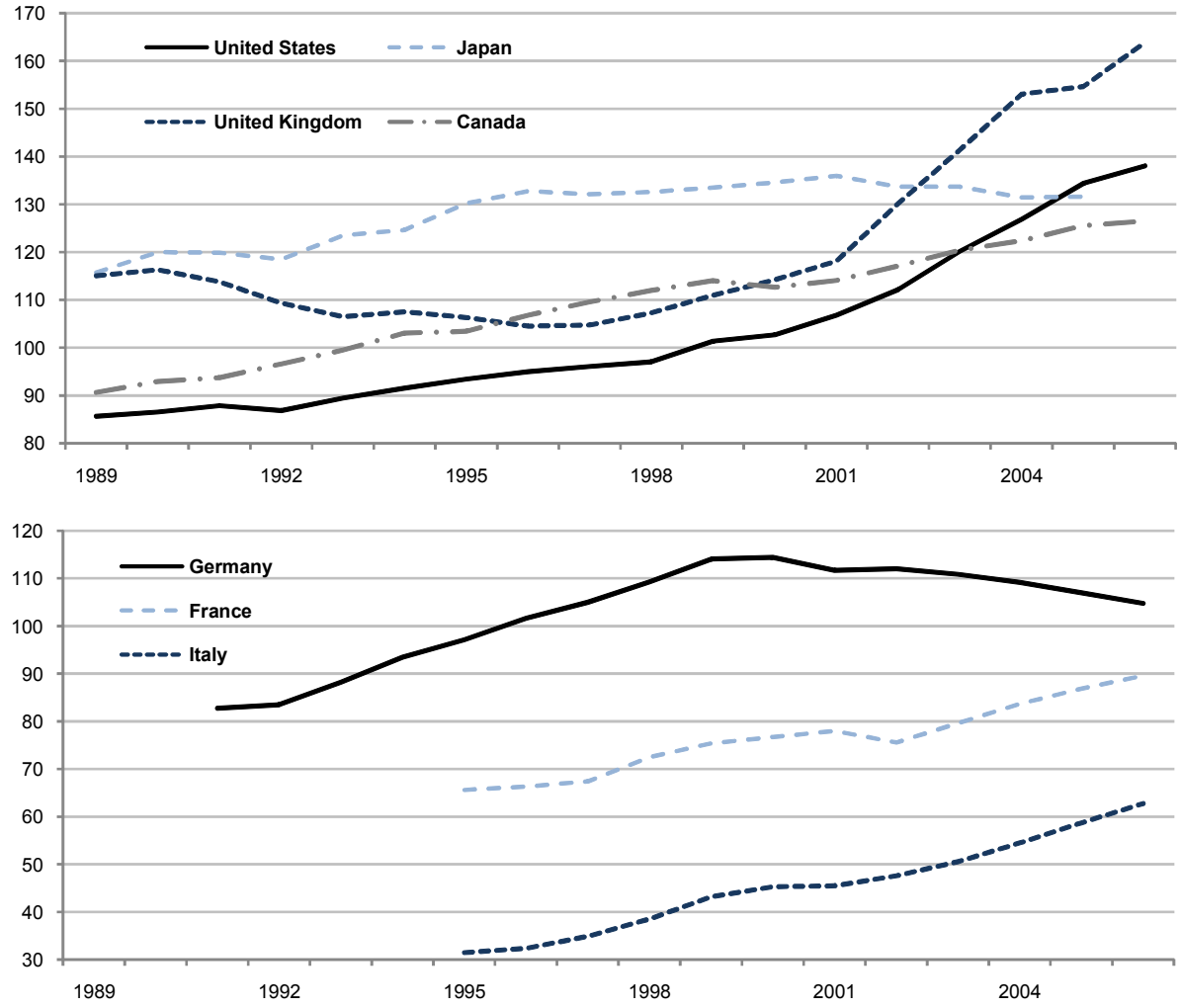
Exchange Commission issued a consultation document seeking public comment as to whether foreign multinationals listed on US exchanges might be allowed to use IFRS instead of GAAP for their US financial statements.

more developed (Catte *et al.*, 2004; Calza *et al.*, 2007; Hoeller and Rae, 2007). Housing-related balance sheet effects gained strength in the United States and the United Kingdom in the wake of financial liberalisation (Muellbauer, 2007). As older households have been found to have a higher propensity to consume out of housing collateral (Campbell and Cocco, 2007), ageing can be expected to increase this channel of transmission.

