Financial globalisation and the transmission mechanism of monetary policy in small- and medium-size countries

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I.   Introduction

There is a growing discussion among central bankers and academics on the implication of globalisation for monetary policy.[2] This debate has mainly two strands. The first concerns the effects that real globalisation might be having on the inflation process. Here the main questions seem to be two: (1) what role does globalisation play in producing and maintaining low inflation, and (2) are global factors becoming more important at the expense of domestic factors as determinants of domestic inflation? The second strand concerns the effect that financial globalisation might be having on the transmission mechanism of monetary policy. Here the issue is the degree to which financial globalisation is weakening the ability of central banks to influence domestic financial conditions. A related concern, especially among small- and medium-sized countries, is whether, as a result of financial globalisation, the exchange rate channel of monetary transmission is becoming overburdened at the same time as the interest rate channel becomes progressively weaker.

This paper is concerned with the second set of issues, ie those related to financial globalisation. It will mostly focus on small- and medium-size developed countries that have adopted a floating exchange rate and inflation targeting. The reasons are three-fold. First, countries with developed and open financial systems should in general be more closely integrated with the global financial system than emerging market countries. It should therefore put the effects of financial globalisation as such into a sharper focus. In emerging market countries the signs of that effect might be blurred by specific problems of emerging market countries related to structural and institutional vulnerabilities, partly reflected in high and variable country risk premia. Second, both theory and experience indicate (cf the trilemma) that countries operating pegged exchange rates and open capital accounts lose control over domestic financial conditions. They neither have nor seek the opportunity to operate independent monetary policy. The issue being investigated in this paper is therefore not strictly speaking relevant for these countries. Third, choosing the above set of countries avoids significant data problems.

The paper is partly motivated by the experience of some of the small- and medium-size countries with open capital markets and floating exchange rates during the currency market turmoil in late February 2006 and the subsequent more general sell-off in May-June of that year, particularly the experiences of New Zealand and Iceland. These events and the subsequent depreciation pressures on a few countries are several stories that are only partly wrapped into one. There are significant country-specific factors involved in these episodes. The events in Iceland were, for instance, to a significant degree reflections of old themes

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[2]   See, for instance, Bernanke (2007), BIS (2006), Bollard (2007), Rogoff (2006) and Weber (2007).

(country-specific overheating and imbalances, overstretching, non-linear adjustment and sudden stop).[3] The sell-off in emerging markets in May and June 2006 was more in the nature of a correction than the beginning of something bigger and was in most cases subsequently reversed (the exceptions were a few countries with significant imbalances, eg Hungary, Turkey and South Africa). However, there were at least two important common elements in these developments. These were, firstly, global conditions of low cost and easy access to credit, that were partly created by very accommodative monetary policy in all the three major currency areas, and, secondly, the effects of ongoing financial integration on small countries with relatively developed financial systems. The first has been much discussed in recent years.[4] The second deserves more attention.

The other motivation for the paper is the ongoing policy discussion in the small developed countries with a floating exchange rate, like New Zealand and Iceland, that seems to be increasingly influenced by concerns that the interest rate channel of monetary policy is being weakened by financial globalisation at the same time that the exchange rate channel works in a non-linear and sometimes disruptive fashion that is for significant periods decoupled from fundamentals. This combination of developments is seen to subject the traded goods sector to excessive fluctuations with potentially detrimental medium- and long-term effects on growth potential. These concerns have raised the question of how other policies, like prudential and fiscal, could be better designed and calibrated to play a countercyclical role, thus relieving some of the pressure on monetary policy. But more fundamental potential remedies have also been mentioned, such as monetary union.

The main questions that will be addressed in the paper are the following:

➢ At the theoretical level, how would we expect financial globalisation to affect the transmission mechanism of monetary policy in countries that are developed and financially sophisticated, but not large enough to significantly affect global financial conditions?

➢ What happens if financial globalisation goes all the way?

➢ What is the current evidence on the development of the interest rate channel of monetary policy in the chosen sample of countries?

➢ What is the evidence on the exchange rate channel? To what degree have exchange rate movements been part of a desired monetary transmission and

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[3] Mishkin and Herbertsson (2006) and the Central Bank of Iceland (2006) provide interesting analyses of the mini-crisis in Iceland.

[4] See, for instance, recent issues of the BIS Annual Report.

economic adjustment, and to what degree have they been decoupled from fundamentals and thus a source of instability?

➢ In as so much as ongoing financial globalisation creates problems for macroeconomic management in small- and medium-sized financially open countries, is there a set of changes to institutions, frameworks and policies that would, at least partly, address such problems?

➢ How does ongoing financial globalisation affect the relative costs and benefits of entering a monetary union?

The rest of the paper is organised as follows: the next section defines financial globalisation and discusses some of the measure of its advance. Section III provides a discussion of the implications of financial globalisation for the transmission mechanism of monetary policy and in that context attempts to answer the question of what would be the implication if financial globalisation runs its full course. Section IV provides some evidence on the evolution of the interest rate channel among small- and medium-size IT countries and Section V discusses the exchange rate channel. Section VI further prepares the ground for the policy discussion by briefly exploring the recent experiences of New Zealand and Iceland, which are of interest as these countries are small and very small mature economies that are financially very open and sophisticated. They might thus be expected to give us early indications of the implications of financial globalisation for such countries. Section VII discusses policy options and Section VIII concludes.

II. What is financial globalisation and how do we measure it?

A fully integrated market is one where economic agents face a single set of rules, have equal access and are treated equally. By implication, the law of one price would hold in such a fully integrated market, ie risk adjusted real returns on assets with the same maturity and other characteristics would be equal. Note, however, that frictions could still be present, but they should be symmetric, ie the same for all agents, sectors and locations (in the case of spatial integration). Using this definition we could define financial integration as the process by which financial markets and institutions become more tightly interlinked and move closer to full integration where the law of one price would hold. Finally, given the above definitions, financial globalisation is cross-border financial integration that is reasonably spread around the globe.[5]

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[5] Cross-border financial globalisation involving only a few countries (eg US and Canada) with the bulk of the world being financially insular would thus not meet the criteria of financial globalisation. Using the same

It is important to bear in mind that the above definition implies that financial globalisation, or cross-border financial integration, is a process rather than a state of nature. Furthermore, this process is only partly driven by governmental action. Governments can in principle lift legal restrictions on capital movements over night (although it would in most cases not be advisable to do so). They could possibly also move relatively quickly to harmonise rules, regulations and practices that are impediments to cross-border financial integration, although in practice it is often a drawn out process and differences in legal systems and business practices tend to be significant impediments to free flow of capital. Furthermore, we would expect legal freedoms to financial innovation that would over time reduce frictions to the flow of capital. The abolition of government imposed restrictions to the flow of capital will thus not instantaneously result in the law of one price holding across countries. It will at least require several years of a market driven integration process. And even then, we might never reach the theoretical limiting case where risk adjusted real rates of returns are through infinitely fast arbitrage process more or less continuously equalised across countries.

The potential implications of cross-border financial integration provide us with candidate measures of its ongoing process. These implications are:

➢ Stronger tendency for real risk adjusted rates of return to be equalised across countries.

➢ Covered interest parity should hold.

➢ Greater scope for risk sharing across countries.

➢ Greater potential to decouple domestic saving and investment.

These implications provide several potential measures of ongoing cross-border financial integration. We have the following taxonomy of tendencies that would be consistent with higher degree of cross-border financial integration:

1. **Legal or de jure measures:**

➢ Lower level of legal restrictions on capital flows

➢ Lower level of other legal and regulatory based impediments to cross-border financial integration, including taxation and the design of monetary instruments.

2. **Price based measures:**

➢ Increased co-movement of asset returns

➢ Covered interest rate parity holds

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terminology we define regional financial integration as cross-border financial integration that is contained

> Closer move to the "law of one price"

3. **Quantity based measures:**

> Higher level of gross cross-border capital flows

> Higher level of cross-border asset and liabilities

> Reduced home bias in domestic portfolios

> Lower correlations of domestic saving and investment

> Lower correlations of domestic consumption and GDP

Taken individually, there are significant caveats associated with several of the measures above.

Taking price based measures first: measuring real risk adjusted returns is complicated in the absence of good measures of inflation expectations and direct measures of risk premiums. In practice we tend to look at correlations of changes in nominal interest rates of similar maturity and risk or in equity returns. There will thus be a measurement bias, which though should stack the cards against detecting the effects of financial integration. Additionally, observed co-movements might not have anything to do with ongoing financial integration and might instead be reflecting the existence of common shocks.

The measurement problems might be somewhat smaller in the case of the quantity based measures. Several of them have also the additional benefit of being available and relatively comparable across a range of countries and time periods. However, there is no clear benchmark in the case of gross capital flows or cross-border assets and liabilities and it is possible to construct examples where these would increase without a progress in financial integration, as defined above, and also the contrary, where they would be constant in the face of such financial integration. In general, we would however expect cross-border assets and liabilities at least to increase so long as financial integration reduces home-bias.

Due the above the mentioned caveats one should preferably look at a broad range of measures when assessing the progress of financial globalisation. The picture that emerges from such a broad look is one that is consistent with a significant progress in financial globalisation during the last decade and a half. That is not particularly surprising given that several mature economies still had capital controls in place in the middle of the 1980s that

within a specific region.

were lifted in the next few years and that a string of emerging market countries removed restrictions to capital movements in the 1990s. We see that covered interest rate parity holds except in those countries that still have restrictions on capital movements. Furthermore, correlations of changes in long-term interest rates have increased significantly during this period, although it could, at least partly, be due to other reasons than financial globalisation. Finally, both gross capital flows and gross external positions (measured by the sum of foreign assets and liabilities as a percentage of GDP) have increased strongly during this period.

But it is a mixed bag. Although home bias has fallen it remains big, even among countries that have operated open capital accounts for decades. Consumption has been more correlated with domestic output than predicted by theory. The global integration of financial markets has therefore so far provided less insurance against idiosyncratic shocks than theory predicts, either because capital flows have effectively been more restricted than seem *de jure*, and financial integration thus less advanced, or because capital flows are inherently volatile due to information problems and herding, thus becoming a source of shocks as much as smoothing. It might, however, be the case that recent increases in current account imbalances, both globally and among individual countries (Australia, Iceland, New Zealand etc), are a sign of a stronger decoupling of domestic saving and investment patterns emerging.

