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Jan Marc Berk
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Corresponding author: Robert-Paul Berben
e-mail: r.p.berben@dnb.nl

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Abstract

This study is part of the Kobe Research Project. It documents the exchange rate policies and the financial liberalisation processes of both the Netherlands and Thailand over the past decades. In view of these experiences and of the academic literature, the study seeks to identify requirements for successful currency regimes, in particular requirements for exchange rate stability. Furthermore, it provides some general lessons with respect to regional monetary co-operation in Asia.

Key words: regional co-operation, Asia

JEL: F33

Requirements for successful currency regimes: the Dutch and Thai experiences

Robert-Paul Berben [a,*] **& Jan Marc Berk** [a,b]
[a] *De Nederlandsche Bank, the Netherlands*
[b] *Free University Amsterdam and Tinbergen Institute*

Ekniti Nitithanprapas & Kanit Sangsuphan
Fiscal Policy Research Institute, Ministry of Finance, Thailand

Pisit Puapan & Piyaporn Sodsriwiboon
Fiscal Policy Office, Ministry of Finance, Thailand

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* Monetary and Economic Policy Department, De Nederlandsche Bank, P.O. Box 98, 1000 AB Amsterdam, The Netherlands. Tel: +31-20-5243036 Fax: +31-20-5242506
email: r.p.berben@dnb.nl.

Executive Summary

Structure of the paper

1. European economies have a long history of regional integration and monetary and exchange rate co-operation. The Kobe Research Project (KRP), to which the present study contributes, seeks to draw lessons from these experiences with a view to fostering regional monetary co-operation in Asia.

2. As part of the KRP, the study at hand tries to identify requirements for successful currency regimes, in particular requirements for exchange rate stability. Furthermore, it aims at providing some general lessons that can be learned from the Dutch experience with respect to regional monetary co-operation in Asia.

3. The study is organised as follows. First, it reviews the academic literature on currency regimes. This review brings to the fore that for maintaining exchange rate stability, the economies involved have to be converged sufficiently, so that large asymmetric shocks are relatively unlikely to occur. In addition, it is argued that a sound financial sector is vital for sustainable exchange rate stability. Finally, increased monetary co-operation implies, inter alia, the free movement of capital among the countries involved, which is at odds with capital controls.

4. In view of these theoretical insights, the study discusses both the Dutch and Thai experiences regarding exchange rate policy, capital controls, and developments in the banking sector.

Policy recommendations

Requirements for exchange rate stability

5. Both the Dutch and Thai experiences demonstrate that for monetary authorities to achieve exchange rate stability, they must have a credible preference for domestic price stability. Other participants in the policy arena should be convinced that the monetary authorities will direct their policy instrument, the interest rate, solely at maintaining exchange rate stability. The Dutch case shows that if the monetary

authorities' commitment to price stability is indeed credible, it works as a disciplining device, in that it forces the government and the social partners to follow stability-oriented policies.

6. Moreover, stability-oriented domestic policies, such as fiscal consolidation, moderate wage developments, and measures to improve the functioning of the labour market, are required, as the interest rate is to be used to maintain exchange rate stability. The Thai case demonstrates that if domestic stability comes under pressure, exchange rate stability may be jeopardised. In the 1990s, the interest rate differential between Thailand and the US widened, and capital inflows surged. This influx of capital combined with weak domestic fundamentals of the Thai economy, such as a weak banking sector and high debt to equity ratios of Thai companies, constituted a considerable asymmetric shock, rendering the Thai exchange rate peg to the US dollar unsustainable.

7. Flexible labour and product markets make a country well equipped for absorbing asymmetric shocks, reducing the need for significant exchange rate changes, and are thus instrumental in maintaining exchange rate stability.

8. The Thai experience illustrates that a strong and competitive financial sector is pivotal in order to cope with external shocks, without endangering exchange rate stability. Strenghtening the quality of the regulatory/supervisory frameworks will be instrumental in this respect.

9. Furthermore, the financial crisis in Thailand of 1997 illustrates the importance of the management of the process of capital account liberalisation. Simultaneous liberalisation of the capital account and the domestic financial system is not without risks. Instead, this process should be introduced step-by-step, based on the developments of fundamentals. The rapid liberalisation of financial markets and of the capital account, without supporting domestic policies aimed at strenghtening the economic structure, contributed to the currency crisis in 1997.

10. Information regarding economic data and policy preferences should be amply and readily available to the general public in order to prevent financial markets from overreacting. For example, financial markets were taken by surprise when the Dutch guilder depreciated vis-à-vis the German mark in 1983, and started to doubt the credibility of the guilder-mark currency peg. The Dutch authorities were subsequently punished for their lack of transparency by having to accept Dutch interest rates well above the German interest rate until the early 1990s in order to maintain the peg.

The Asian crisis is another case in point, where financial markets were not able to properly discriminate between countries in the region, and the Thai currency crisis elicited speculative attacks on a number of Asian currencies, which could only in part be attributed to unsound economic fundamentals.

Lessons regarding monetary co-operation in Asia

11. The Dutch experience indicates that a process towards increased regional monetary co-operation is a long one. Moreover, a monetary union must be considered to be the crowning step of a process of economic integration.

12. Enhancing the institutional underpinnings of regional co-operation and regional economic integration are mutually reinforcing processes. On the one hand, the present paper provides empirical evidence indicating that economic integration between the Netherlands and Germany actually increased *after* the start of the European Monetary System (EMS). On the other hand, the EMS was established, among other things, *because* of strong trade linkages between European countries and the conviction that exchange rate uncertainty would be detrimental in this respect.

13. On the road to increased monetary co-operation, exchange rate flexibility may be instrumental. Especially when prospective member countries have (strongly) differing levels of economic development, changes in the real and/or nominal exchange rate will be inevitable in the process of economic integration. Furthermore, exchange rate flexibility may be needed when policy preferences between countries have not converged sufficiently. For example, when Dutch policy makers in the 1970s gave greater priority to domestic goals, and did not strictly adhere to the anti-inflation policy of Germany, the guilder underwent a gradual depreciation vis-à-vis the mark.

14. Regional economic integration entails freedom of movement of both products and product factors, that is labour and capital. By implication, capital controls have to be removed at some point in time. This does not detract from the fact that – as illustrated by the Dutch experiences – capital controls may be effective in shielding the economy for a limited amount of time. This span of time, however, should be used wisely; that is, it should be used to increase the ability of the domestic economy to cope with the vigour of the global economy, including its financial markets. Flexibility of labour and product markets should be enhanced, improving the competitive position of the economy. The reinstatement of a number of capital restrictions in Thailand, following the Asian crisis, is a case in point. The controls were combined with measures aimed at a restructuring and strengthening of the domestic banking sector. Restrictions therefore are not considered to be an end in themselves.

1 Introduction

Exchanges rates of emerging markets have been at the center of the policy debate over the past decade. A particular controversy is the choice of appropriate currency regimes for East Asian countries. In the aftermath of the Asian crisis many East Asian countries were forced to float their currencies[1], and the question was raised whether these countries should peg their exchange rates (again) to restore price and output stability. A clear-cut answer to this question is not available yet.[2] A popular way to look at this issue is the so-called bi-polar view, which states that in a world with integrated financial markets there are basically two options regarding currency regimes: either a free float, or a strong peg. Glick (2000) argues that as the openness of this region to global trade and finance continues to grow, East Asian countries have little choice but to allow more exchange rate flexibility. Similarly, Larraín and Velasco (2001) make a strong case for floating exchange rates in emerging countries. Fisher (2001) argues that the intent of the bi-polar view is not to rule out everything but the two corner solutions, but rather to pronounce as unsustainable a variety of soft pegging exchange rate arrangements, which can be interpreted as intermediate cases between both poles. In contrast, Branson (2001) strongly advocates 'intermediate solutions' for emerging countries, aimed at stabilising the real effective exchange rate and relying on domestic policy to stabilise the economy. Rajan (2002) contends that the currency problems in East Asia had more to do with the nature of the peg, i.e. a rigid peg vis-à-vis the US dollar, than with the policy of pegging itself. Therefore, he argues in favour of a flexible peg vis-à-vis a diversified composite basket of currencies.

A policy issue related to the choice of currency regime that attracted substantial public attention after the Asian crisis as well, is the idea of wider regional financial co-operation in Asia. A number of initiatives of finanical co-operation is underway, such as the ASEAN+3 Economic Review and Policy Dialogue Process and the formation of a network of bilateral swap arrangements under the Chiang Mai Initiative (see Eichengreen (2001a) and Kuroda and Kawai (2002) for further details).

Having in mind, inter alia, both policy issues referred to above, at the third ASEM Finance Ministers' Meeting in January 2001, which was held in Kobe, Japan, the question was raised whether the process of increasing monetary co-operation in Europe may hold lessons for Asia. This challenging, but comprehensive, question

was then divided into a number of topics, and European and Asian institutions were invited to jointly work on each of them, as part of what has become known as the 'Kobe Research Project'. The present study is a contribution to the Kobe Research Project.

The present study – a joint effort by the Dutch Central Bank and the Ministry of Finance of Thailand – aims at contributing to both policy debates mentioned above in the following way. First, it tries to identify requirements for successful currency regimes, in particular requirements for exchange rate stability. In doing so, the paper combines the relevant academic literature with Dutch and Thai experiences on exchange rate policy. Both countries successfully geared monetary policy to maintaining exchange rate stability (vis-à-vis an anchor currency) for some time, and their experiences may thus give important insights into the prerequisites for attaining exchange rate stability. It is well-known, however, that the latter country faced a currency crisis in the late 1990s, and this unfortunate event will provide further useful information regarding the issue of maintaining exchange rate stability. Secondly, the study tries to provide some general lessons with respect to regional economic and monetary integration that Asian countries in general and Thailand in particular may learn from the Dutch experience. It has to be clear from the very outset of this study, however, that because of the large differences between the Netherlands (Europe) and Thailand (Asia), drawing any lessons should be done with great caution.[3] The set-up of the remainder of this paper is as follows.