Figure 9. Household liabilities

As a percentage of household disposable income

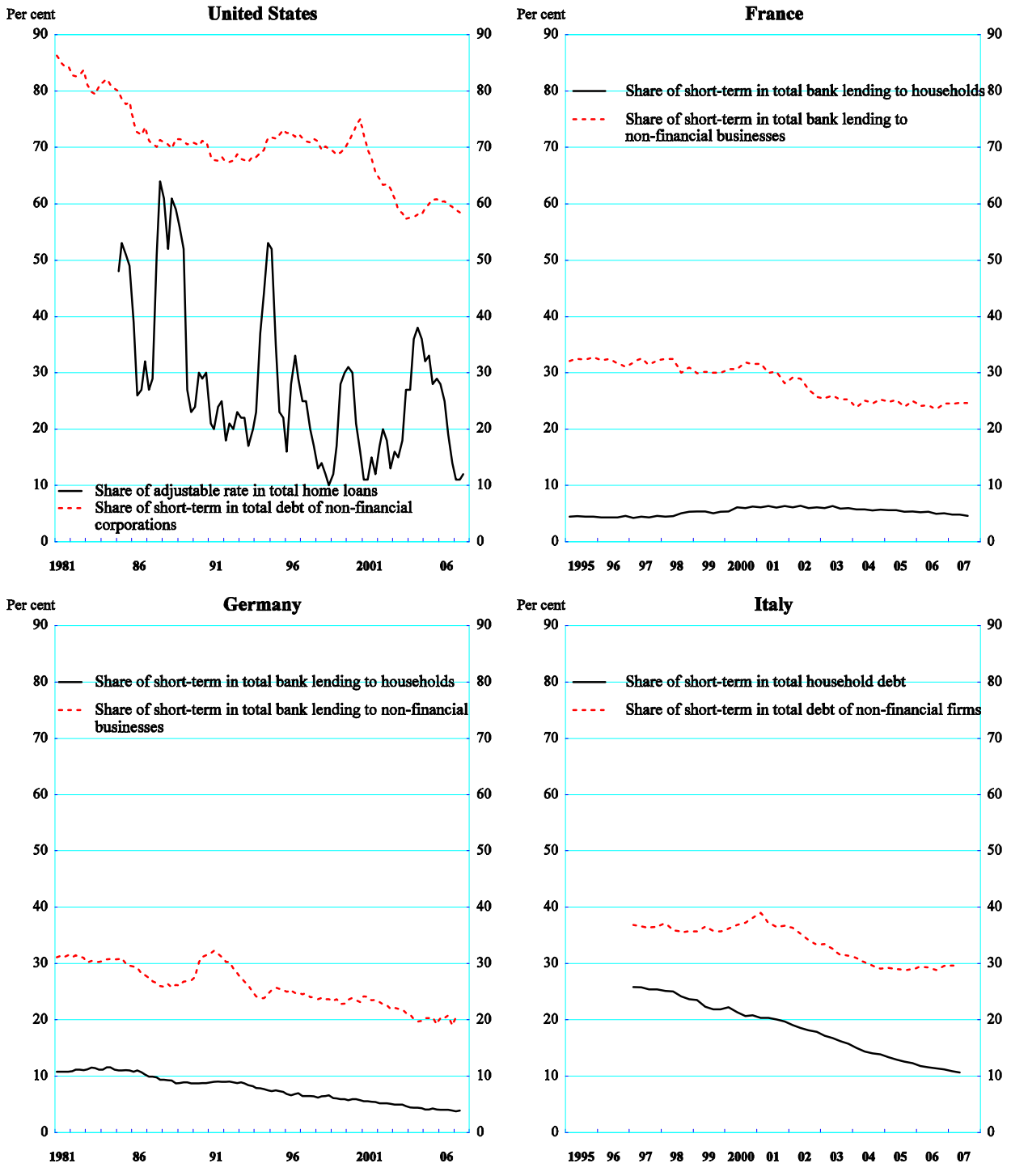


Source: OECD Economic Outlook 82 database. See www.oecd.org/OECDEconomicOutlook/sourcespdf for detailed notes.