Although the evidence is consistent with significant progress of financial globalisation in the last decade and a half, it also indicates that we are in general a significant way from the limiting case of full integration. Thus, even if international co-movements of asset returns have increased strongly during this period, it is in most cases far from perfect. However, there are a few small- and medium-size mature countries where correlations of changes in long-term interest rates with US rates have in recent years become almost 90%. Furthermore, we know that it can only partly be explained by common shocks as some of these countries (eg New Zealand and Australia) were dealing with demand pressures at the same time as the US was trying to revive demand. That raises the question addressed in the next section of what will happen to the transmission mechanism of monetary policy if financial globalisation goes all the way?

III.   Financial globalisation and the transmission mechanism of monetary policy

Full financial globalisation will by definition result in all real returns of similar maturity and risk being equalised across countries. For the small open economy that is unable to affect global financial conditions this means that monetary policy will not be able to affect domestic real

interest rates. Its ability to affect domestic demand through the interest rate channel would then in the limit disappear. That still leaves the exchange rate channel which is sufficient for monetary policy to hit any inflation target in the medium to long run and potentially retain some countercyclical force in the short run, provided of course that monetary authorities do not try to fix the rate. Some would add to this the expectations channel and anchoring effects of a credible inflation target. However, I would argue that these ultimately depend on the central bank being able to affect real financial conditions.

These results are of course not new. Bob Mundell demonstrated in a series of articles in the early 1960s (eg Mundell (1963) and Mundell (1964)) that for the small open economy monetary policy working only through the exchange rate would be a powerful stabilisation tool when the exchange rate floats but totally ineffective when it is fixed. The reverse would hold for fiscal policy.

Two remarks on Mundell's theory are called for. First, he clearly realised the extremity of the assumption of totally free capital movements in the above sense (domestic interest rates pegged at the global level) and that what we now call financial globalisation is a process rather than a state of nature. In his own words: "I assume the extreme degree of mobility that prevails when a country cannot maintain an interest rate different from the general level prevailing abroad. This assumption will overstate the case but it has the merit of posing a stereotype towards which international financial relations seem to be heading" (Mundell (1963)). "I hope my assumptions are unrealistic. If they were not, I could not have made a contribution to theory" (Mundell (1964)). Making extreme assumptions is paramount to economic theory making but has to be kept in mind when we come to assessing current conditions. Macroeconomic textbooks rightly make the jump from totally controlled capital movements to frictionless movements from one page to the next, but it might create the wrong impression that we can in the real world make such transition over night as governments abolish all restrictions.

The second remark concerns the nature of Mundell's model. It is heavily "Keynesian". He assumes money wages and the price level to be fixed as there are unemployed resources and constant returns to scale. The implication is that there is no pass-through from changes in the exchange rate to the price level and there is no need to make the distinction between nominal and real interest rates. Furthermore, there is only one interest rate in the model and monetary policy operates through changing the money supply.

This is not precisely the model that central banks have in their minds nowadays. Let us replace some of these assumptions with the other extreme and see what happens. In order to do so let us factor in the other side of globalisation, ie the real side. In a similar fashion to

our definition of financial globalisation we can define real globalisation as the cross-border integration of markets for goods, services and factors of production. In the extreme case, ie when real side globalisation has run its full course, all goods would be traded, ie there would be no domestic non-traded goods sector. Furthermore, there would be instant factor mobility, implying that real factor returns are equalised across border and that the domestic output gap becomes irrelevant and meaningless. In fact, there would be no specific national resource constraint.

We now add the assumption of full financial globalisation where the real risk adjusted yield curve is, through speedy arbitrage, completely determined by the global curve and unaffected by domestic monetary policy, even in the short run. Monetary policy would lose all its countercyclical force. It is anyhow not needed as there is no domestic output gap that needs to be stabilised. However, monetary policy would through the exchange rate channel be able to deliver any inflation target that the authorities would want. By creating deviations of the domestic nominal policy rate from the global rate the domestic inflation rate can be made to diverge from the global interest rate. The law of one price would still hold, ie there would be real interest rate parity and PPP would be in force. This is really back to the world of perfect markets and the quantity theory. Monetary policy has no real effect. The only effect it has is to determine the inflation rate, which is also neutral in its effect on the real economy.

We are of course very far from this state of affairs. Furthermore, a plausible case could be made that financial globalisation might progress more rapidly than real globalisation. We would then have a situation where the countercyclical force of monetary policy would still be found to be useful but the interest rate channel would be significantly weakened and in the limit fully blocked. To what degree that would constitute a problem would depend partly on how well the exchange rate channel operates. If it works smoothly, ie there is not a pronounced tendency for overshooting and excess volatility and for instance UIP holds more or less continuously, then there might not be much case for concern. However, if there is excess volatility and exchange rates show tendencies to be decoupled from fundamentals (including UIP) then there is more to worry about. It is interesting in this regard that in some of the countries that seem to have been subject more strongly to the forces of financial globalisation, like New Zealand, there has been concern about the potential overburdening of the exchange rate channel and that excess volatility and misalignments might potentially have detrimental effects on the traded goods sector. We will come back to these issues in sections V, VI and VII.

Finally, it might be that as we get closer to the case of full financial globalisation that we enter a region of more dynamic instability, with exchange rates being strongly responsive to short-term interest rate differentials but with medium and long rates being determined by global

rates and unavailable to influence domestic asset price booms, which in turn might be fuelled by capital inflows generated by the short-term interest rate differential.

IV.   Recent evidence on the interest rate channel

This section investigates the evolution of the interest rate channel of monetary policy transmission for a group of mature and emerging inflation targeting countries with open capital accounts. The focus is on the relative influence on domestic long rates of policy rates on the one hand and a representative global rate on the other. The analysis is based on a few assumptions that need to be spelt out. First, it is assumed that neither monetary policy nor the long rates of each of the countries in our sample do affect the global long rate. That means that the global long rate can be taken to be exogenous for the determination of the domestic long rate. Second, it is assumed that central banks are able to control tightly domestic short-term money market rates. Again, that means that the domestic short rate can be taken to be exogenous for the purpose of determining the domestic long rate.

The above assumptions and data availability limits the sample to small- and medium-sized mature economies and a few emerging market economies (with significantly shorter samples). For the first group of countries the investigation looks at monthly data for the period 1990-2006 for Australia, Canada, New Zealand, Norway, Sweden, Switzerland and the UK. For the second group of countries monthly data for Chile, Czech Republic, Mexico, Poland, Thailand, and South Africa during 2000-2006 is used. For some of these emerging market countries the sample will be even shorter due to lack of data.

We start by looking at simple rolling correlations of interest rate changes (36 month window of monthly data) for the sample of developed countries (see Tables 1 and 2 and Graphs II.1-II.8) during the period 1990-2006. There are three set of domestic interest rates, ie 3 month money market rates, medium-term (2-3 year) rates and long-term (10 year) rates. The correlations reported are the following: domestic short-term and medium-term rates, domestic short-term and long-term rates, domestic long-term and US long-term rates and domestic medium-term and US medium-term rates. Across the maturity spectrum and locations we generally expect the following pattern:

  ➢ Domestic short-term rates are more strongly correlated with medium-term rates than long-term rates.

  ➢ Domestic long-term rates are more strongly correlated with US long-term rates than domestic medium-term rates are with US medium-term rates.

The pattern through time that would be consistent with ongoing financial globalisation is the following:

➢ Domestic long-term and medium-term rates are becoming more correlated with US rates, with the tendency being more pronounced in the case of long-term rates.

➢ The link between domestic short-term and long-term rates is becoming weaker and possibly also between short-term and medium-term rates.

The results are broadly consistent with these priors (see Tables 1-2 and Graphs II.1-II.8). Domestic short-term rates are in general more correlated with medium-term rates than long-term rates, as can be seen in Table 1 and Table 2 shows that the correlation with US rates increases with maturity. We further see that correlations of domestic long-term rates with US rates have in most cases been increasing through time but that the tendency is less clear in the case of medium-term rates. Finally, there seems to be some tendency for the domestic interest rate channel to weaken, although not uniformly and there are clearly periods where it weakens significantly and then comes back, which must be due to other factors than progressing financial globalisation. On the whole the data seems to be consistent with ongoing financial globalisation creating higher interest rate correlations, especially at the longer end of the maturity spectrum, and some associated weakening of the interest rate channel. However, the channel is far from dead.

Let us now briefly look at the available data for the 6 emerging market countries mentioned above (Chile, Czech Republic, Mexico, Poland, Thailand, and South Africa). We look at rolling correlations of monthly changes for a 24 month window (shorter than in the case of mature economies due to shorter data series). Some of these countries do not have long maturity government bonds and the investigation is therefore limited to short- and medium-term (mostly 3-5 years in this case) domestic rates and comparable medium-term maturity for the US. The results are given in Graphs III.1 and III.2. There are fluctuations in both sets of correlations but no clear trends, except an upward one in the correlation of Thailand and US medium-term rates. No strong conclusions can be drawn from this data.

Simple correlations of the above type can at best be only indicative. They do not address issues of causality, although our assumptions, if correct, take care of that. Neither do they take into account lags in the relationships or joint determination by several variables. In order to deal with these added complexities an error correction model of the domestic long-term interest rate is specified below. Although plausible, it is somewhat arbitrary by assuming two co-integrating vectors where only one of the exogenous variables (domestic short rates and US long rates) enters each. These restrictions remain to be tested at a later stage but for the current investigation of the evolution of the interest rate channel we let it be.

(1)
$$\Delta i_t^l = \alpha + \beta_s(c_1 + i_{t-1}^l - \gamma_s i_{t-1}^s) + \beta_g(c_2 + i_{t-1}^l - \gamma_g i_{t-1}^{lg}) + \sum_{i=0}^{T}\phi_i \Delta i_{t-i}^s + \sum_{i=0}^{S}\lambda_i \Delta i_{t-i}^{lg} + \sum_{i=1}^{R}\theta_i \Delta i_{t-i}^l$$

i = nominal interest rate, l stands for long, s stands for short and lg stands for global long (proxied by US rates).

Equation (1) could be simplified if we are willing to constrain both the γ's to be equal to 1. That should not be such a strong assumption if we note that any other value will imply that there is a trend increase (or decrease) in the slope of the domestic yield curve and the long-term interest rate spread vis-à-vis the US. Neither is plausible given the sample period and the countries involved. Given this constraint we get (2),

(2)
$$\Delta i_t^l = \alpha^* + \beta_s(i^l - i^s)_{t-1} + \beta_g(i^l - i^{lg})_{t-1} + \sum_{i=0}^{T}\phi_i \Delta i_{t-i}^s + \sum_{i=0}^{S}\lambda_i \Delta i_{t-i}^{lg} + \sum_{i=1}^{R}\theta_i \Delta i_{t-i}^l$$

where $\alpha^* = \alpha + \beta_s c_1 + \beta_g c_2$.