In the next section, we provide a concise survey of the academic literature on currency regimes, with a view to identifying a number of *theoretical* requirements for particular currency regimes to be successful. The adjective 'successful' will have the meaning of being both feasible and conducive to the overall performance of the economy. In discussing these requirements, we focus on currency pegs on the one hand, and floating exchange rates on the other hand.

These theoretical concepts are then used to structure our discussion of the Dutch and Thai exchange rate policies, and on the policy implications of the former for the process of increasing regional co-operation in Asia. The set-up of the case-studies is elaborated on in Section 3, followed by a presentation of the Dutch and Thai experiences in Section 4 and 5, respectively. These case-studies will provide us with insights regarding the *empirical* relevance of the theoretical concepts introduced in Section 2. Next, in the sixth section, we will draw on both the theoretical and the empirical evidence to assess the requirements for a successful currency regime, and to see whether the Dutch road to monetary union holds any lessons for regional co-operation in Asia. Last, Appendices A and B provide additional details on the econometric techniques used in the Dutch case-study, while in Appendix C some further information on the restructuring of the Thai financial sector can be found.

2 Requirements for currency regimes: a review of the literature

In this section, we examine the academic literature in order to identify factors that are potentially relevant to the success of particular currency regimes. We review the pros and cons of various currency regimes, and assess the way these pros and cons depend on a number of underlying factors, which may be both related to macroeconomic policy or the structure of the economy. These factors are called 'requirements' for a currency regime.[4]

It goes without saying that the trade-off between the pros and cons of various currency regimes, and the factors that may alter this trade-off vary across countries and in time. This implies that, a priori, no single currency regime is right for all countries or at all times, cf. Frankel (1999). For instance, Frankel and Rose (1998) stress that the well-known criteria for countries to form an optimal currency area are endogenous: countries that enter a currency union will gradually increase the linkages with the remaining countries that constitute the currency union.

In reality, there is a large number of different currency regimes that fill the continuum between a pure float on the one end, and fixed systems on the other. However, a discussion of all possible regimes is beyond the scope of the present paper. Here, we focus on two regimes, a floating exchange rate and a currency peg. Recent accounts of other currency regimes can be found in, among others, Edwards and Savastano (1999) and Frankel (1999). The reason for concentrating on floating exchange rates and currency pegs is that these two types of regimes play a leading part in the exchange rate policies of the Netherlands and Thailand, respectively; the exchange rate policies of these particular countries will be the topic of the next sections.

Fixed or floating, does this really matter?[5] Theoretically, it can be shown that in a frictionless world with perfect foresight, all exchange rate regimes are equally efficient and deliver the same welfare levels (see Helpman (1981) and Helpman and Razin (1982), among others). So, in a perfect world, currency regimes do not matter. Unfortunately, this result breaks down as soon as frictions, like price rigidities and incomplete markets, are introduced. Recent advances studying the performance of different currency regimes in the presence of a limited number of frictions include Bacchetta and Van Wincoop (2000) and Devereux and Engel (2001).[6] A welfare analysis of the pros and cons of currency regimes including all relevant real-world frictions is not available yet, and will probably never become available. Therefore, we present mainly the 'traditional' pros and cons of fixed and floating currency regimes, including the factors influencing the trade-off between them.

2.1 Review of 'pros' and 'cons'

Credibility versus flexibility

An important distinction between fixed and flexible exchange rates that is emphasized in the literature is that at the macro economic level the former grants a higher degree of credibility to monetary policy making, while the latter enables the monetary authority to pursue an independent policy, providing it with flexibility to accomodate domestic and foreign shocks. This flexibility, then, usually comes at the cost of some loss of credibility, associated with a higher inflation rate. In addition, flexible exchange rates themselves provide an adjustment mechanism to shocks as well. Furthermore, at the micro economic level, fixed exchange rates are associated with lower exchange rate volatility, which may stimulate cross-border trade and investment.[7]

The structure of the economy: optimal currency area criteria and more

Whether a particular currency regime 'suits' a country obviously depends in part on the structure of its economy. Variables describing the structure of the economy may thus be considered requirements as defined above. In this respect, the academic literature has identified a number of relevant variables.

First, a prerequisite for adopting a fixed exchange rate is that the adopting country should have broadly similar preferences as the country from which it aims to import credibility, cf. Hughes Hallet and Weymark (2001). For example, the preferred trade-off between price stability and output growth, by both policy makers and the general public in both countries should be approximately equal. Otherwise, the currency peg may result in severe welfare losses for society as a whole.

Second, if exchange rate pass-through is only moderate and the associated expenditure-switching role of the nominal exchange rate limited (in other words, net-exports hardly react to changes in the exchange rate)[8], the loss in terms of flexibility by adopting a fixed exchange rate is diminished, cf. Devereux and Engel (2001).[9] This means that if a flexible nominal exchange rate did not do a very good job in cushioning the economy in the first place, fixing it is not likely to significantly lower welfare. On the other hand, if exchange rate pass-through is high, *exogenous* exchange rate movements may seriously destabilise the domestic economy. Given a countries' degree of exchange rate pass-through, the desirability of fixed exchange rates hence critically depends on the source of shocks moving the exchange rate.[10] In Section 4, we will therefore investigate the (changing) degree of exchange rate pass-through in the Netherlands.

Third, we already noted that the costs of adopting a currency peg vary positively with the costs of losing both domestic monetary policy and the nominal exchange

rate as tools for 'absorbing' shocks, especially asymmetric shocks. It then follows that, if the extent to which asymmetric shocks occur diminishes or if there are other prices or quantities that are able to cushion shocks, the need for exchange rate flexibility and independent monetary policy decreases. The occurence of asymmetric shocks may become less frequent if either the volume of bilateral trade grows (which effectively transforms any asymmetric shock into a symmetric shock) or business cycles of the countries concerned become increasingly synchronised. On the other hand, if a country is hit by an asymmetric shock and product markets and especially the labour market are flexible enough to counteract this shock, an independent monetary policy and floating exchange rate become in fact redundant, and loosing both of them will not decrease welfare. These are essentially the well-known Optimal Currency Area criteria. Frankel and Rose (1998) argue that these criteria are endogenous, meaning that countries that link their currencies tend to increase their economic inter-relationships, and in that way lock-in the benefits of maintaining stable exchange rates. As a result, the costs of adopting a currency peg may change over time.

Policy discipline

As has been mentioned earlier, the main advantage of a currency peg is that it provides a nominal anchor to monetary policy[11], and hence solves the time-inconsistency problem. This implies that a currency peg is particularly appealing to countries that are unable to pursue alternative monetary strategies that may provide a nominal anchor, such as monetary targeting or inflation targeting. The inability to pursue alternative monetary strategies may originate for instance from a lack of independence of the central bank or because political pressures on the central bank lead to an inflation bias in monetary policy (see Mishkin (1999) for recent survey of different monetary policy regimes).[12,13] However, for a currency peg to be credible and lasting, the monetary authorities have to implement the exchange rate targeting strategy in a highly consistent way, taking short-term disadvantages for granted. For instance, if the monetary authorities lower the nominal exchange rate in case of an economic downturn in order to stimulate the economy, they will thus allow the exchange rate to depreciate and inflation to pick up, and as a consequence inflation expectations of the general public will rise immediately, resulting in a loss of credibility. Furthermore, if financial markets think that the monetary authorities are not willing to take short-term disadvantages for granted, they will 'test' the currency peg, and by means of heavy speculation force the monetary authorities to abandon the currency peg. Alternatively, a requirement for a flexible currency regime to be successful is that there exists a nominal anchor different from the exchange rate.[14]

An advantage of a currency peg that is often mentioned is its alleged ability to

induce fiscal discipline. The story is that under fixed exchange rates lax fiscal policies will eventually lead to a depletion of reserves and hence to an end to the peg. Canzoneri et al. (2001) argue the other way around, and show that a goverment has to follow a Ricardian fiscal policy, that is a policy that guarantees fiscal solvency for any sequence of prices or exchange rates, for a currency peg to be viable.[15] In other words, sound fiscal policy is a requirement for maintaining a currency peg. However, this argument has been challenged by Tornell and Velasco (2000). They argue that flexible exchange rates reflect the excesses of fiscal policy faster and in a more transparant way than fixed exchange rates. This means that under flexible exchange rates, the excesses of fiscal policy are paid immediatly, while under fixed exchange rates imbalances are built up gradually until foreign reserves have been exhausted and the currency has to depreciate sharply. Assuming that fiscal authorities are sufficiently impatient, in the sense that they discount events beyond a certain point in time quite heavily, flexible exchange rates then provide more fiscal discipline and higher welfare by forcing the costs of lax fiscal policy to be paid up-front. In sum, whether fiscal restraint constitutes a requirement for either a successful fixed or floating currency regime is an empirical issue, on which the case-studies that follow below may shed some light.

Financial sector

The rash of currency crises in recent years has, once more, shown that the behaviour of the financial sector is important for the operation of a currency regime. A growing conventional wisdom holds that liberalisation of international capital flows is either an underlying cause or at least a contributing factor behind these currency crises (Glick and Hutchison (2000)). In other words, in a world of high capital mobility, an important disadvantage of a fixed exchange rate regime is that it leaves a country open to speculative attacks on its currency. Such a speculative attack may not only trigger an abrupt and large depreciation of a countries' currency, but it may be highly destructive for the economy at large as well. Especially in emerging markets, exchange rate targeting may promote financial fragility, as a result of which a currency crisis may grow into a full-fledged financial crisis. It has been shown that currency crises and banking crises, the so-called 'twin' crises, are intimitely linked. The occurrence of 'twin' crises may be either the result of a banking crisis leading to a currency crisis, or a currency crisis leading to a banking crisis, or it may be a matter of joint causality.[16] Here we will sidestep the former explanation, and focus on the latter two explanations.