Longer-term funding has reduced cash flow effects on borrowers

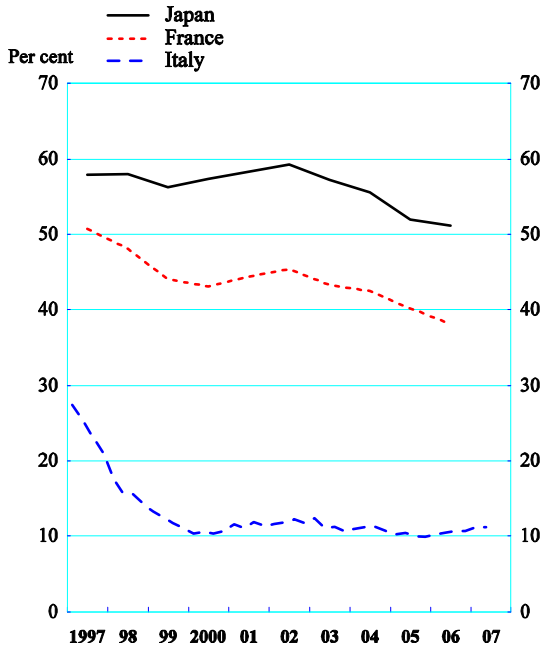
30. Insofar as firms and households have shifted from floating- to fixed-rate liabilities and assets, the direct cash flow effects of monetary policy are reduced. While little direct data are available, using short- and long-term lending as proxies suggests that floating-rate loans seem to be diminishing as a share of household and firm borrowing (Figure 10). On the asset side of household balance sheets, there has been a trend decline in the share of short-term instruments, at least in the countries where the data are available (Figure 11).

Figure 10. The diminishing importance of short-term borrowing



Sources: Thomson financial and OECD calculations.

Figure 11. Share of short-term securities in total household assets



Sources: Banque de France, Bank of Japan, Banca d'Italia.

31. Weaker cash flow effects can have noticeable implications for overall monetary transmission as this channel has been found to be important in a number of countries including the euro area, France and Italy (Chatelain *et al.*, 2003; Chatelain and Tiomo, 2003; Gaitotti and Generale, 2003). Van Els *et al.* (2003) claim that cash flow effects may account for as much as half of the response of business investment to shifts in policy rates in France and Italy.

32. In countries such as Italy or Japan where household net financial wealth has increased and become very large, household cash flow effects may, seen in isolation, have acted to diminish monetary transmission. Indeed, when a substantial share of net financial assets is invested in short-term instruments, higher rates increase current income, which in turn tends to boost consumption (Mojon, 1998). The opposite occurs when rates are reduced. In the presence of credit constraints, households will respond in part to changes in current income rather than solely to changes in permanent income. Simulations using the OECD Global Model suggest that in Japan, the country where the shift towards government indebtedness and large private-sector net assets has gone the furthest over the past decade, net interest payments to households significantly reduce the transmission of a rate hike to consumption and activity (see Box 4).

Box 4. **Gauging the contribution of household interest income to monetary transmission in Japan**

In general an increase in real interest rates due to monetary tightening may be expected to slow activity, but some have argued that in Japan the effect on private consumption could go in the direction of boosting spending and growth. The reason is that Japanese households hold net financial assets worth 3.7 times their disposable income. Since most of these net financial assets are debt instruments (3.2 times their disposable income), increases in interest rates bring in large income gains for households. This *income effect* goes in the direction of boosting consumption, and the size of households' net position in debt instruments suggests it might be strong. A one percentage point increase in the return on all household assets other than shares and property would boost net interest payments received by households from near zero to 3% of disposable income.

Simulations have been undertaken using the newly developed OECD Global Model to gauge by how much movements in household net interest income contribute to the net impact of monetary policy on output and prices.[1] Short-term money market interest rates are assumed to increase by one percentage point in years N and N+1. Long-term bond yields are modelled to rise in line with the average of expected future short-term rates.

1. A first simulation has been run without the higher net interest flows to households. In this first scenario, the higher cost of capital curbs investment while declining share prices depress consumption via wealth effects. As higher borrowing costs also push up the government debt ratio, the fiscal reaction function built in the model results in tax increases with a further dampening impact on consumption.

2. In the second simulation, everything is the same as in Scenario except that households receive higher net interest flows.[2] The favourable income effect partly offsets the restrictive effects from lower wealth and higher taxes.

The differences in the responses of economic variables between Scenarios 2 and 1, shown in Table 1, measure the impact of net interest flows on monetary transmission. The upshot is that net interest flows to households have the effect of substantially reducing the impact of a rate hike on consumption, therefore going in the direction of weakening monetary transmission, in countries such as Japan where households have high net wealth largely invested in debt instruments.