The βs are measures of adjustment speeds to the long-run equilibrium levels (provided they exist). They should therefore have negative sign. If a β is not significantly different from zero then there is no long-run relation. Care should be exercised in interpreting the implications of non-significant β, especially in the case of the short-long relation. It does not mean that there is no interest rate channel. We do not expect monetary policy to be able to exert long-run influences on long-term real interest rates. If inflation expectations are over the medium term anchored at a stable inflation target, as should be the case in the current sample of countries, then the same would apply to nominal long rates. All that is required for there to be an interest rate channel is for monetary policy to have influence on longer maturity rates over the short and medium term.[6]

Equation (2) is estimated for 7 mature small- and medium-size inflation targeting countries, both with and without the error correction terms. The results are given in Tables 3-7. Table 3

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[6] Note that what is being tested here is different from the tests of monetary independence in Obstfeld and Taylor (2004). They look at the ability of countries to set short-term interest rates different from a base country. We do not question that ability in this case. All these countries have floating exchange rates and one has only to look at the short-term interest rate differentials to see that they can set different rates from the US. Frankel, Schmukler and Servén (2002) are also of relevance in this connection. They look at a large sample of developing and industrialised countries during the period 1970-1999 and find in most cases full long-run transmission of international interest rates to domestic rates, even for countries with floating exchange rate regimes. The only exceptions are the very largest developed countries that can thus benefit from independent monetary policy in more than the short run. However, all we need for monetary policy to play a role through the interest rate channel is short- to medium-run monetary independence. Again Frankel et al use short-term rates.

gives summary information on the regression for the 7 countries in the sample. The regressions explain from 40-70% of the changes in domestic long rates, with the error correction terms not adding much explanatory power.

Table 4 gives the results for β_s. For the whole period there is only a strongly significant relationship in the cases of Canada and Switzerland. Splitting the sample gives some indication of a weakening relationship. The main exception is Norway, but these results are probably coloured by the fact that Norway operated a fixed exchange rate policy until the late 1990s.

Table 5 gives the results for the coefficient on the level relationship between domestic and US long rates. It does not give a particularly clear pattern, with some indications of a faster adjustment speed and/or a more significant relationship in some countries (Australia and UK), weakening in others (Canada, Norway and Sweden) and unchanged in two cases (Switzerland and New Zealand).

The cumulative impact of first difference terms only might provide additional indications. Table 6 shows an almost uniform tendency of a weaker cumulative impact of first differences of short-term interest rates on the corresponding change in the long-term interest rates, with it almost disappearing in Australia, Canada and New Zealand. The only exception is Norway, but then it operated exchange rate targeting until the late 1990s.

Table 7 shows that the cumulative impact of the first differences of US long-term rates on the change in the domestic rate is high for the whole sample period but is in most cases lower in the second half of the sample period than in the first half. It might seem to contradict the results of the simple correlation. However, care should be exercised in interpreting these results as they provide only a partial picture.

The results of this data exercise are not conclusive. There is some evidence of a closer relationship between domestic and US long-term rates but at this stage we cannot have confidence that financial integration is the main reason for the results. There is also some evidence of a weakening of the domestic interest rate channel, but it is not dead.

V.   The exchange rate channel

In Section III it was shown that full cross-border financial integration will make the domestic interest rate channel of monetary policy transmission inoperational but leave the exchange rate channel to determine, in the long run, the inflation rate. Depending on the state of real cross-border integration and short-run wage and price rigidities it could also provide some short-run stabilisation through its effect on the traded goods sector.

How well the exchange rate channel will work in this regard will to a significant degree depend on how closely exchange rates are aligned with fundamentals. That is, however, where the concerns seem to arise. Evidence seems to suggest foreign exchange market exhibit excess volatility and that exchange rates diverge for lengthy periods from fundamentals. The existence of carry trade can in some sense be taken as evidence of this as it involves a bet that interest rate differentials are not fully compensated by exchange rate movements, ie that UIP does not hold. The basic problem is that the exchange rate has a dual nature. On the one hand it is a macroeconomic adjustment tool and probably the most important relative price of small- and medium-size open economies, and on the other hand it is an asset price with all the potential problems that can be associated with that. This means that the exchange rate can potentially be both a tool for stabilisation and a source of shocks. What aspect dominates in this regard is ultimately an empirical question and will in specific cases depend on structural aspects of individual countries and might be affected by the constellation of monetary, fiscal and prudential policies.

The data seems to suggest that exchange rates have not become less volatile, and in some cases more volatile in spite of the greater stability of real growth and inflation (Great Moderation). If we look at the specific examples of some of the countries investigated in this paper then it could be mentioned that the coefficient of variation of monthly changes in the real effective exchange rate of Australia and New Zealand was higher in the second half of 1996-2005 than in the first half. (For the development of the volatility of the nominal effective exchange rate of New Zealand see also Graph IV.4).

How much does it matter? The real economic costs of exchange rate volatility have proven hard to quantify. Estimates of the effects on trade and growth are usually much smaller than seem to be implicit in the discussion of many politicians and businessmen.[7] Furthermore, there does not seem to be a significant trade-off between exchange rate volatility and the volatility of important macroeconomic variables.[8] On the other hand there is a literature that indicates that the existence of separate currencies might be a much stronger impediment to trade. Andrew Rose has in several empirical papers found that a membership in a monetary union increases trade with the other members very significantly at the same time as trade diversion seems to be small. Increased trade in turn increases growth.[9] Further evidence is provided by Frankel and Wei (1995), using a gravity model of bilateral trade, who find that membership in the EU increases trade with other EU members by at least 60%.

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[7] See for instance Rogoff (1998). Levine and Carkovic (2001) get similar results in a panel study of the growth equation covering 73 countries over the period 1960-1995.

[8] See Flood and Rose (1995).

[9] See Frankel and Rose (2002).

One possible way to square these results is to say that if you do have your own currency then its volatility within the bounds usually observed does not matter that much. However, if de facto and expected volatility vis-à-vis natural trading partners goes all the way to zero the effects will be strong. It is only at that point that expected exchange rate flexibility goes to zero and associated risk premia in domestic interest rates disappear.

A possible conclusion from all of this is the following: the exchange rate channel will work at the end of the day, although financial globalisation might be making the road bumpier. That might not matter too much, partly because financial globalisation is also providing the instruments (hedging etc) to reduce the cost of exchange rate volatility. However, if we think that the cost of excess volatility in exchange rates is too high for small countries to bear, then they should consider entering a monetary union.

VI.   The cases of New Zealand and Iceland

New Zealand and Iceland are developed countries with open and sophisticated financial systems. It is precisely for this reason that they are interesting experiments on how financial globalisation as such affects small countries. Emerging market countries, however, suffer to a higher degree from structural and institutional vulnerabilities and these can, or can be taken to be, the main sources of observed problems.

There are many striking similarities between Iceland and New Zealand. First, structural: small developed economies; natural resource based and probably more exposed to terms of trade shocks than bigger and more diversified developed countries; high living standards; developed financial systems; and open capital accounts. Second, policy frameworks: inflation targeting; floating exchange rates; and a low frequency of foreign exchange interventions. Third, recent economic developments:

1.   Both countries have in most recent years been out of sync with the rest of the world economy by booming at the same time as the rest of the world was still facing a slack. New Zealand has had a significant positive output gap since 2002 and Iceland developed a very large positive output gap in 2004.

2.   The economic boom has in both countries partly been driven by and has partly sucked in capital inflows. The result has been very big current account deficits (peaking at 9.6% of GDP in 2006 in New Zealand and at nearly 27% of GDP in Iceland in 2006) and a sharp appreciation of the real effective exchange rate.

3.   Monetary policy was in both countries tightened in order to contain the inflationary consequences of the domestic boom, resulting in relatively high real short-term

interest rates and widening the short-term interest rate differential vis-à-vis abroad. That in turn sucked in still more capital and strengthened the exchange rate further, which was of course helpful in terms of containing inflationary pressures. However, both countries faced problems with the pass-through to long rates, either because these were anchored by global arbitrage and because of structural changes and increased competition in housing finance in the case of Iceland. The result was that the interest rate channel of the monetary transmission mechanism got weakened, or for a while even completely blocked.

4.   Booming conditions, optimism and capital inflows fuelled very strong domestic credit and asset price cycles. Real growth of credit to the private sector peaked above 10% in New Zealand in late 2004 and early 2005. The corresponding figures for Iceland are, however, much higher, or above 40% for real credit to the private sector in the second half of 2005 and 30% for real house prices. The housing boom in turn fuelled consumption and domestic demand through wealth effects. Monetary policy was unable to significantly counter the credit and asset price booms, partly because the interest rate channel was blocked and partly because it involved the well known policy dilemmas discussed in the literature on monetary policy and asset prices. A much stronger monetary policy response, if effective, would have appreciated the currency further and might at some stage have come into conflict with the inflation target. However, particularly in the case of Iceland where inflation has been running well above the target, a tighter monetary stance was anyhow, in retrospect, warranted.

5.   Both New Zealand and Iceland have experienced very substantive issuance by foreign entities of local currency bonds. These peaked in the first half of 2006 at around 32% of GDP in New Zealand and just over 25% in Iceland. The issuance of these bonds is part of the arbitrage mechanism of financial globalisation and it would not take place to this magnitude if it were not for the degree of sophistication and openness of the financial markets of these two countries. However, they complicate the conduct of monetary policy.

There are also important differences between Iceland and New Zealand. Iceland is of course much smaller and the issues associated with financial globalisation and size might therefore be more pronounced. Recent macroeconomic imbalances are also much bigger in the case of Iceland. Furthermore, the role of domestic industrial and economic policies in generating those imbalances are much more significant (large scale investments in power generation for new aluminium smelters, increases in loan-to-value ratios in the public housing finance

system and tax cuts). The banking systems are also very different: mostly foreign (Australian) owned in the case of New Zealand, but domestic and expanding abroad in the case of Iceland. Finally, the mini-crisis in Iceland in the first half of 2006 had several elements of sudden stop crises that are well known from emerging market countries, with a run on the currency and the access of the banking system to foreign credit becoming highly restrictive for a while. New Zealand has not experienced anything on that scale.[10]

There is anecdotal evidence that periods of sharp falls in 2006 in currencies like the Icelandic króna, the New Zealand dollar, the Hungarian forint and the Brazilian real, to take examples, were associated with unwinding of carry trades involving these currencies. Changing expectations of global monetary conditions seemed to have played a significant role in this respect. In particular, carry trade involving the New Zealand dollar seems to have come on and off as perceptions of the future pace of monetary tightening in Japan have shifted. That is a prima facia case of the exchange rate of a small country being strongly affected by global financial forces, completely unrelated to its own fundamentals, thus significantly complicating their conduct of macroeconomic policies.