Chang and Velasco (1998) argue that in a fixed rate system the occurence of banking and currency crises is related to the underlying international illiquidity of the economy, that is, its ability to service its foreign debt.[17] Whether or not the (mon-

etary) authorities operate a lender of last resort policy only determines whether a crisis materialises as a bank run or a currency regime collapse. Kaminsky and Reinhart (1999) find that banking-sector problems often pre-date currency crises. However, the collapse of a fixed currency regime turns out to deepen the banking crisis, so that the peak of the banking crisis in most cases comes after the currency crash. Existing problems in the banking sector are aggravated by either the high interest rates required to defend the exchange rate peg or the foreign currency exposure of banks.[18] Similarly, Obstfeld (1994) argues that banks that are already 'vulnerable' in the sense of having large unhedged foreign liabilities and/or a unmanageble maturity mismatch between assets and liabilities, may be pushed over the edge by an interest rate hike that goes together with a currency crisis.[19]

Empirical research indicates that the twin crisis phenomenon is most common in financially liberalised emerging markets. Glick and Hutchison (1999) conjecture that the openness of emerging markets to international capital flows, combined with a liberalised financial structure, make them particularly vulnerable to twin crises. In addition, Demirgüç-Kunt and Detragiache (2001) show that banking crises are more likely to occur in liberalised financial systems, but that the impact of financial liberalisation on banking sector fragility is weaker when the institutional environment is stronger. Hence, it follows that for a fixed currency regime to be sustainable, the banking system must be strong, well-capitalized and well-regulated, cf. Larraín and Velasco (2001). These conditions may be added to the traditional Optimal Currency Area criteria discussed earlier.

One way to mitigate the drawbacks of a fixed exchange rate regime for financial sector stability, is to impose capital controls. The Impossible Trinity (see for instance, Frankel (1999)) states that, in principle, one can attain any pair of attributes from the triple consisting of 'monetary independence', 'exchange rate stability', and 'full financial integration', by giving up the remaining attribute. Whether achieving 'monetary independence' and 'exchange rate stability' at the expense of 'full financial integration' is possible, is open for debate. In Section 4, where we will discuss inter alia Dutch monetary policy in the 1960s and 1970s, we will show that Dutch capital controls were then only temporary effective.[20] This conclusion is in line with a number of papers surveyed in Eichengreen and Mussa (1998), and leads us to conclude that capital controls may indeed be effective, but for a limited period of time only. Notwithstanding the issue of effectiveness of capital controls, it remains however to be seen whether capital controls are desirable from a broad macroeconomic perspective. In theory, free capital movements permit a more efficient global allocation of savings and direct resources toward their most productive uses, and are hence welfare enhancing.[21] In contrast, the presence of asymmetric information and domestic distortions may weaken the benefits of full capital account liberalisation.

3 Set-up of case studies

As explained in the Introduction, the goal of the present paper is twofold. First, it aims at identifying requirements for successful currency regimes, drawing both on economic theory as discussed above, and on the Dutch and Thai experiences in this respect. Secondly, it tries to draw lessons from the Dutch road to monetary union for further financial co-operation in the Asian region. Below, we therefore provide concise chronologies of both Dutch and Thai exchange rate policy and exchange rate behaviour. As it turns out, both the Netherlands and Thailand favour exchange rate stability vis-à-vis the currency of a large, low inflation, country. The case-studies will therefore be used to identify requirements for maintaining exchange rate stability. In explaining this preference for exchange rate stability, we start with assessing the role played by the 'traditional' Optimal Currency Area criteria, since economic theory indicates that for currency pegs to be sustainable, reducing the likelihood of asymmetric shocks is important and asymmetric shocks are less likely to occur when countries fulfil these Optimal Currency Area criteria. We will furthermore pay attention to developments in the financial sector, as the previous section stressed the importance of this sector of the economy for the operation of currency regimes.

4 The Netherlands

Following the set-up presented in the previous section, this section will provide an account of Dutch exchange rate policy from the 1970s onwards, the process of capital liberalisation, and developments in the banking sector, respectively. We present *inter alia* new evidence on the endogeneity of the Optimal Currency Area criteria, and assess the effectiveness of Dutch capital controls in the 1960s and 1970s.

4.1 Motivation of Dutch exchange rate policy

A useful starting point for a discussion of exchange rate policy, and Dutch monetary policy in general, is the Bank Act of 1948. According to this act, the twofold objective of Dutch monetary policy was *to regulate the value of the Netherlands monetary unit in such a manner as will be most conducive to the nation's prosperity and welfare, and in so doing seek to keep the value as stable as possible*. Dutch monetary policy has subsequently been described as *moderate monetarism*, as it clearly contained elements of monetarism as developed by Friedman and others, cf. De Greef *et al.* (1998). The adjective *moderate* has been used for a number of reasons. One of them is that monetary pol-

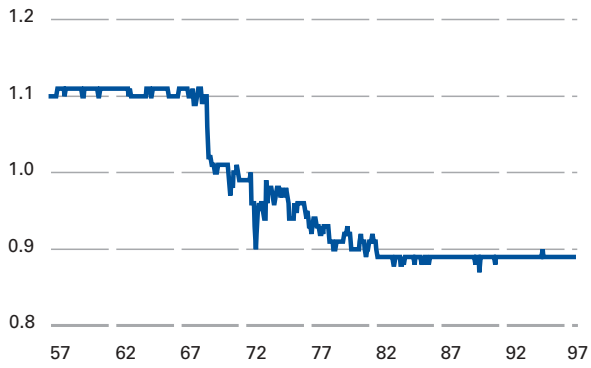
icy was combined with a strong preference for fixed or stable exchange rates, which is in contrast to the mainstream monetarist view that flexible exchange rates are to be preferred as a means to insulate a country from foreign (inflationary) shocks. The preference for maintaining a stable value of the guilder explains why, after the demise of the Bretton Woods system of fixed but adjustable exchange rates, Dutch monetary policy sought a new policy anchor. German monetary policy had a very good track record of fighting inflation. Pegging the guilder to the German mark thus not only resulted in a stable exchange rate of the guilder vis-à-vis the mark, fostering trade with the main trading partner of the Netherlands, but entailed the import of low German inflation as well.

4.2 The guilder exchange rate: a chronology

After almost two years of turmoil in international exchange rate markets, in 1973 the Bretton Woods system of fixed but adjustable exchange rates is finally abandoned, and European currencies start to float. In March 1973, the German mark is revalued by 3%, and the mark is revalued again by 5_% in June 1973. Although initially the Netherlands had no grounds to revalue the guilder as well, in September 1973 the guilder is eventually revalued by 5%, in order to prevent rising import prices jeopardising anti-inflationary policies. In the course of these years, the currencies of the European Economic Community countries, Belgium, France, Germany, Italy, Luxemburg and the Netherlands, participated in an arrangement called *the snake*, which allowes them to fluctuate within a band of $\pm 2^1/_4\%$ around pre-announced central rates.

In 1976, the snake arrangement comes under pressure, and France decides to leave the snake. At the same time, the mark is revalued, this time by 2%. The main explanation for the strength of the mark relative to the other European currencies is the favourable inflation differential of Germany vis-à-vis the remaining European currencies participating in the snake arrangement. Dutch authorities abstain from a revaluation of the guilder in order to restore tranquility in the foreign exchange markets, although the strong position of the Dutch current account might have justified a different decision.

Figure 1 The mark-guilder exchange rate



Source: IFS.

In 1978, the dollar depreciates sharply, and exerts a strong upward pressure on the mark. As a consequence, in October 1978, the mark is revalued by 4% to restore stability in the foreign exchange markets. The Dutch government, however, is of the opinion that there is no direct reason for the exchange rate rearrangement. Similarly, the Dutch central bank takes the view that a devaluation of the guilder is not the proper way to enhance competitiveness of the Dutch economy. The latter goal should primarily be achieved by reducing inflation. In other words, a lack of competitiveness should not be compensated by lowering the exchange rate, but should be addressed by improved domestic economic policy.

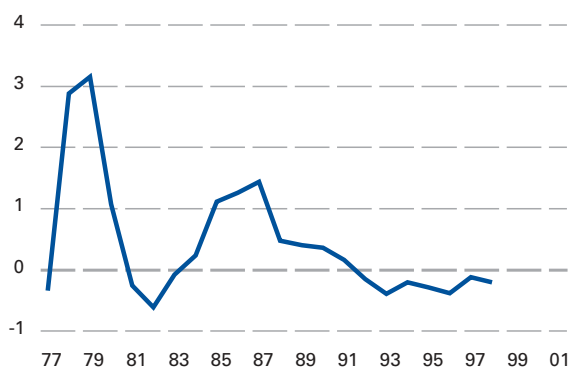
In 1979, the Netherlands become one of the founding members of the EMS, the European Monetary System, which seeks to stabilise bilateral exchange rates within mutual bands of ±2.25% around pre-announced central rates. Already in the course of that year, the value of the mark is pushed up by a decline in confidence in the dollar. Consequently, the mark is revalued by 2% in September 1979. The Netherlands is not in favour of this decision as they consider it to be unnecessary given the inflation differential vis-à-vis Germany and the actual development of the guilder-mark exchange rate, but preserving fixed rates among the Benelux countries[22] finally is considered more important than matching the German revaluation.

Economic developments in the countries participating in EMS continue to diverge, leading to a rearrangement of the central rates in October 1981, including a revaluation of the guilder and the mark by 5½%. The guilder-mark central rate was left unchanged for a number of reasons. First of all, the Dutch inflation rate only marginally exceeds its German counterpart. In addition, the actual guilder-mark exchange rate has been fairly close to its central rate, illustrating the gradual strength-

ening of the guilder-mark peg after the 1979 realignment. Continued divergences across EMS countries ultimately end in a major rearrangement of the central rates in March 1983. The mark is then revalued by 2% vis-à-vis the guilder. This turns out to be the last change in the guilder-mark central rate. Following this devaluation, financial markets start to test the credibility of the guilder-mark peg and Dutch short-term interest rates have to be raised considerably above German rates for a number of years to restore confidence of financial market in Dutch exchange rate policy, see Figure 2.

At the start of the 1990s the EMS has evolved into a truly fixed exchange rate system in a environment of (almost) perfect capital mobility. In 1992-3, this system is confronted with a number of currency crises, and the EMS bands are widened to ± 15%. During these crises, however, the credibility of the Netherlands' exchange rate policy is amply demonstrated when the guilder appreciates to above its central rate vis-à-vis the mark and Dutch interest rates even undershoot their German counterparts. After the 1992-3 EMS crises, it is decided to maintain a mutual ±2.25% fluctuation band for the guilder-mark exchange rate. In practice, this band turns out to be even as tight as ±0.5%.