Table 1. **Higher household interest income reduces the impact of a rate hike in Japan**

	Dampening effect of net interest flows on the response of key variables to a rate hike (Percentage deviation of Scenario 2 from 1)			
	Year N	Year N+1	Year N+2	Year N+3
Real disposable income	0.6	0.8	0.4	0.2
Consumption	0.1	0.3	0.4	0.2
Investment	0.0	0.2	0.2	0.2
Real GDP	0.1	0.2	0.2	0.1
Inflation	0.0	0.1	0.1	0.0

Source: OECD calculations using the OECD Global Model.

1. See Hervé *et al*. (2007) for a description of the model.

2. The structure of the model is such that the higher long and short-term interest rates are paid on government and corporate bonds held by households but not on their other financial assets (such as time deposits). An implication is that the positive disposable income shock entering the simulation before feedback mechanisms is much lower (1.2% of disposable income) than the 3% mentioned in the first paragraph.

5. Effects on monetary policy transmission through asset prices

Some structural trends have implications for wealth effects

33. Three ongoing structural trends work to reinforce the wealth effects of monetary policy:

- More developed financial markets imply that a larger proportion of assets are priced and that asset pricing is more efficient.
- Since households hold more assets (Figure 12), their wealth will vary more for a given change in asset prices. Ageing is expected to keep pushing up the asset-to-income ratio over the next two

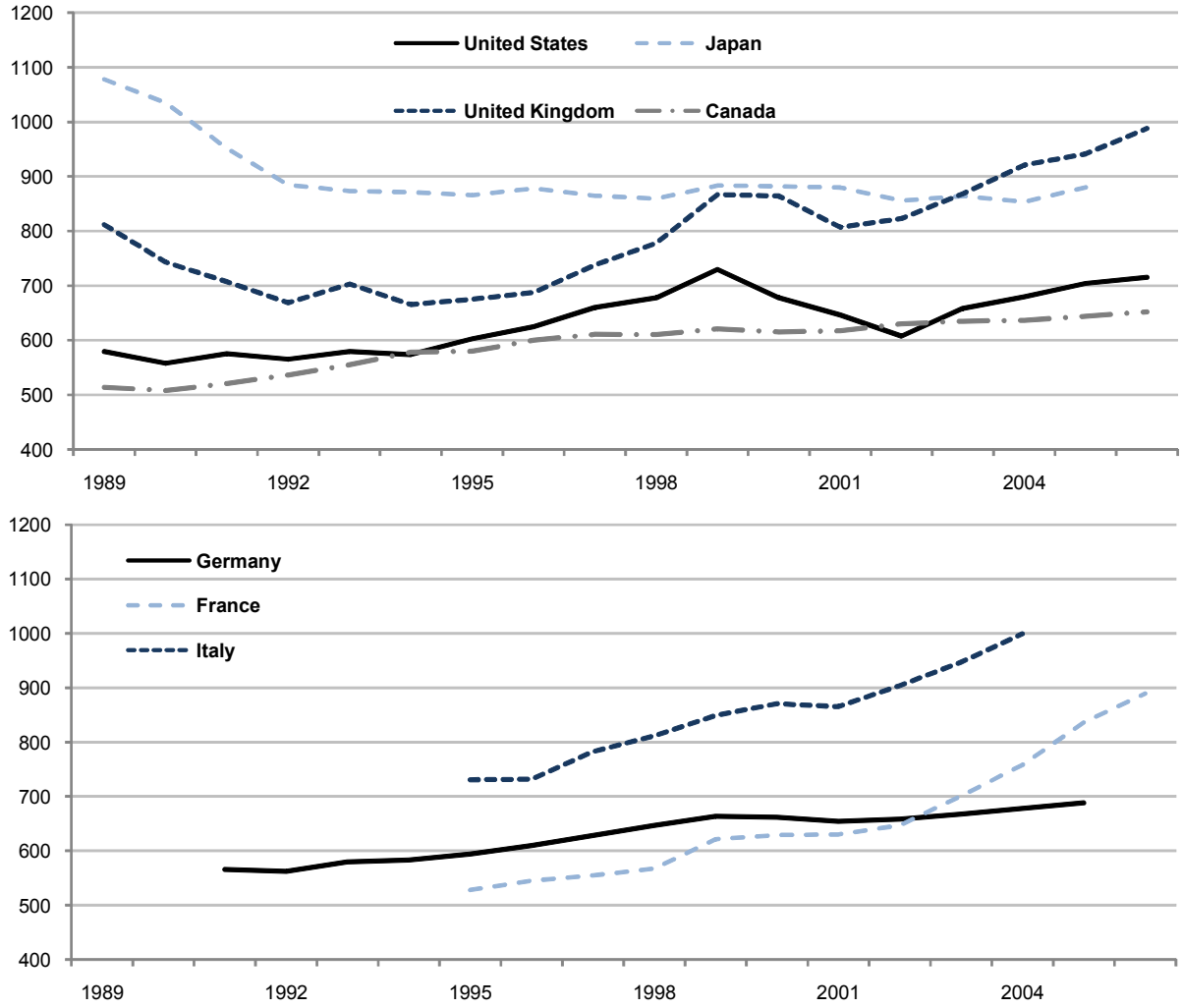
decades, albeit with gradually diminishing intensity as the working cohorts preparing for retirement become thinner (Oliveira Martins *et al.*, 2005).[10]