The issuance of local currency bonds by foreign entities has been prominent in the most recent periods in many high yielding markets, but particularly so in Iceland and New Zealand (for excellent descriptions of such bond issuance in New Zealand and Iceland, see respectively Drage, Munro and Sleeman (2005) and Thorvardur Tjörvi Ólafsson (2005). New Zealand has been through two cycles of these bonds since the market took off in the middle of the 1980s, whereas Iceland only became subject to such issuance in 2005 (see Graph IV.9). The issuance of these "offshore" bonds is part of the search for yield phenomena as high interest rate differentials are particularly conducive to their appearance. A good example of that is the recent Japanese appetite for New Zealand uridashi bond. These bonds are not without benefits. They require certain minimum level of capital market development and promote in turn the further deepening and increased liquidity of domestic capital markets. Then they can provide a useful source of hedging for foreign currency external debt. However, they complicate the conduct of monetary policy and induce swings in exchange rates that have as much to do with conditions in the funding countries as anything else.

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[10] Mishkin and Herbertsson (2006), the Central Bank of Iceland (2006) and Sighvatsson (2006) provide

VII. Policy options

The problems and challenges created for macroeconomic management in small but financially developed economies by ongoing financial globalisation can on the basis of the discussion in the sections above be summarised as follows:

- It is becoming more difficult to be out of sync with the rest of the world;

- The interest rate channel of monetary policy becomes weaker and less predictable;

- Speculative capital flows create volatility in the exchange rate and at times significant decoupling from fundamentals;

- Such exchange rate volatility and overburdening of the exchange rate channel can have detrimental effects on the traded goods sector;

- Boom burst cycles in asset prices become amplified, which might have consequences for financial stability.

I will in this short section not provide a lengthy discussion of the potential policy responses to these problems. There is an interesting discussion of those in several countries, not the least in New Zealand and Iceland. Thus, for instance, the authorities in New Zealand have initiated a major review of its macroeconomic and prudential policies (eg see Reserve Bank of New Zealand (2006)). In summary, the potential policy responses might involve the following elements:

- Avoid overburdening monetary policy => bigger role for fiscal policy

- More flexible IT and a longer horizon for price stability?

- Macroprudential approach to financial regulation and supervision and calibration of prudential instruments with a view to minimise pro-cyclicality

- Supplementary instruments? Cf policy discussion in New Zealand

- Review of tax and incentive structures of asset markets; particularly housing

- Influencing market actors through public pronouncements?

- Foreign exchange intervention?

Finally, we could mention policies are in some sense more fundamental:

- ❑ Live with it?

- ❑ Avoid being too much out of sync?

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interesting analyses of the mini-crisis in Iceland.

❑   Monetary union?

VIII. Conclusions

It is a well established theoretical conclusion that full cross-border financial integration will, for small countries at least, mean that monetary policy will be unable to influence domestic real interest rate. It will though still be able to deliver any inflation target through the exchange rate channel.

Financial globalisation is a process and not a state of nature. There are several measures of aspects of financial globalisation that indicate where we are in this process. These indicate that it has still a significant way to go. There is, however, some mixed signals and uncertainty. In a sense that means that we know where we are heading but not where we are!

As expected, there is some evidence of a weakening of the interest rate channel among small- and medium-size mature IT countries. However, it is still far from dead. Weakening of the interest rate channel might be seen as a problem if the exchange rate channel is not well behaved due to excess volatility and decoupling from fundamentals. However, the detrimental effects of exchange rate volatility have proven hard to quantify.

Financial globalisation might increase the relative benefit for small open economies of entering a larger monetary union.

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Annex: Tables

Table 1. Correlation of short term rates with domestic medium and long-term interest rates [1]

	1990-1993	1997-1999	2001-2003	2004-2006
Medium term				
Australia	..	0.6	0.2	0.4
Canada	..	0.4	0.5	0.4
New Zealand	0.9	0.7	0.6	0.5
Norway	0.9	0.6	0.6	0.7
Sweden	0.8	0.6	0.6	..
United Kingdom	0.6	0.5	0.6	0.3
Long term				
Australia	0.5	0.6	0.3	0.4
Canada	0.5	0.2	0.1	0.4
New Zealand	0.7	0.4	0.2	0.4
Norway	0.4	0.2	0.3	0.5
Sweden	0.5	0.3	0.3	..
United Kingdom	0.4	0.4	0.4	0.3

[1] Monthly changes. Sources: National data; BIS estimates.

Table 2. Correlation of domestic medium and long term interest rates with comparable US rates [1]

	1990-1993	1997-1999	2001-2003	2004-2006
Medium term				
Australia	..	0.5	0.6	0.3
Canada	..	0.8	0.7	0.8
New Zealand	0.2	0.6	0.6	0.4
Norway	0.0	-0.1	0.4	0.7
Sweden	-0.3	0.3	0.7	..
United Kingdom	-0.1	0.7	0.8	0.5
Long term				
Australia	0.5	0.8	0.9	0.9
Canada	0.7	0.9	0.9	0.9
New Zealand	0.2	0.8	0.8	0.8
Norway	-0.1	0.4	0.7	0.8
Sweden	-0.1	0.6	0.8	..
United Kingdom	0.2	0.7	0.8	0.7

[1] Monthly changes. Sources: National data; BIS estimates.

Table 3. Summary information on the regressions

	Domestic short term rates	Domestic long-term rates	US long-term rates	R^2	
	Lags[1]	Lags[1]	Lags[1]	Full specification	Without long run relation
Australia	2 + C	1	2 + C	0.68	0.67
Canada	1 + C	1	2 + C	0.71	0.70
New Zealand	1 + C	1	2 + C	0.62	0.60
Norway	1 + C	1	2 + C	0.43	0.41
Sweden	1 + C	1	2 + C	0.42	0.39
Switzerland	2 + C	1	2 + C	0.38	0.35
United Kingdom	2 + C	1	2 + C	0.46	0.45

[1] Number of lags; 'C' indicates the inclusion of contemporaneous observation in the regression

Sources: National data; BIS estimates.

Table 4. Coefficient on the short-long relation (β_s)

	1990-2006	1990-1998	1999-2006
Australia	-0.01(-0.73)	-0.01(-0.46)	0.01(0.39)
Canada	-0.02(-2.07)**	-0.03(-2.58)**	-0.00(-0.45)
New Zealand	-0.02(-1.73)*	-0.04(-2.09)**	0.01(0.95)
Norway	-0.02(-1.72)*	-0.02(-1.06)	-0.02(-2.38)**
Sweden	-0.02(-1.35)	-0.02(-1.14)	-0.07(-1.61)
Switzerland	-0.02(-2.79)***	-0.02(-2.28)**	-0.02(-0.85)
United Kingdom	-0.01(-1.29)	-0.02(-1.28)	0.02(0.82)

Sources: National data; BIS estimates.

Table 5. Coefficient on the long domestic and US relation (β_g)

	1990-2006	1990-1998	1999-2006
Australia	-0.02(-2.20)**	-0.02(-1.36)	-0.04(-1.81)*
Canada	-0.01(-1.02)	-0.05(-1.97)*	-0.01(-0.39)
New Zealand	-0.04(-2.61)***	-0.04(-2.08)**	-0.04(-2.28)**
Norway	-0.04(-2.74)***	-0.06(-1.98)*	-0.01(-0.61)
Sweden	-0.03(-2.68)***	-0.04(-1.91)*	-0.03(-1.24)
Switzerland	-0.04(-2.15)**	-0.04(-1.59)	-0.05(-1.34)
United Kingdom	-0.01(-1.16)	-0.03(-0.99)	-0.06(-1.87)*

Sources: National data; BIS estimates.

Table 6. Cumulative impact of short term interest rates on domestic long-term interest rates [1]

	1990-2006	1990-1998	1999-2006
Australia	0.18	0.16	0.02
Canada	0.14	0.14	0.04
New Zealand	0.25	0.27	-0.01
Norway	0.22	0.22	0.31
Sweden	0.17	0.16	0.16
Switzerland	0.38	0.47	0.25
United Kingdom	0.29	0.30	0.21

[1] Calculated as ratio between the sum of the coefficients of contemporaneous and laggeddomestic short term interest rates and one minus the sum of the coefficents of lagged domestic long term rates. Monthly changes in doemstic long term interest rates were regressed on monthly changes in doemstic short term interest rates, monthly changes in lagged long term domestic interest rates and monthly changes in long-term interest rates of the United States

Sources: National data; BIS estimates.

Table 7. Cumulative impact of US long term interest rates on domestic long-term interest rates [1]

	1990-2006	1990-1998	1999-2006
Australia	0.92	1.04	0.79
Canada	0.89	1.06	0.63
New Zealand	0.72	0.73	0.74
Norway	0.68	0.60	0.76
Sweden	0.84	0.88	0.75
Switzerland	0.83	0.88	0.75
United Kingdom	0.67	0.76	0.49

[1] Calculated as ratio between the sum of the coefficients of contemporaneous and lagged US long term interest rates and one minus the sum of the coeffcents of lagged domestic long term rates. Monthly changes in doemstic long term interest rates were regressed on monthly changes in doemstic short term interest rates, monthly changes in lagged long term domestic interest rates and monthly changes in long-term interest rates of the United States.

Sources: National data; BIS estimates.

Annex: Graphs

I. Some indicators of cross- border financial integration

Graph I.1

Gross external position

Foreign assets plus foreign liabilities, as a percentage of GDP
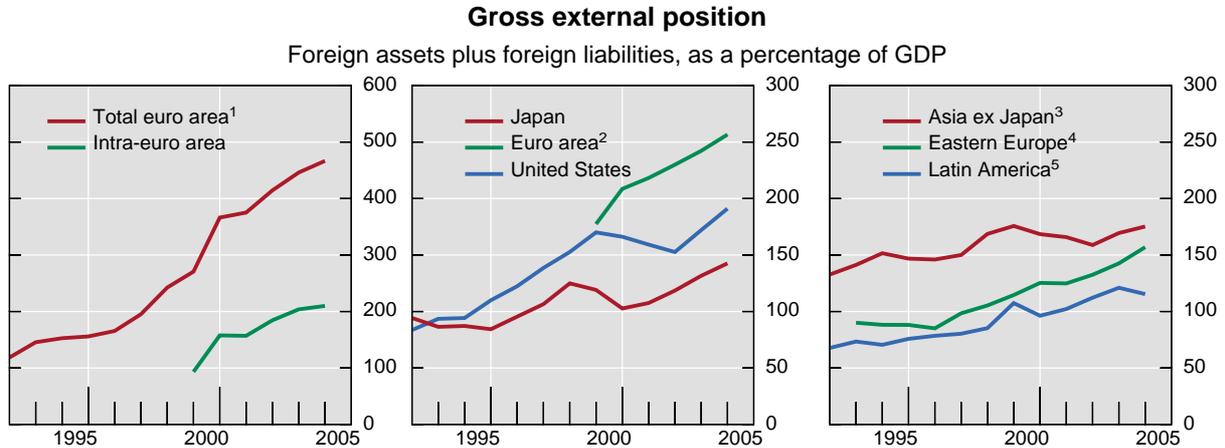
[1] Including intra-euro area assets and liabilities.   [2] Excluding intra-euro area assets and liabilities.   [3] China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan (China) and Thailand.   [4] New EU members, ie Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia.   [5] Argentina, Brazil, Chile, Mexico, Peru and Venezuela.