Figure 2 Short-term interest rate differential between the Netherlands-Germany



Source: IFS.

4.3 The guilder exchange rate: some explanations

The main justification of Dutch exchange rate policy prior to EMU is that the Netherlands and Germany to a large extent fulfil the requirements for making up an optimal currency area. For example, as indicated above, the Netherlands and Germany share a preference for low inflation. Furthermore, there is ample evidence showing that the Dutch and German economies are highly integrated[23]

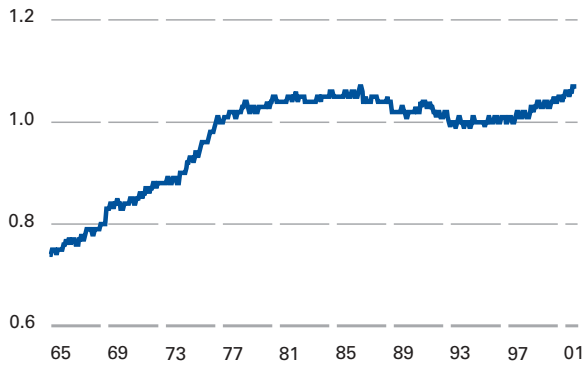
First, general economic developments in both countries are on average fairly similar, as some 90 percent of cyclical movements in German manufacturing output feed through to manufacturing output in the Netherlands; for GDP this is still as large as 75%. It is noteworthy that cyclical movements in Germany spill over to the Netherlands with only a very slight lag. This implies that the likelihood of asymmetric shocks is fairly low.

Second, there is a close similarity between both countries as far as the development of nominal and financial variables is concerned. For instance, Figure 3 shows that from the inception of the EMS, the Dutch-German CPI-ratio has been relatively stable. By implication, Dutch competitiveness with respect to Germany, as reflected by consumer prices, has remained constant, making significant changes in the exchange rate no longer necessary.[24] In contrast, before the EMS the Dutch-German CPI-ratio clearly trended upward, which is the mirror image of the gradual depreciation of the guilder vis-à-vis the mark in the 1970s as shown in Figure 1 above. In the 1970s, Dutch policy makers gave greater priority to domestic goals instead of accepting the requirements that exchange rate stability imposes on domestic policy. The behaviour of the guilder-mark exchange rate over the past three decades thus substantiates the claim that as long as the economies that maintain a currency peg have not converged sufficiently, either in terms of economic structure or in terms of policy preferences, significant changes in the exchange rate, that is exchange rate flexibility, may be unavoidable.

Third, the Dutch central bank has pursued its exchange rate targeting strategy in a highly consistent manner. Short-term interest rates were raised – considerably, if necessary – at any signs of the guilder weakening against the mark. Monetary policy thus gained credibility, and as a result the gap between Dutch and German short-term interest rates gradually decreased.

In sum, it appears that Dutch exchange rate policy can to a considerable extent be justified by the well-known optimal currency area criteria, as discussed in Section 2. Here we would like to stress that the degree to which countries fulfil the optimal currency area criteria may change over time, and may even depend on whether a country has actually adopted a peg or not. This has also been the case for the Netherlands. For instance, in the run-up to EMU, the Netherlands has successfully pursued

Figure 3 The Dutch-German consumer price ratio



Source: IFS.

a policy of fiscal consolidation, which according to the theoretical arguments put forward in Section 2, further enhanced the credibility of the currency peg. The other way around, the credible commitment to price stability by the monetary authorities also worked as a disciplining device, in that it forced other participants in the national policy arena, notably the government and social partners, to follow stability-oriented policies. In addition to fiscal consolidation, this resulted in moderate wage developments and measures to improve the functioning of the labour market. We will further illustrate the endogeneity of the Optimal Currency Area criteria by means of an econometric analysis of the degree of pass-through of bilateral exchange rate movements into relative prices between the Netherlands and Germany.

Exchange rate pass-through in the Netherlands

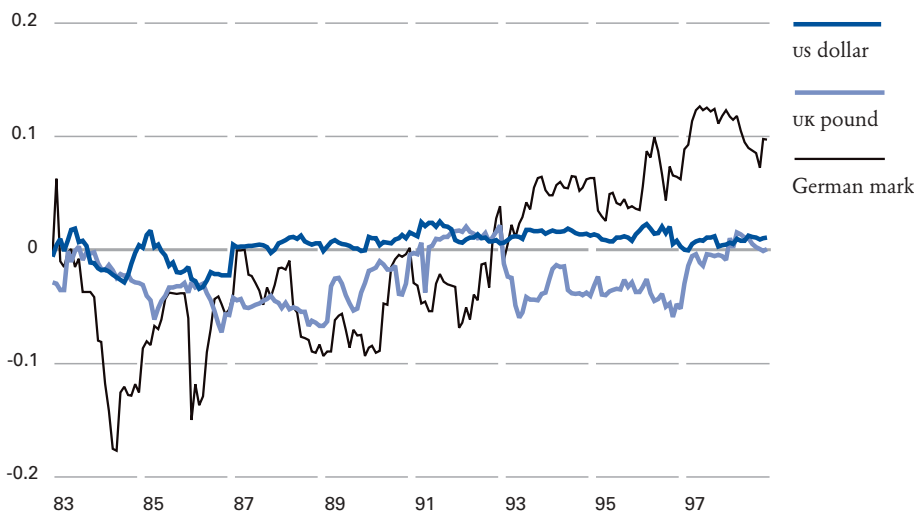
The extent to which the economies of two countries are integrated can, inter alia, be judged by the way prices in both countries move together. In particular, if, in order to maintain the competitive positions of both countries, a change in the bilateral nominal exchange rate results in a significant and rapid change in relative prices, this is evidence that both countries have strong interrelationships. Engel (2000) shows that, compared to other countries in Europe[25], price differentials between the Netherlands and Germany are very responsive to exchange rate changes, suggesting that these economies are highly integrated. Unfortunately, Engel does not present evidence regarding changes in the degree of responsiveness. To assess this issue, we investigate the impact of changes in the guilder-mark exchange rate on price differentials between both countries. To put this impact into perspective, we also analyse

the impact of the guilder-pound and the guilder-dollar exchange rates on prices differentials between the Netherlands and the UK, and the US, respectively.

Figure 4 depicts the impact of a change in the nominal bilateral exchange rate on relative prices, as a percentage of the change in the nominal exchange rate. Prices are known to be sticky in the short-run. For that reason, we calculate the degree of exchange rate pass-through as the cumulative impact on relative prices over a two-year horizon. A time-profile is obtained by calculating the impact over a moving window of 10 years. The sample runs from 1973:1 to 1998:12. This means that the first observation in Figure 4 is the estimated impact of a change in the exchange rate during 1973:1-1982:12. Of course, the dynamics of relative prices are not only the result of changes in the exchange rate, but depend, among other things, on changes in supply and demand conditions. Therefore, in calculating the impact of a change in the exchange rate on relative prices, we have controlled for the influence of relative business cycle developments. We refer to Appendix A for a detailed description of the econometric methodology.

Figure 4 offers two main insights. First, the impact of exchange rate changes on prices in industrialised countries is fairly modest, cf. Choudhri and Hakura (2001), and the references cited therein. The impact has sometimes even the wrong sign, which may to some extent be attributed to estimation uncertainty. Second, the impact of changes in the guilder-mark exchange rate on the Dutch-German price ratio has significantly increased over the sample period, whereas the impact of

Figure 4 Pass-through of changes in bilateral guilder exchange rates



changes in both the guilder-pound and the guilder-dollar exchange rate do not reveal any trending behaviour. This illustrates that the Netherlands and Germany have become increasingly integrated over the past decades.

A potential explanation for the increase in the impact of changes in the guilder-mark exchange rate on relative prices runs as follows. Confronted with volatile exchange rates, an exporter may be induced to use local currency pricing in order to maintain market share, that is, to fix the price of his product in the currency of the foreign consumer. If, on the other hand, the exchange rate is relatively stable, there are good reasons for the exporter to adopt producer-currency-pricing, that is, fix the export price in the home currency. For instance, he no longer has to be afraid of loosing market share as a result of unexpected hikes in the exchange rate. Therefore, he can impose complete pass-through of exchange rate changes into his foreign selling price, without endangering profits.[26]

Capital account restrictions: a chronology [27]

Throughout the 1950s and 1960s, the Netherlands levied restrictions both on short-term and long-term capital outflows. The latter were motivated by the wish to protect the domestic capital market: in the aftermath of the second World War the Netherlands pursued a policy of low interest rates to foster reconstruction, and long-term capital outflows were regarded as a drain on domestic resources in this respect. Meanwhile, this cheap credit policy was complemented by direct controls on bank lending in order to curb money growth and to maintain price stability. Short-term capital inflows were considered to (indirectly) contribute to domestic money growth. Hence, in order to not let short-term capital inflows interfere with domestic monetary policy objectives, restrictions on short-term capital inflows were imposed.

In 1971, when the guilder was allowed to float, the Netherlands were confronted with speculative inflows, jeopardising internal monetary stability. A closed bond circuit, the so-called O-circuit, was established, intended to curtail foreign demand for Dutch guilder paper. In subsequent years, a number of additional restrictions were implemented. In 1972, payment of interest on guilder deposits held by non-residents was prohibited, and further capital controls were enacted, restricting the availability of foreign credit for Dutch residents. Eventually, in March 1973, a negative interest rate on non-resident accounts was imposed. While before this time, exchange controls were primarily considered as a complement to domestic financial and monetary policies, in these years the wish to avoid an undue appreciation of the guilder and deterioration of the Dutch competitive position was put forward as an additional motive.