- In an environment where inflation and output have become more stable, households can estimate their permanent income with greater certainty. Households will then be more likely to act in response to changes in asset prices which have a more certain impact on their lifetime wealth.

On the other hand, financial globalisation implies that asset prices are increasingly determined by global rather than domestic monetary conditions.

Figure 12. Household assets

As a percentage of household disposable income



Source: OECD Economic Outlook 82 database. See www.oecd.org/OECDEconomicOutlook/sourcespdf for detailed notes.

34. It should be noted that appraising the practical importance of these changes remains a matter for further research. Empirically, "pure" wealth effects are very difficult to measure because they are

10. Oliveira Martins *et al.* (2005) expect the asset-income ratio to peak around 2020-30 in France, Germany and Japan (but not in the United States where it is anticipated to keep rising mainly because the birth rate is higher).

intermeshed with balance sheet effects in the data. For instance, Muellbauer (2007) claims that the co-movement between housing wealth and consumption in the United States and the United Kingdom is primarily due to collateral rather than wealth effects. Fundamentally, Ludvigson *et al.* (2002) have argued that pure wealth effects are small because monetary policy only affects asset prices temporarily and households "look through" transitory asset price fluctuations when evaluating their lifetime wealth (Lettau and Ludvigson, 2001; Hördahl and Packer, 2007).

Shifts in the cost of new, relative to existing, capital are likely to have greater effects

35. With more developed credit markets, firms will find it easier to invest in new capital rather than to purchase existing companies when the relative cost of new to existing capital falls. Monetary policy can therefore be expected to have a stronger effect on investment through its impact on the relative prices of existing and new capital (the ratio between these being known as Tobin's *q*). In other words, investment should rise by more for the same increase in the *q* ratio. However, since Tobin's *q* effects on business investment are notoriously difficult to identify in the data (Bernanke and Gertler, 1995), detecting any changes remains a challenge for empirical research.

36. Residential construction is one area where Tobin's *q* effects have been found to be powerful (Jud and Winkler, 2003), and they are likely to have been reinforced by financial development. First, greater access to mortgage credit translates into house prices which are more responsive to interest rates (Glaeser *et al.,* 2005). The implication is that the *q* ratio for housing is likely to move more for a given change of monetary stance. Second, to the extent that developers, like other entrepreneurs, face reduced credit frictions, a given change in the *q* ratio for housing can be expected to have a greater effect on residential construction.

Globalisation increases the role of the exchange rate

37. Greater financial integration and lower inflation volatility should in principle make capital flows and exchange rates respond more to unexpected changes in short-term interest rate differentials reinforced the impact of monetary policy. Recent experience with the carry trade indicates that many investors can remain confident that exchange rates will not move to offset interest rate differentials (Nordvig, 2007; Galati *et al*., 2007).[11] Currencies with higher short-term interest rates have tended to appreciate against the ones with lower rates. When the exchange rate appreciates in response to a rate hike, the resulting fall in competitiveness reinforces the tightening of monetary policy. However, the contribution of the carry trade to transmission cannot be taken for granted. First, exchange rate effects of monetary policy are notoriously difficult to identify in a robust fashion over long periods (Angeloni *et al.*, 2003). Second, as the carry trade rests on the assumption that an arbitrage can persist for prolonged periods, nothing guarantees that it is a permanent feature of the world economy.[12]