Sources: P R Lane and G M Milesi-Ferretti, "The external wealth of nations mark II: revised and extended estimates of foreign assets and liabilities 1970–2004", *IMF Working Paper 06/69*, March 2006; IMF.

Graph I.2

Covered interest rate parity

Actual (onshore) and implied (offshore) three-month interest rates on domestic currency, in per cent[1]
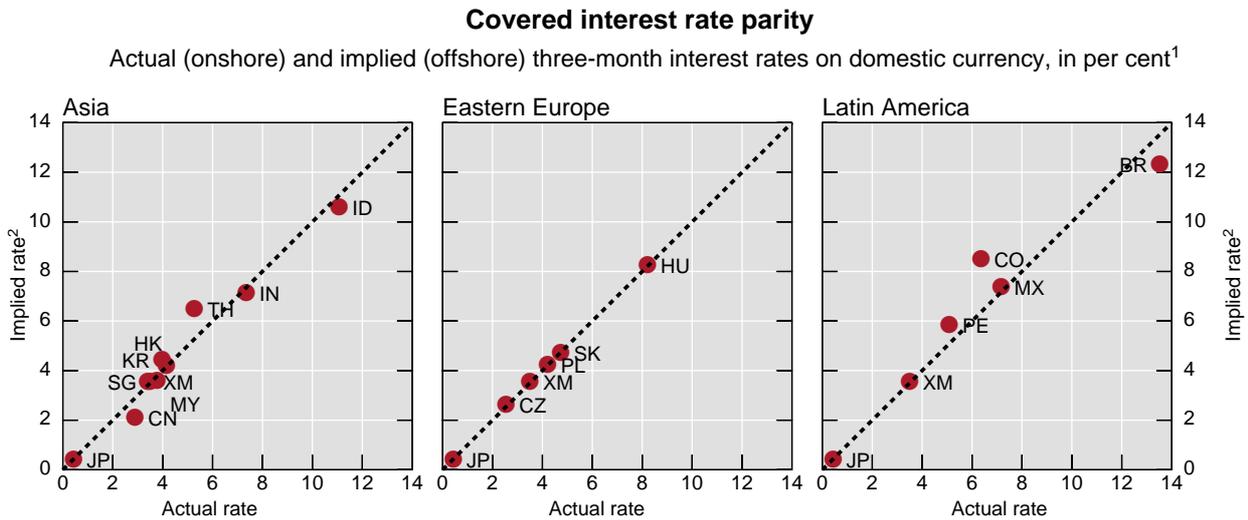
[1] Average in October 2006.   [2] Derived from the theoretical relationship between spot and forward exchange rates against the US dollar, and US dollar LIBOR.

Sources: Bloomberg; BIS calculations.

Graph I.3

Regional bias in foreign investment

As a percentage of investors' total foreign assets, at end-2004

Investment in Asia (ex Japan)[1]

- by Japan
- by rest of the world

| Equities | Bonds[2] | Loans[3] |

Investment in eastern Europe[1]

- by EU 15
- by rest of the world

| Equities | Bonds[2] | Loans[3] |

Investment in Latin America[1]

- by US and Canada
- by rest of the world

| Equities | Bonds[2] | Loans[3] |
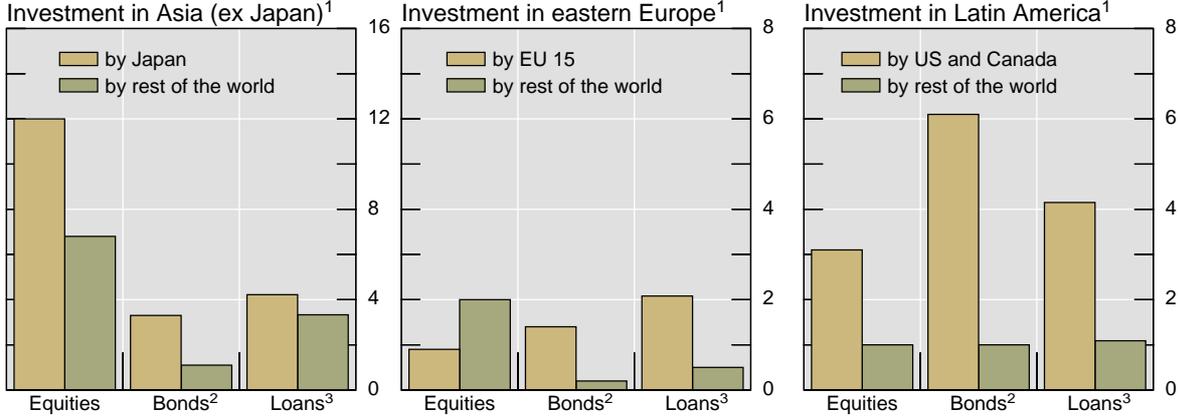
[1] For a list of countries in each region, see Graph 1.   [2] Including money market instruments.   [3] Cross-border consolidated claims of BIS reporting banks, on an ultimate risk basis, based on the nationality of the reporting bank.

Sources: BIS; IMF CPIS.

II. Interest rate correlations among selected mature IT countries

Graph II.1

Domestic long-term and short–term interest rates[1]

Australia
New Zealand
Norway

1.0
0.6
0.2
−0.2
−0.6

1990   1992   1994   1996   1998   2000   2002   2004   2006

[1] Monthly changes using a 36-month moving window.

Sources: National data; BIS estimates.

Graph II.2

Domestic long-term and short–term interest rates[1]

Canada
Sweden
Switzerland
United Kingdom

1.0
0.6
0.2
−0.2
−0.6

1990   1992   1994   1996   1998   2000   2002   2004   2006

[1] Monthly changes using a 36-month moving window.

Sources: National data; BIS estimates.

Graph II.3

Domestic medium-term and short–term interest rates[1]

- Australia
- New Zealand
- Norway

1.0
0.6
0.2
−0.2
−0.6

1990   1992   1994   1996   1998   2000   2002   2004   2006

[1] Monthly changes using a 36-month moving window.

Sources: National data; BIS estimates.

Graph II.4

Domestic medium-term and short–term interest rates[1]

- Canada
- Sweden
- United Kingdom

1.0
0.6
0.2
−0.2
−0.6

1990   1992   1994   1996   1998   2000   2002   2004   2006

[1] Monthly changes using a 36-month moving window.

Sources: National data; BIS estimates.

Graph II.5

Domestic long-term and US long-term interest rates[1]

Australia
New Zealand
Norway

[1] Monthly changes using a 36-month moving window.

Sources: National data; BIS estimates.

Graph II.6

Domestic long-term and US long-term interest rates[1]

Canada
Sweden
Switzerland
United Kingdom

[1] Monthly changes using a 36-month moving window.

Sources: National data; BIS estimates.

Graph II.7

Domestic medium-term and US medium-term interest rates[1]

- Australia
- New Zealand
- Norway

[1] Monthly changes using a 36-month moving window.

Sources: National data; BIS estimates.

Graph II.8

Domestic medium-term and US medium-term interest rates[1]

- Canada
- Sweden
- United Kingdom

[1] Monthly changes using a 36-month moving window.

Sources: National data; BIS estimates.

III.   Interest rate correlations among selected emerging IT countries

Graph III.1

Correlation of domestic short-term interest rates with domestic medium-term interest rates[1]

[1] Monthly changes using a 24-month moving window.

Sources: National data; BIS estimates.

Graph III.2

Correlation of domestic long-term interest rates with US rates[1]

[1] Monthly changes using a 24-month moving window.

Sources: National data; BIS estimates.
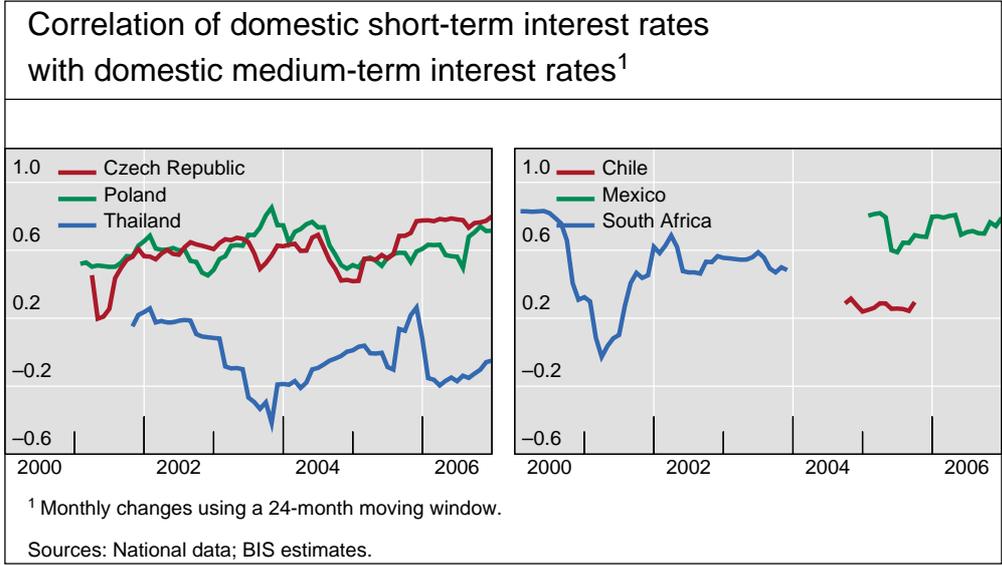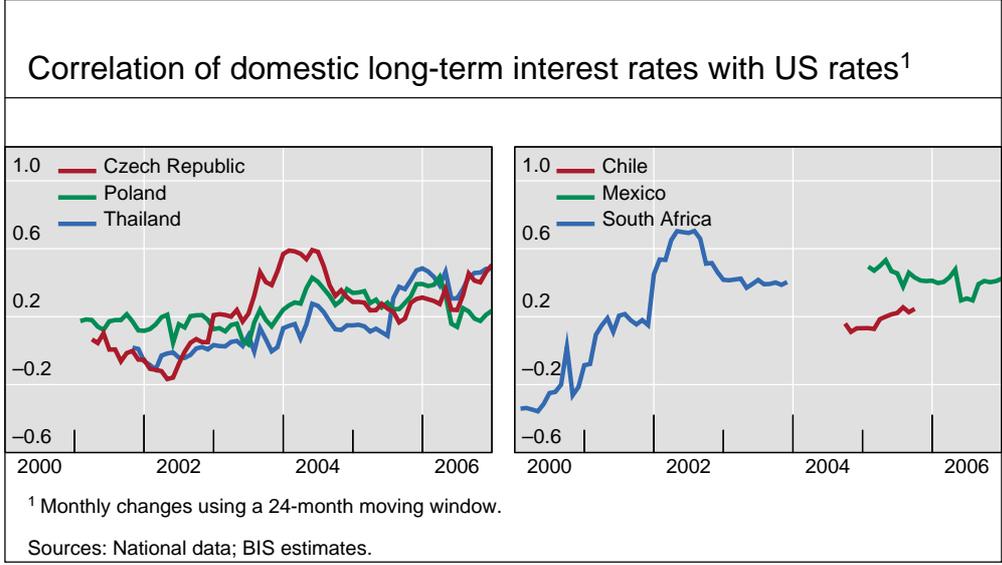
IV. Economic developments in New Zealand and Iceland