In the aftermath of the first oil crisis in 1973, the direction of speculative flows reversed. The closed bond circuit was abolished, and other restrictions were sub-

sequently lifted, partly in view of the rising current account deficit. At that time, exchange controls were increasingly seen as having important drawbacks. For instance, restrictions on exchange controls tend to adversely affect other transactions, such as direct investment flows, as well. Put differently, by preventing capital to flow freely, the allocation of savings and investments across the world will be suboptimal. In 1977, the Netherlands switched to a positive system of capital controls, meaning that all cross-border capital transactions were permitted unless explicitly restricted. Restrictions on short-term capital inflows were maintained in order not to undermine domestic credit restrictions, while medium and long-term capital inflows were liberalised in order to facilitate the financing of the current account deficit.

In 1979, the Netherlands became one of the founding members of the EMS, and Dutch monetary strategy was redirected towards maintaining exchange rate stability with respect to the German mark. In connection with this, all remaining restrictions on capital inflows were ultimately lifted in 1983. In October 1986, the Netherlands became the fourth OECD member country which had fully liberalised all capital movements.

Effectiveness

Generally speaking, the effectiveness of capital controls tends to vary inversely with the state of development of domestic financial markets. Bakker and Chapple (2002) argue that the effectiveness of Dutch capital controls, although relatively successful in the immediate postwar period, gradually eroded as the Dutch economy opened up and financial markets modernised. For example, the effectiveness of the controls on inflows in the 1970s is questionable, as restrictions on borrowing from offshore banks had at most affected 10 percent of total capital imports. Also, the restrictions could be easily circumvented by specially created short-term paper, swaps, or intra-multinational group credits. In other words, the authorities were able to control only part of the capital flows.

We assess the effectiveness of capital controls by investigating the degree to which they insulate the domestic financial market from developments in foreign financial markets[28], using the German financial market as a proxy. In particular, we study whether capital controls have affected the link between stock returns and changes in short-term and long-term interest rates in the Netherlands and Germany. The hypothesis is that if the effectiveness of capital controls changes, this will alter the relationship between domestic and foreign financial variables. Admittedly, changes in financial variables are related to developments in the economy at large. Hence, when the domestic and foreign economies do not move in tandem, differences in the stance of the economy should be taken into account when measuring the relationship between domestic and foreign financial variables. On the other hand, when

the domestic and foreign economies are highly integrated, variables measuring the stance of the economies can be left aside. This is an important reason for using the German financial market as a proxy for foreign financial markets.

Econometric methodology

There are basically two ways to measure the impact of changes in capital controls on the link between financial variables across borders. First, one can split the sample according to the dating of regulatory changes. For instance, one can calculate the correlation between Dutch and German stock returns before October 1986, when capital transactions were fully liberalised, and after October 1986, and test whether there is a significant change in correlation, cf. Kaminsky and Schmukler (2000) and Goetzmann *et al.* (2001). The main drawback of this approach is that the capital liberalisation process is a complex process and it is unlikely that the 'official dates' of capital liberalisations will be informative of the true date of market integration; recall that there are often ways to circumvent capital controls. In fact, it is the goal of the present study to document when the evasion of capital controls became so pervasive to render the official capital control ineffective.

Alternatively, one can let the data speak for themselves. When the domestic financial market becomes increasingly integrated into the world financial market, the time-series properties of domestic financial variables, and the interaction of these variables with their foreign counterparts, are likely to change. A change in the process generating the data then pins down the date at which capital control became less effective in practice. In this paper, we exploit the technique of Bai, Lumsdaine and Stock (1998) to find endogenous break points for parameters in vector autoregression (VAR) models. We refer to Appendix B for a brief, non-technical description of this technique, and to Bai *et al.* (1998) for an extensive technical discussion. Bekaert *et al.* (2001) provide an illuminating application of the technique to the dating of capital market liberalisation in emerging markets.

Empirical results

We use monthly observations on the call money market rate and government bond yield for the Netherlands and Germany, respectively, from the IMF's International Financial Statistics. The sample runs from 1960:1 to 1998:12. Monthly observations on Dutch share prices are obtained from this source as well, while observations on the German share prices are taken from the OECD. The latter series starts in 1964:11. These data are used to construct monthly stock returns and monthly changes in interest rates. Together, these variables cover a significant part of Dutch and German financial markets.

Figure 5 Correlations between Dutch and German financial variables

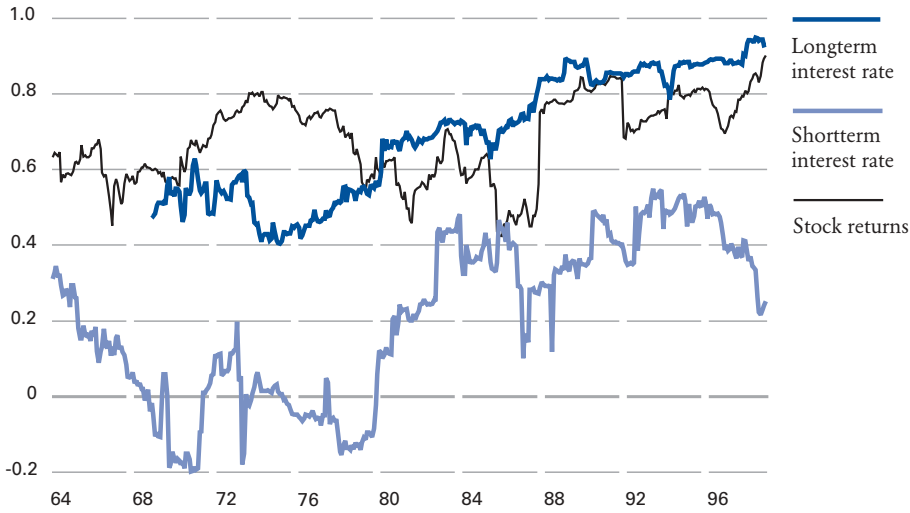


Figure 5 gives a first glance at the effectiveness of the capital controls, showing the correlations between the Dutch and German financial variables, measured over a four year moving window. The graphs suggests that the correlation between Dutch and German stock returns has been fairly high since the beginning of the 1960s, which does not lend much support to the view that capital controls have been effective. Actually, the high degree of comovement between Dutch and German stock returns during the 1960s and 1970s is quite surprising, as Dutch and German equity markets were not well developed at the time, limiting the possibilities for arbitrage between both markets, and increasing the scope for equity prices on both markets to drift apart. The correlation between changes in short-term interest rates between both countries even decreased as capital controls were gradually lifted in the 1960s. Furthermore, in the early 1970s, when the Dutch authorities re-introduced a number of restrictions on international capital flows (see above), the correlation between changes in short-term interest rates shows a temporary increase. Again, this suggests that capital controls were not particularly effective in insulating changes in the domestic short-term interest rate from movements in the foreign interest rate. Finally, Figure 5 shows that indeed the correlation between long-term interest rates was lower in the 1960s and 1970s as compared to the 1980s and 1990s. But, this figure also shows that the increase in the correlation really started off in the late 1970s. The rise in correlation is therefore more likely to be due to the start of the European Monetary System and the gradually strengthening of the guilder-mark peg afwards, than to capital liberalisation.

In sum, if any change in the correlations between Dutch and German financial markets were to be detected, it is more likely due to a strengthening of the currency peg than to capital liberalisation.

To further statistically assess the timing of financial market integration between the Netherlands and Germany, we use Bai *et al.*'s (1998) technique to estimate dates at which the interrelationships between Dutch and German financial variables show signs of a structural change. Figure B1 in Appendix B presents graphs of the relevant Wald-statistics, that indicate the likelihood of various break-dates. With respect to stock returns, we conclude that Dutch and German equity markets have become increasingly integrated near the end of the sample [29]. The estimated break date is February 1995; a 90% confidence interval around this estimate runs from September 1993 to June 1997. This corroborates our earlier finding that the process of capital liberalisation appears not to have impinged on the correlation between stock returns. Regarding short-term interest rates, there is strong evidence that the interrelationship between Dutch and German short-term interest rates changed around November 1979. The uncertainty surrounding this estimate is small; a 90% confidence interval runs from March 1978 to June 1981. This confirms our previous finding that the comovement between Dutch and German short-term interest rates is not so much influenced by capital restrictions, but rather by the inception of the guilder-mark currency peg. A similar conclusion can be drawn regarding long-term interest rates. The relationship between the Dutch and German long-term interest rates shows signs of a structural break around February 1981. The accuracy of this estimate is, however, less than that for the short-term interest rates: a 90% confidence interval runs from September 1976 to June 1985. Both the fact that the break in the relationship between the long-term interest-rates takes place after the break in the relationship between the short-term interest-rates, and the fact that the estimate of the former break date is less precise, can, at least in part, be attributed to the gradually increasing credibility of the guilder-mark currency peg, implying a gradual convergence between inflation expectations in both countries, and hence long-term interest rates. Last, we pool the three pairs of financial variables into a single model to determine when the relationship between the Dutch and German financial markets featured a structural change. Then we find that, again, the start of the ERM turns out to be the event driving the change in the interrelationship between the Dutch and German financial markets. By analysing the variables jointly, we are able to accurately pin down the break date at November 1979, with a 90% confidence interval running from July 1979 to March 1980. This leads us to conclude that the process of capital liberalisation did not have a major impact on the integration of financial markets between the Netherlands and Germany.

Notwithstanding the empirical results above, capital restrictions in the 1950s and 1960s did allow Dutch monetary authorities to pursue a cheap credit policy without a drain of capital. Hence, in that time capital restrictions facilitated economic reconstruction. This lends support to the hypothesis that capital controls may be effective in shielding the economy for a limited amount of time, and that this span of time should be use wisely; that is, it should be used to increase the ability of the domestic economy to cope with the vigour of the global economy.

Developments in the banking sector [30]

The period 1960-1973 can be characterised as a period of expansion and concentration of the banking sector. Partly stimulated by the launch of the European Common Market in 1958, the non-banking business sector witnessed a number of mergers. This led to an increase in the demand for credit by big firms, and in order to meet this change in the demand for credit, the banking sector had to consolidate as well. In the 1960s, a first wave of mergers is observed. Notably, in 1964 a merger between Twentsche Bank and Nederlandsche Handel-Maatschappij created ABN, and Amsterdamsche Bank and Rotterdamsche Bank joined forces to become AMRO. In 1970, two large agricultural banking co-operations merged into RABO-bank. However, despite the economies of scale as a result of concentration, and the rapid expansion of output, profitability of the banking sector remained low (Wellink (1990)).