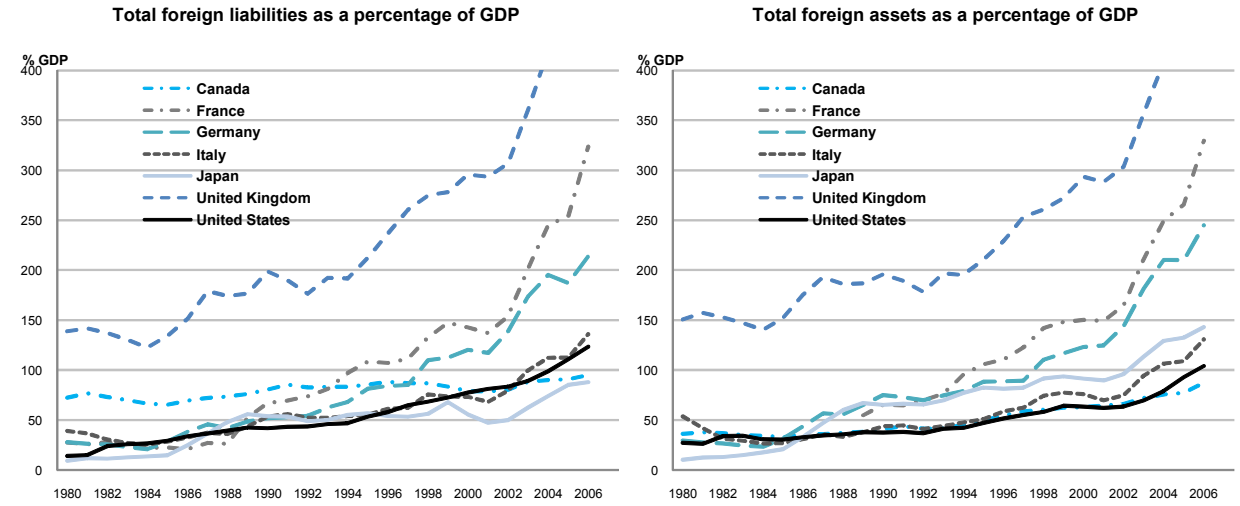
38. The internationalisation of portfolios (Figure 13) works in the direction of reinforcing valuation effects from exchange rate shifts. Depending on the composition of a country's assets and liabilities by currency, the valuation effects on wealth and consumption may amplify or offset the impact of exchange rate movements on activities due to shifts in competitiveness. For instance, when a country borrows in its own currency and hold assets denominated in foreign currency, exchange rate appreciation will reduce net

11. International experience shows that exchange rates on average fail to respond to interest rate differentials in the way economic theory predicts (Fama, 1984; Sarno, 2005).

12. Recent empirical studies have concluded that incomplete markets can explain the observed departures from uncovered interest rate parity (Bacchetta and van Wincoop, 2007; Sarno and Valente, 2006). These findings suggest that over time financial development should work to restore the link predicted by theory between interest rate differentials and exchange rate movements.

external wealth measured in the home currency, which will tend to encourage more saving. The associated contractionary effect on consumption in this case should magnify the impact of reduced competitiveness on net exports. The mechanism is symmetric: in the same country, depreciation will boost net external wealth, creating an incentive to lower saving that adds to the expansionary impact of improved competitiveness.