Graph IV.1

New Zealand: relative cyclical position and interest rate differential
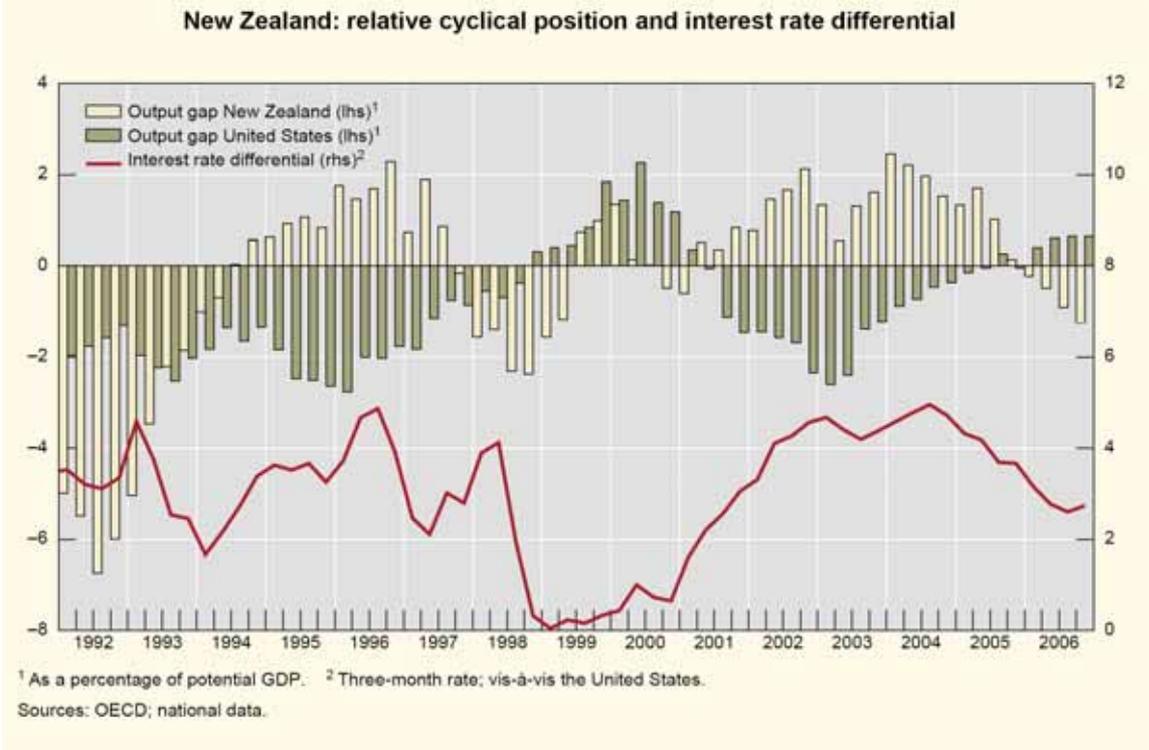
NZ has been out of sync with the ROW during the last 5 years => a significant positive short term interest rate differential emerged

Graph IV.2

New Zealand: capital flows and interest rate differential
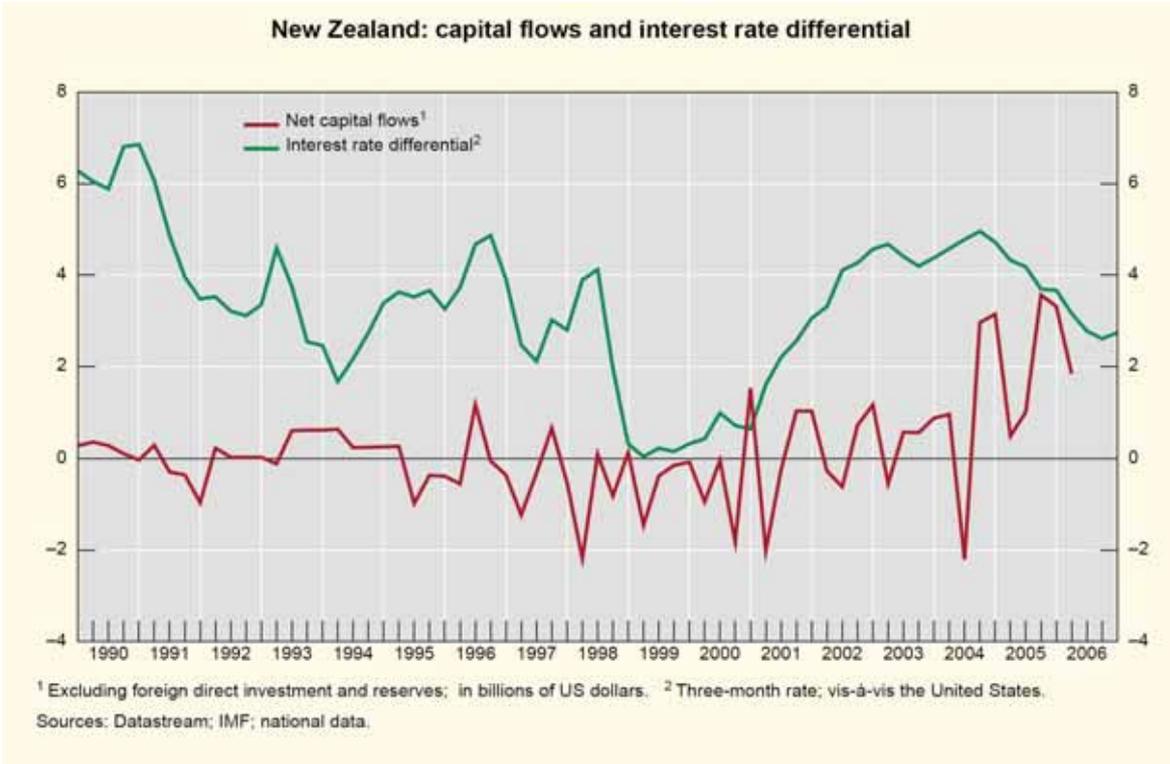
The positive interest rate differential has sucked in capital
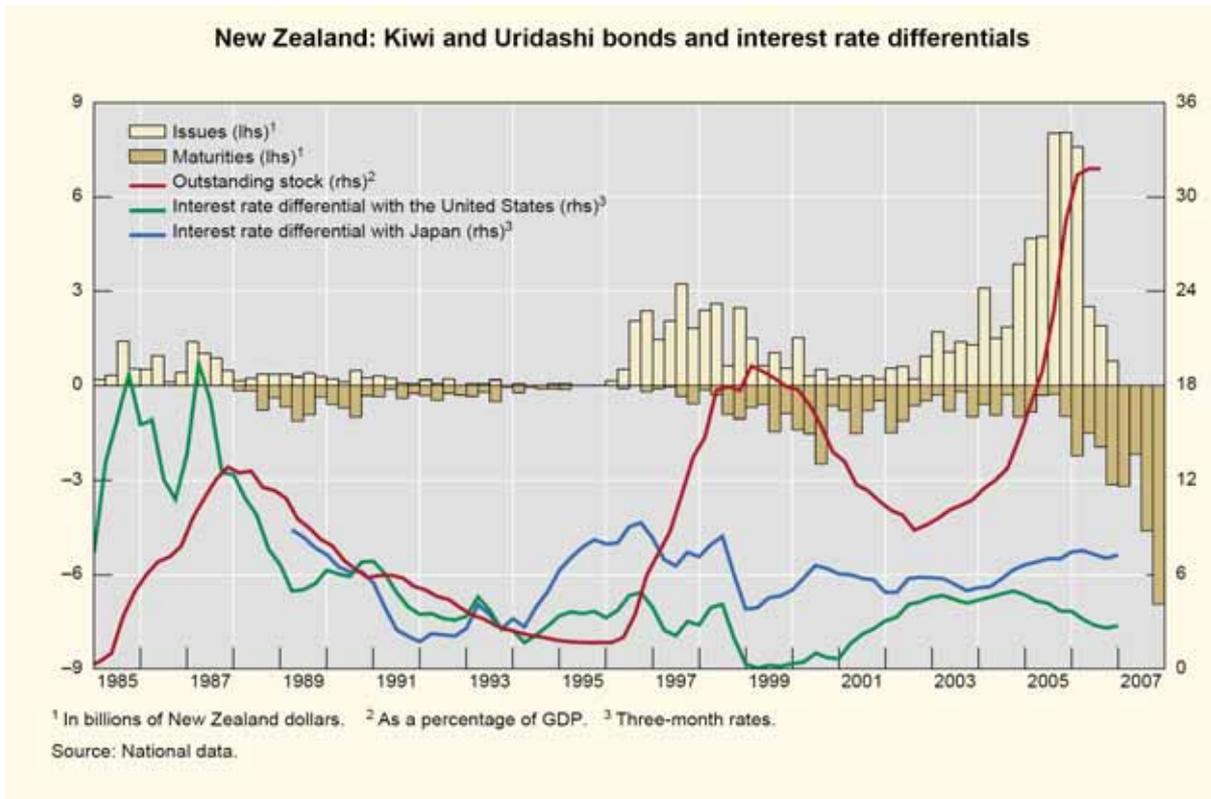
Graph IV.3

New Zealand: Kiwi and Uridashi bonds and interest rate differentials

Issues (lhs)[1]
Maturities (lhs)[1]
Outstanding stock (rhs)[2]
Interest rate differential with the United States (rhs)[3]
Interest rate differential with Japan (rhs)[3]

[1] In billions of New Zealand dollars. [2] As a percentage of GDP. [3] Three-month rates.
Source: National data.