The structure of the Dutch banking system changed again considerably from the beginning of the 1980s. With the increasing openness of financial markets in the world, and in particular the rapidly approaching integrated European financial market, it became clear that Dutch banks, even the big ones, were too small to hold their own against international competition. Profitability was still low, and in order to be successful players in a global financial market, banks in the Netherlands had to grow. Attempts at cross-border mergers (between AMRO and the Belgian Generale Bank in the late 1980s) failed, and the Dutch banks turned to each other and to the financially powerful insurance companies. This was made possible by the lifting of the ban on close co-operation between banks and insurance companies as of the first of January 1990 and by the fact that the monetary authorities' attitude towards bank mergers became significantly more lenient.

In sum, financial liberalisation, a key development in European integration, spurred a process of concentration in the Dutch banking sector, ahead of many other European countries.

5 Thailand

The discussion of the Thai experiences will be along the lines outlined in Section 2. In order to further assess the role played by the financial sector in supporting currency regimes, we will examine the process of financial liberalisation in Thailand in some detail.

5.1 Motivation of Thai exchange rate policy

Since the early 1950s, Thai monetary policy has been directed towards maintaining price stability[31]. The chief monetary policy instruments have been open market operations in the repurchase market[32], lending by the Bank of Thailand[33], creation of ceilings on lending interest rates, and intervention in the foreign exchange market. Over the past five decades, Thailand generally achieved a low level of inflation. Figure 6 indicates that, barring the episodes of the two oil crises, annual inflation rates have been below five to seven percent for most of the time.

Thai authorities maintained price stability by pegging the baht to the US dollar, i.e. the currency of a large country with a good track record of fighting inflation. As a result, Thailand was able to import low inflation, which is similar to the Dutch experience. Figure 7 shows that, indeed, until 1997 the baht-dollar exchange rate has been remarkably stable over the past decades[34].

Figure 6 Thai inflation rate

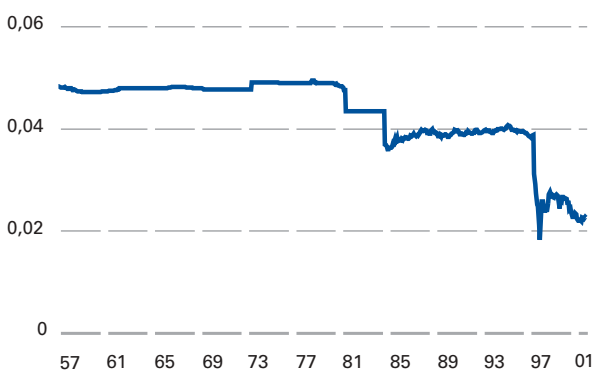
Source: IFS, annual percentage change.

5.2 The baht exchange rate: a chronology

Thailand, as a member of the International Monetary Fund, adopted the par value system of Bretton Woods in 1963. The Thai government determined the par value of the baht in terms of gold and a fluctuation band of ±1% around this par value[35]. The government established the Exchange Equalization Fund (EEF) to play an effective role in stabilizing exchange rate movements, and to set the US dollar rates at which it would buy from and sell to commercial banks. Then, the Thai Bankers' Association determined the rates applicable to any foreign exchange transactions between commercial banks and their customers.

According to the Royal Decree Determining the Par Value of the baht B.E. 2506 (1963), the value of the baht was fixed at 0.0427245 gram of gold per baht or 20.80 baht per US dollar, and this exchange rate was used until the early 1970s, when a number of adjustments was made (see Table 1). In particular, after the Smithsonian Agreement of 1971 and the first oil shock of 1973, the Thai government decided to maintain the parity of the baht against the US dollar, but to depreciate in terms of gold. Both devaluations were aimed at preventing a further deterioration of the trade deficit and to help exporters and farmers maintaining their earnings in terms of the baht. In July 1973, the baht was revalued against the US dollar, since major European currencies were then floated against the US dollar and these currencies steadily appreciated vis-à-vis the U.S dollar, which led to a depreciation of the effective exchange rate of the baht. The government aimed at restoring the value of the baht against other currencies (with the exception of the US dollar) to its previous level and at preventing an increase in import costs. In 1978, when the IMF endorsed the new gener-

Figure 7 The dollar-baht exchange rate



Source: IFS.

Table 1 Par value of the baht, 1963-1978

	baht per US dollar	gram gold per baht
1963	20.80	0.0427245
Dec 1971	20.80	0.0393516
April 1973	20.80	0.0354164
July 1973	20.00	0.0368331
March 1978	fixed parity to gold terminated	

alised floating exchange rate system, the fixed parity system was terminated. From this moment onwards, the baht has been tied to either the US dollar or a weighted average of currencies.

From March 1978 to November 1978, the baht was tied to a weighted average of currencies of the Thai major trading partners', to ensure greater stability in the baht value; though, in practice the baht was 100 percent weighted in the US dollar in that period. On November 1, 1978, the EEF switched to a fixing system, under which it, in consultation with commercial banks, determined the US dollar rate each day. The US dollar fixing rate was then used as the base rate at which transactions between commercial banks and customers were conducted. The exchange rates of the baht vis-à-vis other currencies were determined on the basis of the cross rates between the fixing rate for the US dollar and the exchange rates of the currencies concerned vis-à-vis the US dollar. This system was not without problems. As of 1981, the US dollar started to appreciate against the baht, forcing the EEF to sell a large amount of dollars to stabilise the dollar-baht exchange rate. Although in May and July 1981, the baht was devalued by 1.07 and 8.7 percent, respectively, as a result of the ongoing slide of the baht vis-à-vis the US dollar the daily fixing system had to be abolished eventually in order to promote financial stability and relieve trade and payments problems. So, from July 1981 onwards, the baht was again fixed vis-à-vis the US dollar only. This currency peg would dampen imported inflationary pressures and provided greater confidence in the monetary system. After maintaining a fixed exchange rate against the US dollar for about three years, the continued appreciation of the US dollar vis-à-vis other currencies, led to an overvaluation of the baht compared to these other currencies and a significant deterioration of the Thai trade balance. Therefore, in November 1984, the Thai authorities devalued the baht to 27.0 baht per US dollar, and changed the exchange rate system again to a peg to a basket of currencies, in order to stabilise the effective exchange rate of the baht. Initially, the basket's composition was on a trade-weighted basis. But after the depreciation of the dollar in

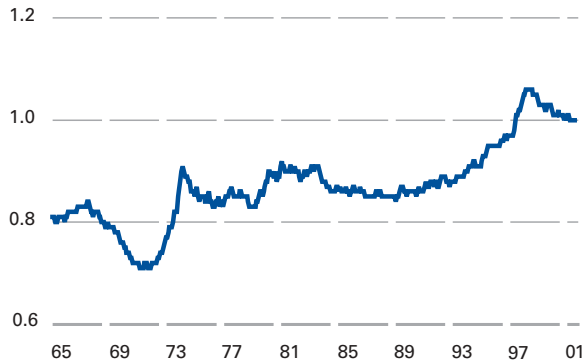
1985, the authorities switched to a mixed-weight system, using a weighted average of trade-weights and settlement weights. As 85 percent of the international transactions of Thailand was settled in dollars, in practice this implied fixing the baht to the US dollar. Hence, in sum, from the 1950s until the mid 1990s, the baht was, either formally or informally, pegged to the US dollar.

In the 1990s, the US dollar became one of the most stable currencies in the world, which, through the tight link between the baht and the dollar, supported Thailand's rapid growth over the years. In March 1996, when export growth slowed sharply, concern about the large current account deficit put the baht under growing pressure, and a devaluation of the Thai baht was considered increasing likely to occur. After two major speculative attacks on the baht, the Bank of Thailand decided to adopt a two-tier Foreign Exchange market system. From May 15, 1997, domestic financial institutions were asked not to transact with currency speculators in offshore markets, thereby creating two exchange rates for onshore and offshore markets. The measure gave the Bank of Thailand breathing room to find ways to counter future attacks, though it seemed unlikely to be maintained indefinitely. Eventually, The Bank of Thailand was forced to abandon the fixed exchange rate system on July 2, 1997. In the aftermath of the currency crisis, the Thai authorities switched to the so-called managed floating exchange rate system, whereby the value of the baht is determined by market forces to reflect economic fundamentals, although the Bank of Thailand continued to monitor its movements closely and to intervene in the market when necessary to stabilise the rate within an undisclosed band.

5.3 The baht exchange rate: some explanations

The Thai authorities pegged the baht to the US dollar for a number of reasons. First, for the promotion of exports and to relieve trade problems. The US has been Thailand's major trading partner, as 20-25% of total Thai exports go to the US Moreover, more than 80% of the international transactions of Thailand is settled in dollars. Put differently, the Thai economy is strongly connected to the US dollar, warranting stabilisation of the baht-dollar exchange rate. Secondly, the baht-dollar currency peg provided Thai monetary authorities with a nominal anchor for monetary policy. In view of Thailand's inflation record over the past three decades, as displayed in Figure 6, this nominal anchor has proved to be rather successful. Indeed, Figure 8 shows that between 1965 and the early 1990s, the Thai-US consumer price ratio has been remarkably stable. This indicates that the pass-through of changes in US prices into Thai prices has been rapid, reducing the need of the baht-dollar exchange rate to function as shock absorber.

Figure 8 The Thai-US consumer price ratio



Source: IFS.

However, since the early 1990s, developments of US and Thai prices have diverged, as the trend in the US-Thai price ratio after 1990 indicates. Given the stability of the *nominal* exchange rate of the baht vis-à-vis the US dollar, this led to a de facto *real* appreciation of the baht. This real appreciation of the baht can be attributed to the Thai economy undergoing substantial changes in the 1990s, and was for that reason not considered problematic[36]. The annual growth rate amounted to an average of 9 percent during 1987-1996, compared to 3 percent during 1980-1986, mainly as a result of a surge in investment[37]. This increase in investments led to a deteroriation of Thailand's current account, since the government's budget remained balanced. The ensuing current account deficit was matched by capital inflows, which grew rapidly from US$10.9 billion in 1990 to US$18.2 billion in 1996. However, this rapid, import-led, growth was accompanied by liberalisation and globalisation of the domestic financial system without precautionary measures, such as effective risk management, and an adequate prudential supervision system. This enabled a financial crisis to develop, and caused the collapse of the baht-dollar peg. In order to understand what went wrong, we will provide an account of the process of financial liberalisation in Thailand.