Figure 13. The internationalisation of portfolios

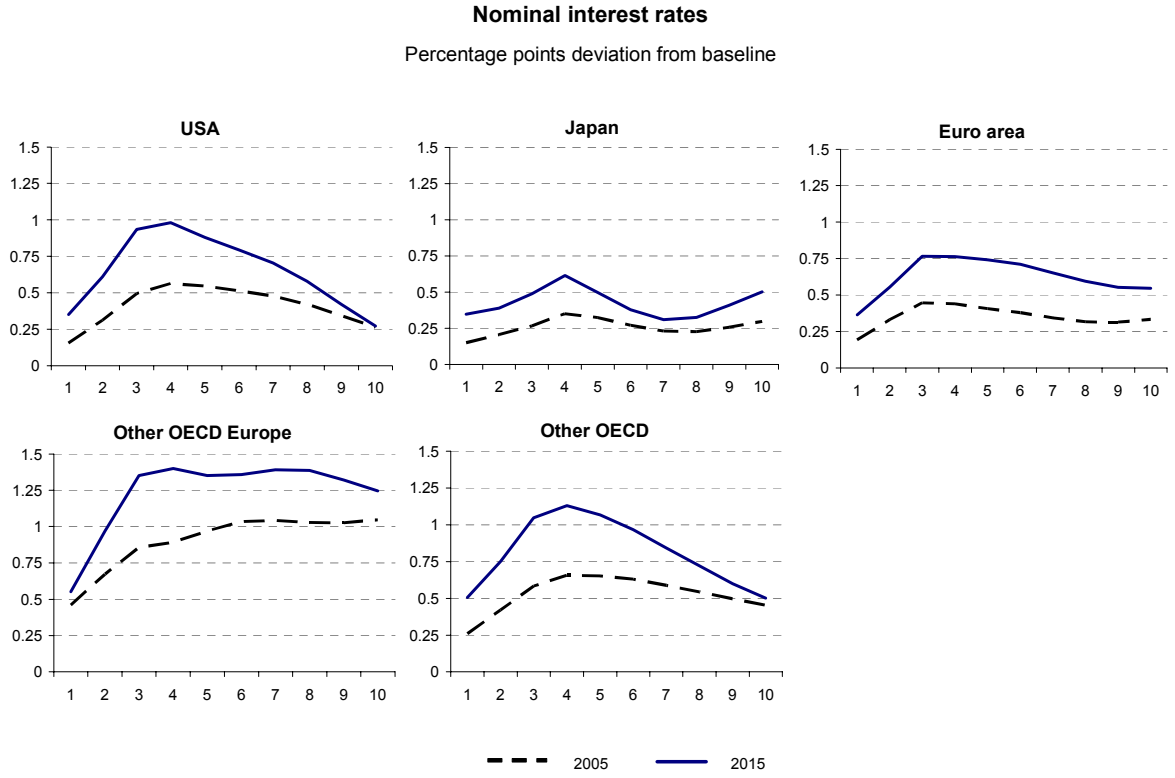


Source: IMF, *International Financial Statistics*; OECD *Economic Outlook* database.

39. Globalisation also implies that external demand absorbs an increasing share of output. Greater trade integration therefore magnifies the impact of changes in competitiveness on aggregate demand (Mishkin, 1995). Symmetrically, domestic demand makes up a diminishing share of activity. An important implication is that the transmission of monetary policy involves increasingly important international spillovers. For instance, simulations using the newly developed OECD Global Model reckon that, for the same relative demand shock in the non-OECD area, OECD monetary authorities will have to respond substantially more aggressively in 2015 than in 2005 (Figure 14).

40. In contrast with effects on output, the direct effect of exchange rate movements on prices appears to have diminished. The impact of exchange rate movements on import prices has been found to have weakened across OECD countries over the last two decades (Ihrig *et al.*, 2006; Sekine, 2006). Greater trade integration may be one factor behind this lower pass-through. If foreign producers have pricing power and exports make up an increasing share of their sales, they will be more responsive to final domestic prices in local currency when they set their prices. Gust *et al.* (2007) reckon that greater trade integration may account for about a third of the observed decline in pass-through in the United States between 1975-85 and 1995-2005. By contributing to greater currency stability and predictability, the more stable inflation environment may have also contributed to reducing the pass-through from the exchange rate to import prices. The reason is that, when exchange rate fluctuations are seen as less persistent, foreign producers will find it to their advantage to stabilise prices in local currency to avoid losing market share (Taylor, 2000).

Figure 14. Monetary policy responses to an increase in non-OECD domestic demand



Note: The panels show the simulated effects of an ex-ante increase of 1% in domestic demand in all the non-OECD economies for ten years. OECD countries set monetary policy to limit and eventually offset the resulting inflationary pressures.
Source: Hervé, *et al*, "Globalisation and the Macroeconomic Policy Environment," *OECD Economics Department Working Paper*, No.552.