The issuance NZ dollar currency bonds by foreign entities has soared in these conditions

Graph IV.4

New Zealand: real effective exchange rate developments

Level (lhs)[1]
Volatility (rhs)[2]

[1] Index; 1996 - 2006 = 100. [2] Measured as the standard deviation of monthly changes over an uncentred moving window of 36 months.
Sources: IMF; BIS.
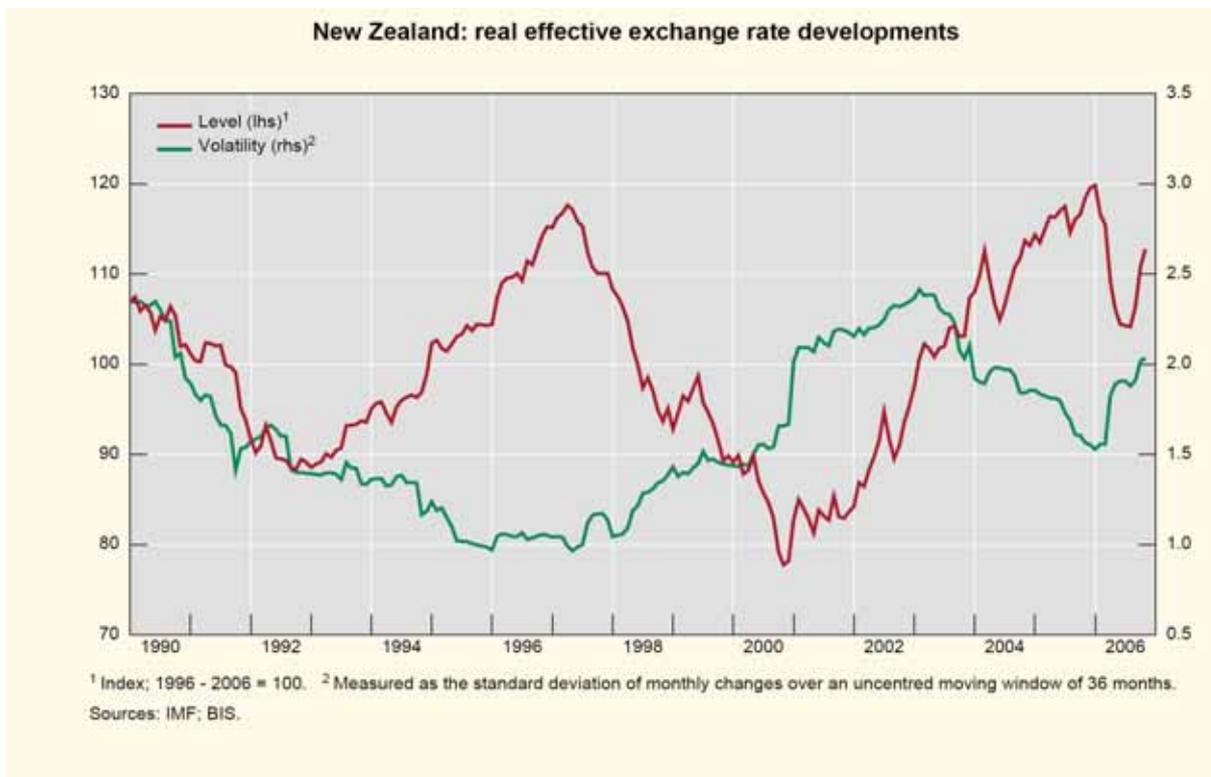
Booming conditions and capital inflows strongly appreciated the real exchange rate

Graph IV.5

New Zealand: credit and house prices

- Output gap New Zealand (lhs)[1]
- Real credit growth to the private sector(lhs)[2]
- Real house prices (rhs)[3]

[1] As a percentage of potential GDP.   [2] In per cent.   [3] 1990–2005 = 100.

Sources: OECD; national data.
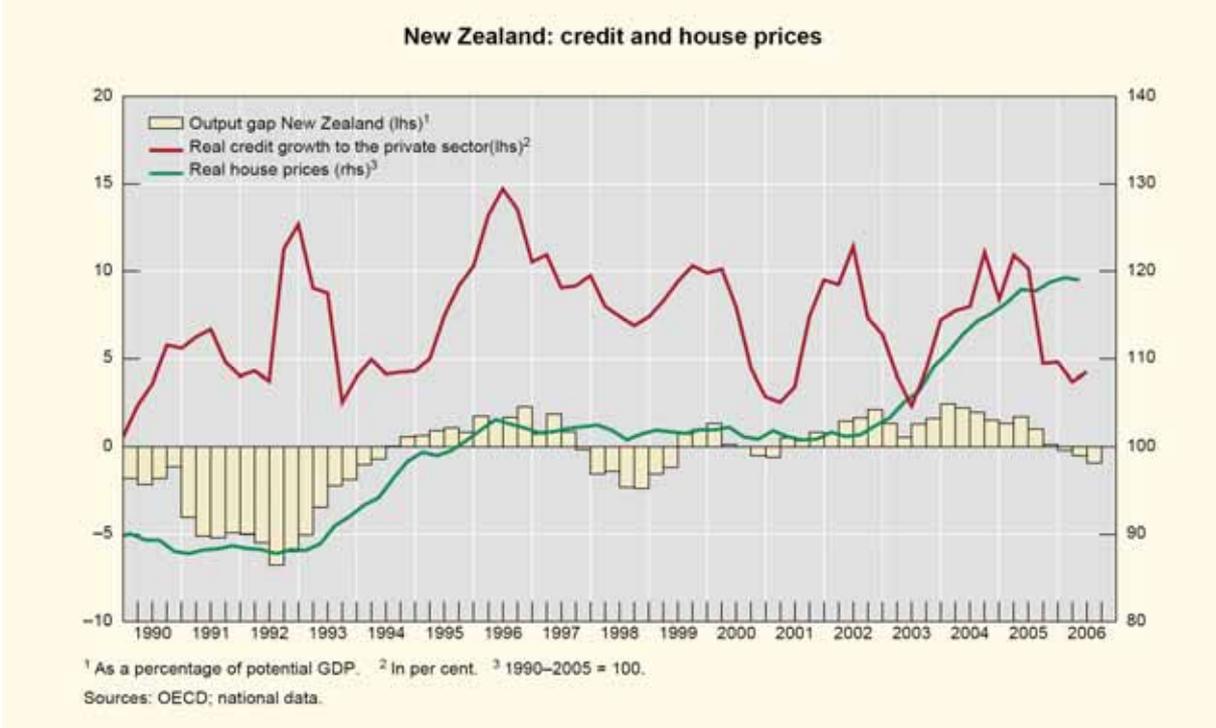
A strong credit and housing boom developed, partly as a result of these macroeconomic conditions

Graph IV.6

New Zealand: policy and market rates[1]

- Policy rate
- Short–term rate[2]
- Long–term rate[3]

[1] In per cent.   [2] Three–month rate.   [3] Ten–year rate.

Source: national data.
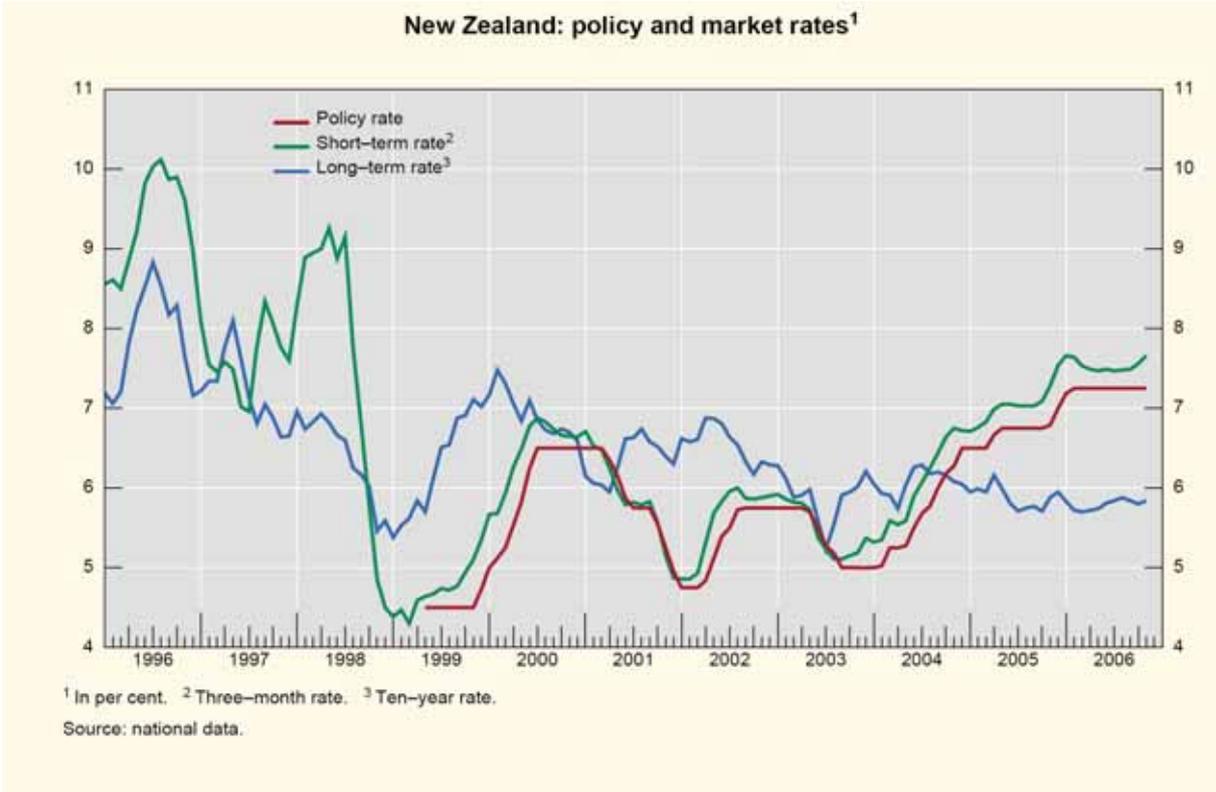
Policy rates were increased but long-term rates did not react

Graph IV.7

Interest rates: New Zealand and the United States[1]