Liberalisation of the financial sector in Thailand: a chronology, the consequences, and resolution

In the 1970s and 1980s, the flows of foreign exchange were subject to the Exchange Control Act of 1942 and the Royal Decree of 1943. The law provided the rules and detailed procedures on foreign exchange controls, including activities involved with the balance of trade, i.e. import and export, and balance of payments, i.e. service and

capital, which are administered by the Bank of Thailand as the exchange control officer. The Investment Promotion Act of 1977 provided a number of incentives and privileges for foreign *investments* in Thailand. For instance, remittance of investment funds into Thailand, whether direct, portfolio or loans, was free from any exchange control restrictions; in contrast, the repatriation of such investment funds and the returns required approval. To ensure that receipts of foreign currencies emanating from *exports* were sold to an authorised bank, exporters were required to acquire a Certificate of Exportation from an authorised bank in order to clear export goods through customs. On the other hand, remitting foreign currency abroad, for instance generated by *imports*, needed approval. For example, an importer had to seek approval before making foreign exchange payments for imports from the Exchange Control Officer.

Nothwithstanding the fact that controls on foreign exchange were gradually relaxed, the financial system itself remained highly regulated, not providing a favorable environment for free capital flows. For example, the Bank of Thailand imposed ceilings on deposit and lending rates, and actively influenced the allocation of bank credit across sectors via three policy measures: (1) the requirement that commercial banks had to lend 20 percent of their previous years deposits to the agricultural sector – any shortfall had to be deposited at the government owned Bank of Agriculture and Agricultural Cooperatives, (2) the exemption from capital requirement of lending to priority sectors such as promotion of exports, small scale industry, and agricultural production, and (3) banks' access to preferential refinancing at the central bank for lending to priority sectors. Futhermore, Thailand's banking sector was highly concentrated, with the 5 largest domestic banks accounting for two-thirds of total bank assets. Over the past decades, only a single new bank was established, indicating that it has been extremely difficult to enter the Thai banking sector.

In the late 1980s, measures were taken in order to enhance the competitiveness of domestic financial institutions and to restructure the financial system. The major plan was aimed at expanding the current operations of financial institutions, developing the domestic financial structure, boosting competition and liberalisation of the Thai financial system, promoting the redistribution of economic prosperity from the center to the countryside, improving oversight of financial institutions and the financial system, as well as developing Thailand into a regional financial center.

The Bank of Thailand proposed the process of financial reform in Thailand in terms of three financial system development plans. The first and second plans covered the period 1990-1992 and 1992-1995, respectively. In addition, the third financial plan included the period of 1995 to 2000. The first two plans were successfully accomplished; however, the last plan was struck by the crisis in mid-1997.

The first stage of capital account liberalisation started in 1990. Thailand accepted Article VIII's status of the International Monetary Funds' Articles of Agreement, which resulted in a complete liberalisation of current account transactions and a reduction of the number of restrictions on capital flows. With respect to the domestic financial sector, interest rate ceilings on commercial bank's time deposits with a maturity of less than one year were abolished, and commercial bank's were allowed to have larger net foreign exchange exposures. In 1991, the authorities allowed non-residents to hold baht-denominated accounts and Thai residents to hold foreign currency deposits which expanded scopes of businesses of commercial banks and finance companies. The authorities also abolished ceilings on saving and lending rates of financial institutions.

The second financial plan started late 1992. Regarding the financial sector, in order to improve financial institutions standards, the Bank of Thailand imposed the BIS capital adequacy standard. Then, in 1993, the capital account was further liberalised through the introduction of BIBF, the Bangkok International Banking Facilities, aiming to create a new financial center in the Asian region. The BIBF fostered borrowing and lending in foreign currencies[38], and provided other investment banking services, such as advice on mergers and acquisitions. The monetary authorities also granted privileges, such as corporate tax reductions and an exemption from withholding tax on interest income from foreigners, to financial institutions in order to allow the BIBF to compete with financial institutions in other (foreign) financial centers. In 1994, the authorities extended the financial reform plans to the off-shore banking business by setting up the Provincial International Banking Facilities (BIBFS). Similar to the BIBF, the BIBF's funding must be from overseas. In contrast, the BIBF was allowed to extend credits both in baht and in foreign currencies, whereas the BIBF was allowed to engage in the latter activity only.

Before further liberalisation plans could be implemented, in 1997 Thailand was hit by a financial and currency crisis.

The following concepts turn out to be key in any explanation for this crisis: real appreciation, capital inflows, moral hazard, and balance sheet problems. As was already indicated, in the 1990s the baht underwent a *real appreciation*. For years, this was not considered a problem, arguing that import-led growth was an appropriate recipe for an emerging economy. During 1996 and 1997, this perception changed, and the baht was considered increasingly overvalued. Meanwhile, the growing current account deficit was financed by *capital inflows*. Capital inflows via portfolio investment rose from $2.1 billion in 1995 to $3.9 billion in 1997. Furthermore, the share of the short-term component in Thailands external debt rose from around 36 percent in 1990 to 52 percent in 1995, and the country's external debt surged from US$ 52.1 bil-

lion in 1993 to US$ 93.4 billion in 1997. As a result of these capital inflows, and of moral hazard by financial institutions[39], credit grew rapidly. Basically, the argument is that due to inadequate regulatory and supervision frameworks and implicit or explicit state guarantees to deposit holders, financial institutions directed a sizable proportion of credits to non-productive, and often speculative investments such as real estate, construction, and consumer loans, which may involve unsound projects that were highly susceptible to the risk of economic slowdown. During 1990-1996, the volume of financial assets grew at a much faster rate than was required to support economic activity; assets of commercial banks and finance companies increased by an average of 21 and 30 percent per annum, respectively, while nominal GDP rose by 'only' 13 percent per year. The volume of financial sector credit extended to the private sector, as proportion of GDP, also expanded significantly from 83 percent in 1990 to 147 percent in 1996. Especially (financial) firms with high debt-to-equity ratios and loaded with foreign currency denominated debt, were severely hit by the depreciation of the baht. During the 1990s, the debt to equity ratio of Thai corporates increased significantly, rising from 1.6 in 1988 to 2.3 in 1996, while the maturity structure of debt was shortened considerably. By the end of 1996, therefore, Thailand's firms were highly susceptible to liquidity and interest rate shocks. These *balance sheet problems* (Krugman, 1999) have in turn led to an increase of non-performing loans at the banks.

After the attack on the baht, the Bank of Thailand imposed some capital account restrictions in order to prevent speculation on the baht. As discussed before, these restrictions separated the foreign exchange market into 'onshore' and 'offshore' market by prohibiting baht transactions with non-residents currency speculators. On January 30, 1998, this measure was abolished and replaced by a 50 million baht lending limit to non-residents. Also, to enhance the capital adequacy standard, the Bank of Thailand increased the first tier capital to risk asset ratio of commercial banks from 5.5 percent to 6 percent and increased the overall capital-to-risk asset ratio of finance companies to 7.5 percent. After the crisis, Thailand financed the net capital outflows by its current account surplus and official borrowing, thereby causing a considerable change to the structure of total capital inflows. Furthermore, the nature of capital inflows shifted from private to government based inflows. This favorable change in the nature of capital inflows, together with a surplus in the country's current account balance enabled monetary authorities to maintain a low interest rate policy to help the country's economic recovery process. Economic stability has been gradually enhanced over the first half of 1998. The net outflow of private capital slowed down as confidence of foreign investors in economic policy returned. This allowed an improvement in the roll-over rate of foreign debt and encourages more foreign direct

investment. In addition, as from the second quarter of 1998, liquidity conditions have been improved steadily.

The International Monetary Fund (IMF) offered financial support conditional on the Thai government fulfilling stringent conditions for economic and financial reform. The reform plan included three broad objectives. First, to resolve nonviable and insolvent financial institutions. Second, to strengthen the financial sector structure. Third, to enhance the regulatory and supervisory regime. During the initial period (1997-1999), the reform policy focused on the first objective resulting in the resolution of the assets and liabilities of the 56 closed finance companies, restructuring and recapitalising troubled commercial banks and resolving the non-performing loans. Despite the reform efforts, the Thai economy went into a vicious circle when real economic activity contracted more dramatically than expected – as a direct consequence from a contraction in demand, a sharp increase in non-performing loans, and constrained credit flows to the corporate sector. In 2001, a new Government under the leadership of Prime Minister Thaksin Shinawatra, advocated the 'Dual Track Plus' Development Model. The aim of this model is twofold. First, it emphasises a more balanced path of economic development to revitalise the Thai economy. Secondly, it promotes linkages between the domestic economy and the world in order to reposition Thailand to become a more competitive economy in the world market (we refer to Appendix C for an overview of measures taken to restructure the Thai financial sector).

To summarise, the Thai financial system has significantly changed over the past three decades. In the past, it was fairly intensely regulated by means of, among other things, ceilings on interest rates, limitations of credit allocation, and restrictions on branches. Following the economic expansion and the integration in world financial markets, Thailand in 1990 adopted the financial liberalisation program to support future economic development. The opening of the capital account has caused an influx of capital to the financial system of Thailand. However, the misallocation of resources, lack of proper supervision, and weakness of macroeconomic policy management brought about the financial crisis in Thailand in the middle of 1997. This crisis gave an impetus to financial reform and more effective supervisory policies aimed at monitoring and addressing banking problems. Eventually, the reform program led to an increase in foreign investor's confidence and has paved the way for long- term financial and economic stability.