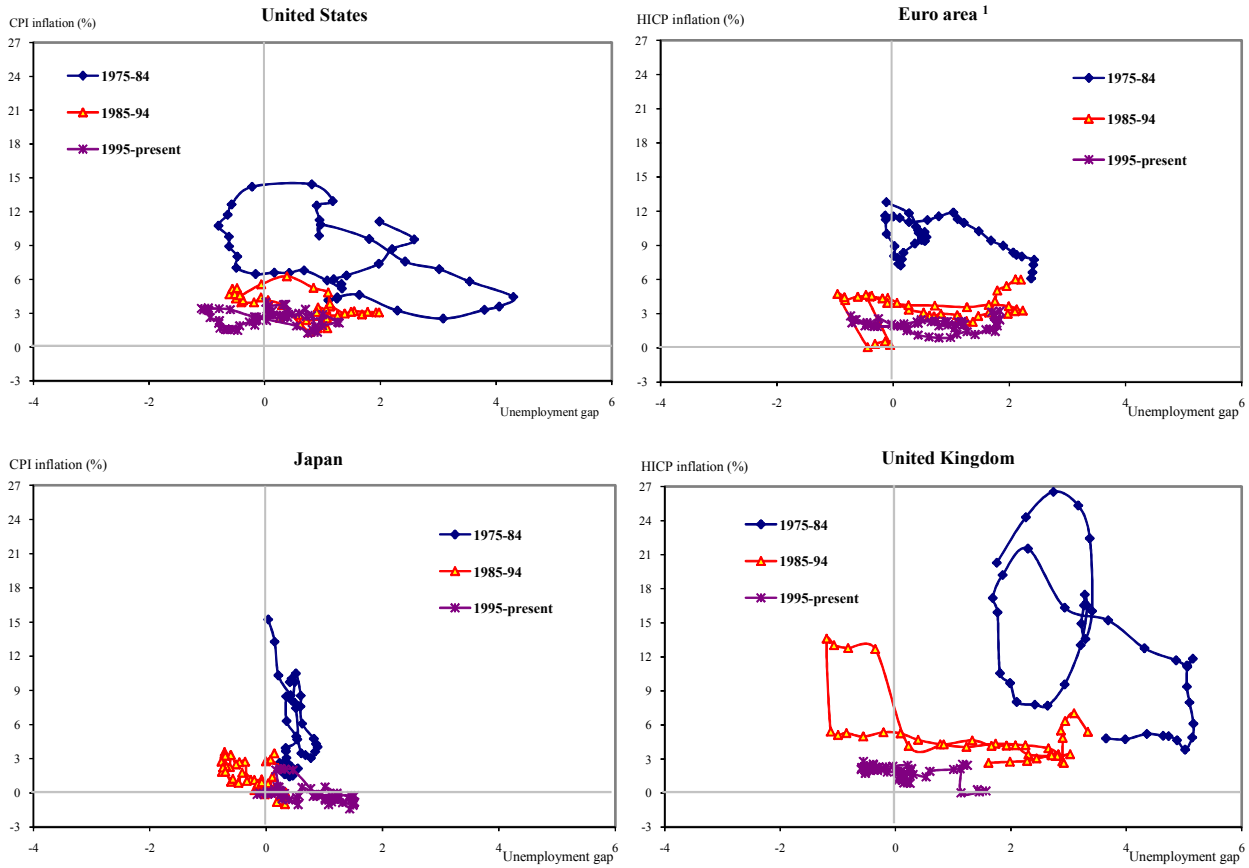
6. Transmission from monetary policy to inflation

41. Over the past three decades, inflation has gradually become less responsive to fluctuations in domestic demand in OECD countries (see Figure 15 and Pain *et al.*, 2006). At least two structural factors lie behind the flattening of the short-run trade-off between inflation and activity (the Phillips curve):

- Improvements in the framework for and conduct of monetary policy have played a key role. The greater credibility of monetary authorities has led to more stable inflation expectations (Mishkin, 2007a). The inflation process has become less persistent (Cogley and Sargent, 2005; Altissimo *et al.*, 2006). Especially, countries that introduced explicit inflation targets have managed to detach inflation expectations from past outcomes, thus reducing its persistence (Levin *et al.*, 2004).
- Globalisation has contributed to the flattening of Phillips curves, notably because attempts to press for higher wages or prices result in a larger shift of activity abroad (OECD, 2007b).

Figure 15. Phillips curves in selected OECD economies

CPI inflation versus unemployment gaps



Note: The unemployment gap is the difference between the unemployment rate and the NAIRU (as estimated by the OECD).
1. For the euro area, CPI is shown prior to 1991. Western Germany is used in place of total Germany to calculate the aggregate euro area prior to 1991.
Source: OECD Economic Outlook database.

42. A flatter Phillips curve is a two-sided sword. On the one hand, it means that demand fluctuations will initially translate into smaller deviations of inflation from target. On the other hand, a flatter Phillips curve implies an increased sacrifice ratio: if inflation gets out of hand, bringing it back in check involves higher output costs than when the curve was steeper. The trade-off between output and inflation variability worsens. Because stabilising inflation in response to cost-push shocks requires larger movements in output, preserving stable inflation comes at the price of higher output volatility (Iakova, 2007). Furthermore, a flatter Philips curve increases the uncertainty in evaluating the output level consistent with price stability, thereby complicating the task of monetary management.

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