- New Zealand official cash rate
- New Zealand three-year government bond yield
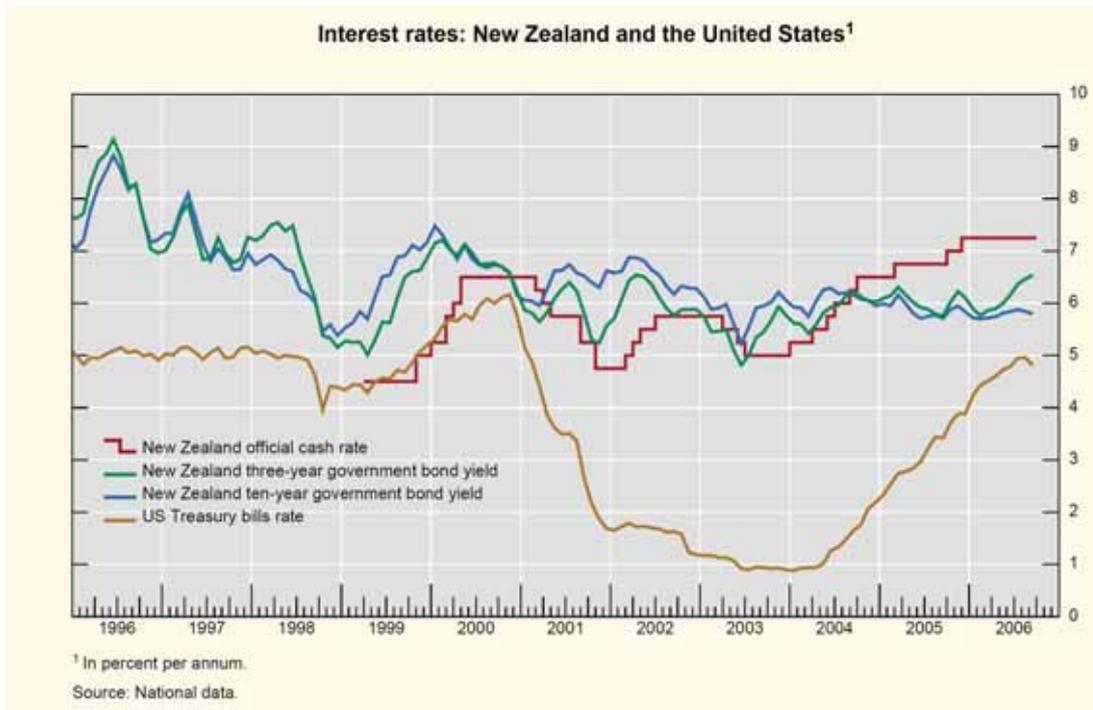- New Zealand ten-year government bond yield
- US Treasury bills rate

[1] In percent per annum.
Source: National data.

Medium-term rates did not do much either

Graph IV.8

Correlation of domestic long-term interest rates with US rates[1]

Long-term interest rates[2]

- Australia
- New Zealand
- Norway

[1] Monthly changes using a 36-month moving window.   [2] Ten-year government bond yields.
Source: National data.
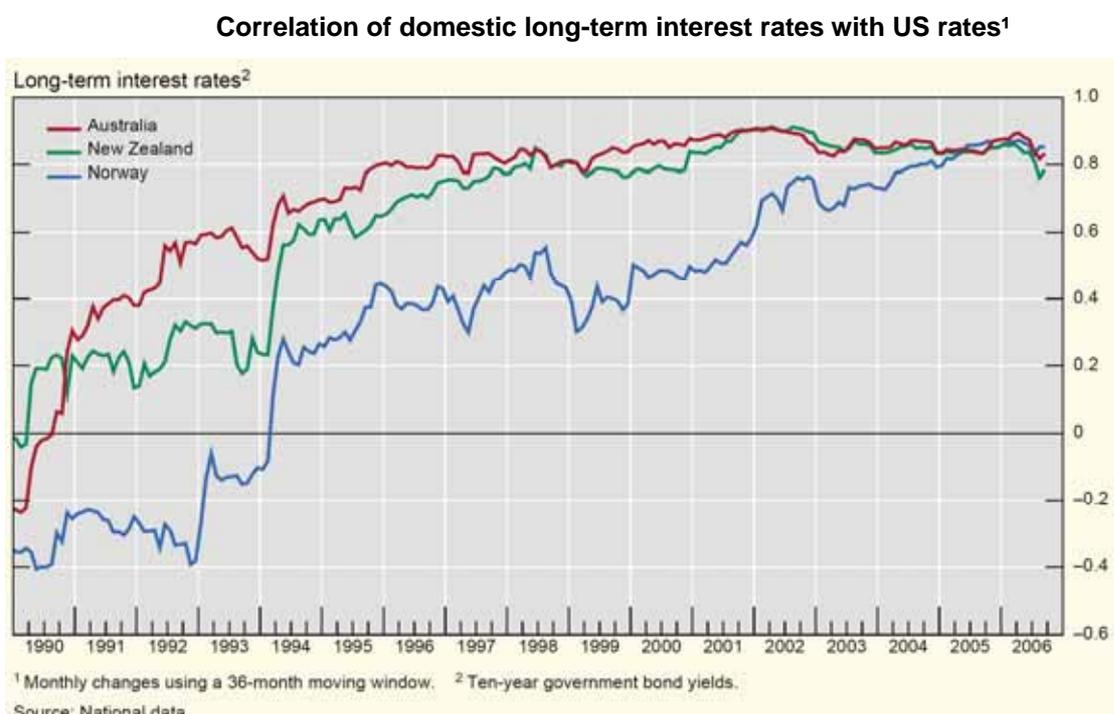
Because long-term and medium-term rates have become much more strongly correlated with global rates

Graph IV.9

Macroeconomic developments in Iceland
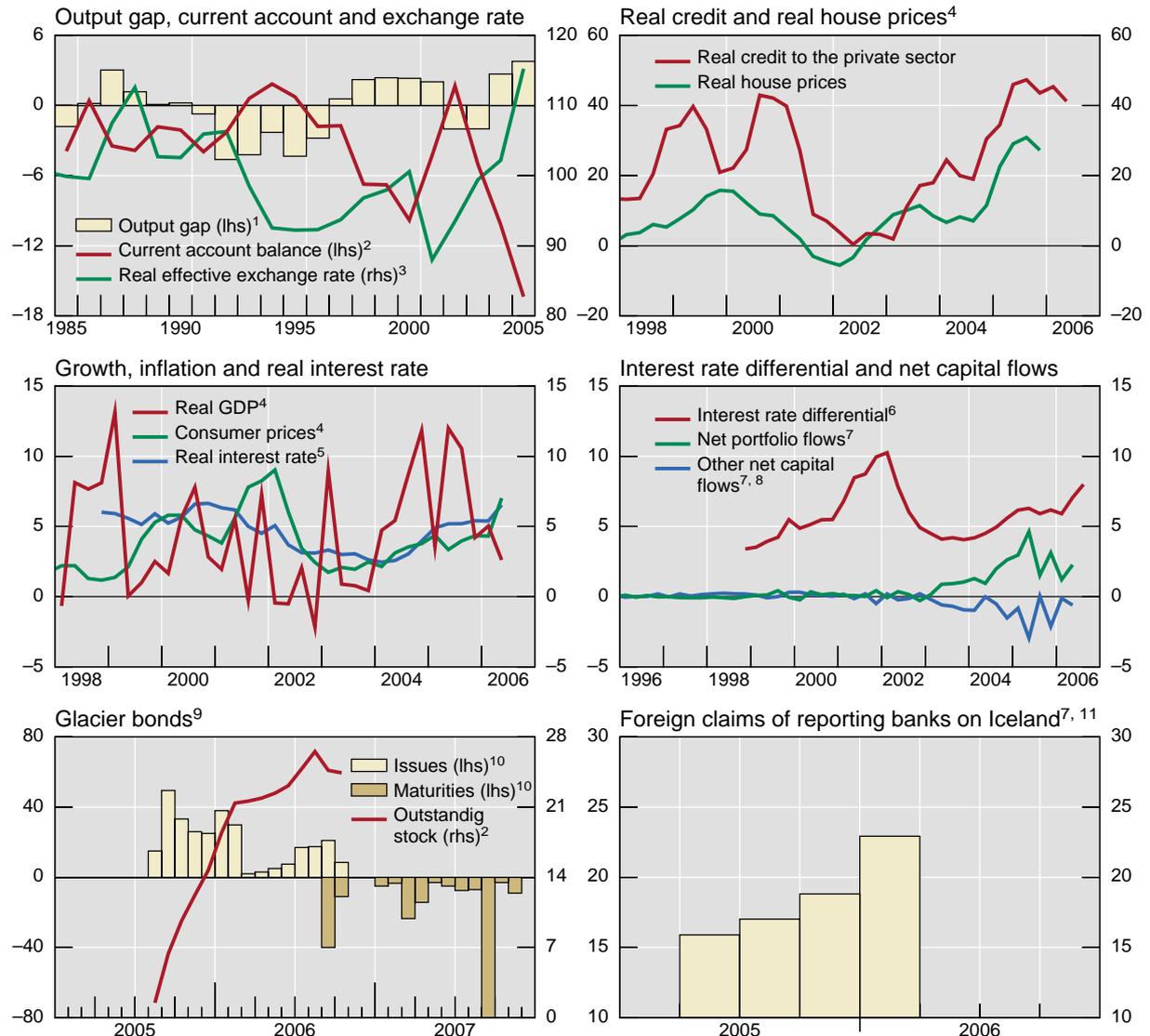
Output gap, current account and exchange rate

Output gap (lhs)[1]
Current account balance (lhs)[2]
Real effective exchange rate (rhs)[3]

Real credit and real house prices[4]

Real credit to the private sector
Real house prices

Growth, inflation and real interest rate

Real GDP[4]
Consumer prices[4]
Real interest rate[5]

Interest rate differential and net capital flows

Interest rate differential[6]
Net portfolio flows[7]
Other net capital flows[7,8]

Glacier bonds[9]

Issues (lhs)[10]
Maturities (lhs)[10]
Outstandig stock (rhs)[2]

Foreign claims of reporting banks on Iceland[7,11]

[1] As a percentage of potential GDP.   [2] As a percentage of GDP.   [3] In terms of relative consumer prices; 1985–2005 = 100.   [4] Changes over 4 quarters.   [5] Three-month interest rate minus centred 5-quarter moving average of year-on-year inflation.   [6] Three-month rate; vis-à-vis the United States.   [7] In billions of US dollars.   [8] Excluding foreign direct investment and reserves.   [9] Króna-denominated eurobond issues.   [10] In billions of krónur.   [11] Consolidated; ultimate risk basis.

Sources: IMF; Datastream; national data; BIS.