6 Conclusions

The previous sections presented evidence regarding requirements for currency regimes, in particular for maintaining exchange rate stability, both from a theoretical and from an empirical perspective. Drawing on this evidence, in this section we will list requirements for exchange rate stability; the sequence in which they are presented is chosen arbitrarily.

Next, we will try to provide some general lessons with respect to regional economic and monetary integration that Thailand, and the Asian region in general, may learn from the Dutch experience (this issue is taken up in some detail by Chui, Morris and Pineau (2002) as well).

Requirements for exchange rate stability

1. Both the Dutch and Thai experiences demonstrate that for monetary authorities to achieve exchange rate stability, they must have a credible preference for domestic price stability. Other participants in the policy arena should be convinced that the monetary authorities will direct their policy instrument, the interest rate, solely at maintaining exchange rate stability. The Dutch case shows that if the monetary authorities' commitment to price stability is indeed credible, it works as a disciplining device, in that it forces the government and the social partners to follow stability-oriented policies.
2. Moreover, stability-oriented domestic policies, such as fiscal consolidation, moderate wage developments, and measures to improve the functioning of the labour market, are required, as the interest rate is to be used to maintain exchange rate stability. The Thai case demonstrates that if domestic stability comes under pressure, exchange rate stability may be jeopardised. In the 1990s, the interest rate differential between Thailand and the US widened, and capital inflows surged. This influx of capital combined with weak domestic fundamentals of the Thai economy, such as a weak banking sector and high debt to equity ratios of Thai companies, constituted a considerable asymmetric shock, rendering the Thai exchange rate peg to the US dollar unsustainable.
3. Flexible labour and product markets make a country well equipped for absorbing asymmetric shocks, reducing the need for significant exchange rate changes, and are thus instrumental in maintaining exchange rate stability.
4. The Thai experience illustrates that a strong and competitive financial sector is pivotal for a proper cushioning of external shocks, without endangering exchange rate stability. Strenghtening the quality of the regulatory/supervisory frameworks will be instrumental in this respect.
5. Furthermore, the financial crisis in Thailand of 1997 illustrates the importance of

the management of the process of capital account liberalisation. Simultaneous liberalisation of the capital account and the domestic financial system is not without risks. Instead, this process should be introduced step-by-step, based on the developments of fundamentals. The rapid liberalisation of financial markets and of the capital account, without supporting domestic policies aimed at strengthening the economic structure, has been one of the factors that led to the currency crisis in 1997.
6. Information regarding economic data and policy preferences should be amply and readily available to the general public in order to prevent financial markets from overreacting. For example, financial markets were taken by surprise when the Dutch guilder depreciated vis-à-vis the German mark in 1983, and started to doubt the credibility of the guilder-mark currency peg. Dutch authorities were subsequently punished for their lack of transparency by having to raise the Dutch interest rate well above the German interest rate until the early 1990s in order to maintain the peg. The Asian crisis in another case in point, where financial markets were not able to properly discriminate between countries in the region, and the Thai currency crisis elicited speculative attacks on a number of Asian currencies, which could only in part be attributed to unsound economic fundamentals.

Before we turn to a list of potential lessons that can be learned from the Dutch experience regarding monetary co-operation in the Asian region, it should be noted that Europe and Asia differ in many respects, and that one should thus be very catious in drawing definitive conclusions. An important difference between Europe and Asia is that in the former region the currency of a country *within* the region served as a nominal anchor for monetary policy, benefiting further monetary co-operation. In contrast, many Asian countries peg(ged) their currencies to the US dollar, the currency of a country *outside* the region. Notwithstanding this and numerous other differences between Europe and Asia, the following 'lessons' may be learned:

Lessons from the Dutch experience regarding monetary co-operation in Asia
7. The process towards increased regional monetary co-operation is a long one. Moreover, a monetary union must be considered to be the crowning step of a process of economic integration.
8. Enhancing the institutional underpinnings of regional co-operation and regional economic integration are mutually reinforcing processes. On the one hand, the present paper provides evidence that the degree of economic integration between the Netherlands and Germany has actually increased *after* the start of the European Monetary System (EMS). On the other hand, the EMS was established, among other things, *because* of strong trade linkages between European countries and the conviction that exchange rate uncertainty would be detrimental in this respect.

9. On the road to increased monetary co-operation, exchange rate flexibility may be instrumental. Especially when prospective member countries have (strongly) differing levels of economic development, changes in the real and/or nominal exchange rate will be inevitable in the process of economic integration. Furthermore, exchange rate flexibility may be needed when policy preferences between countries have not converged sufficiently. For example, when Dutch policy makers in the 1970s gave greater priority to domestic goals, and did not strictly adhere to the anti-inflation policy of Germany, the guilder underwent a gradual depreciation vis-à-vis the mark.

10. Regional economic integration entails freedom of movement of both products and product factors, that is labour and capital. This means that at some point in time, capital controls have to be removed. This does not detract from the fact that – as has been shown by the Dutch experiences – capital controls may be effective in shielding the economy for a limited amount of time. This span of time, however, should be used wisely; that is, it should be used to increase the ability of the domestic economy to cope with the vigour of the global economy, including its financial markets. Flexibility of labour and product markets should be enhanced, improving the competitive position of the economy. The reinstatement of a number of capital restrictions in Thailand, following the Asian crisis, is a case in point. The controls were combined with measures aimed at a restructuring and strengthening of the domestic banking sector. Restrictions therefore are not considered to be an end in themselves.

Appendix A Measuring exchange rate pass-through

In this appendix, we explain in detail how we derive the exchange rate pass-through measure used in Section 4.3.

Point of departure is the model presented in McCarthy (1999). McCarthy studies the pass-through of the *effective* exchange rate and import prices on domestic producer and consumer prices in a number of industrialised economies. We modify his model is three ways. First, we study the impact of *bilateral* exchange rates on inflation. Second, we do not discriminate between import prices, producer prices and consumer prices. Instead we focus on consumer prices. To be precise, we analyse the impact of bilateral exchange rate fluctuations on the CPI-inflation differential between the two countries involved. Last, we do not distinguish between demand and supply shocks; instead, we use the output gap differential between the two countries to measure differences in the general stance of the business cycles of the economies.

To examine the pass-through of the exchange rate fluctuations to CPI-inflation differentials, we assume that the CPI-inflation differential at time t, denoted $\tilde{\pi}$, comprises of four components. The first component is the expected inflation differential based on the information available at the end of period t-1, denoted $E_{t-1}(\tilde{\pi}_t)$. The second and the third components are the effects of period t (relative) business cycle and external or exchange rate shocks on the inflation differential. The business cycle shock is denoted ε_t^b, whereas the external shock is ε_t^e. Finally, there is the inflation shock in period t, ε_t^π, which is simply the portion of the inflation differential at time t that cannot be explained by the first three components. To complete the model, we assume that the external shock can be identified from the dynamics of the exchange rate after taking into account the contemporaneous effect of the business cycle shock. Last, the (relative) business cycle shock is identified from the dynamics of the output gap differential between the two countries involved, $\tilde{y}_t$. In sum,

(1) $\tilde{y}_t = E_{t-1}(\tilde{y}_t) + \varepsilon_t^b$,

(2) $\triangle e_t = E_{t-1}(\triangle e_t) + b_1 \varepsilon_t^b + \varepsilon_t^e$,

(3) $\tilde{\pi} = E_{t-1}(\tilde{\pi}_t) + c_1 \varepsilon_t^b + c_2 \varepsilon_t^e + \varepsilon_t^\pi$.

Put differently, we assume that the inflation differentials, the output gap differentials, and the exchange rate fluctuations can be adequatly modelled by a recursive

vector autoregression (VAR). Under the assumption that the conditional expectations in equations (1)-(3) can be replaced by linear projections of lags of the variables in the system, the model can be estimated as a VAR and a Cholesky decomposition can be used to recover the impact of fluctuations in the bilateral exchange rate on the inflation differential. Furthermore, the impact on the price differential after a particular number of periods can be estimated as the cumulated sum of the responses of the inflation differential over these periods. The degree of exchange rate pass-through to relative prices is then calculated as the response of the price differential after two years, as a percentage of the initial exchange rate shock.

We obtain data on industrial production, the consumer price index, and bilateral nominal exchange rates for the Netherlands, Germany, the UK, and the US, respectively, from the IMF's International Financial Statistics database. The data are sampled at the monthly frequency, running from 1973:1 to 1998:12. Output gaps of individual countries are calculated by means of Baxter and King's (1999) band-pass filter, employing the standard assumption that the business cycle can be approximated by cycles with frequencies lying between 1.5 and 8 years.

To obtain a time-profile of the degree of exchange rate pass-through, the VAR has been estimated over a rolling window of ten years, starting in 1973:1. The number of lagged variables to be included has been determined for each sample period separately by the Schwartz Information Criterion (SIC), where the minimum number of lags was one and the maximum was twelve. A comprehensive set of estimation results is available from the authors upon request.

Appendix B Dating the integration of financial markets

This appendix provides a description of the method used for dating the integration of financial markets in Section 4.3. The present paper assumes that the stochastic properties of the Dutch financial variables, denoted by y_t, can adequately modelled as a vector autoregression (VAR) conditional on the German financial variables, denoted by x_t, allowing for a single structural break in the parameters, that is,

(4) $y_t = A_0 + A_1(L)\,y_{t-1} + B(L)x_t + d_t(k)(\tilde{A}_0 + \tilde{A}_1(L)\,y_{t-1} + \tilde{B}(L)x_t) + \varepsilon_t$

where $d_t(k) = 0$ for $t < k$, and $d_t(k) = 1$ for $t \geq k$. If y_t and x_t contain only a single financial variable, for instance Dutch and German stock returns, A_0 and $\tilde{A}_0$ are scalars, $A_1(L)$ and $\tilde{A}_1(L)$ are polynomials in the lag-operator with scalar coefficients, and ε_t is a univariate error-term with fixed variance. If two or three financial variables are analysed jointly, the coefficients in equation (4) become two-by-two or three-by-three matrices, and becomes a multivariate error-term with fixed covariance matrix. In this paper, we assume that the variables on the right-hand-side of equation (4) are stationary [40]. Results from econometric tests for stationarity, which are available upon request, justify this assumption.

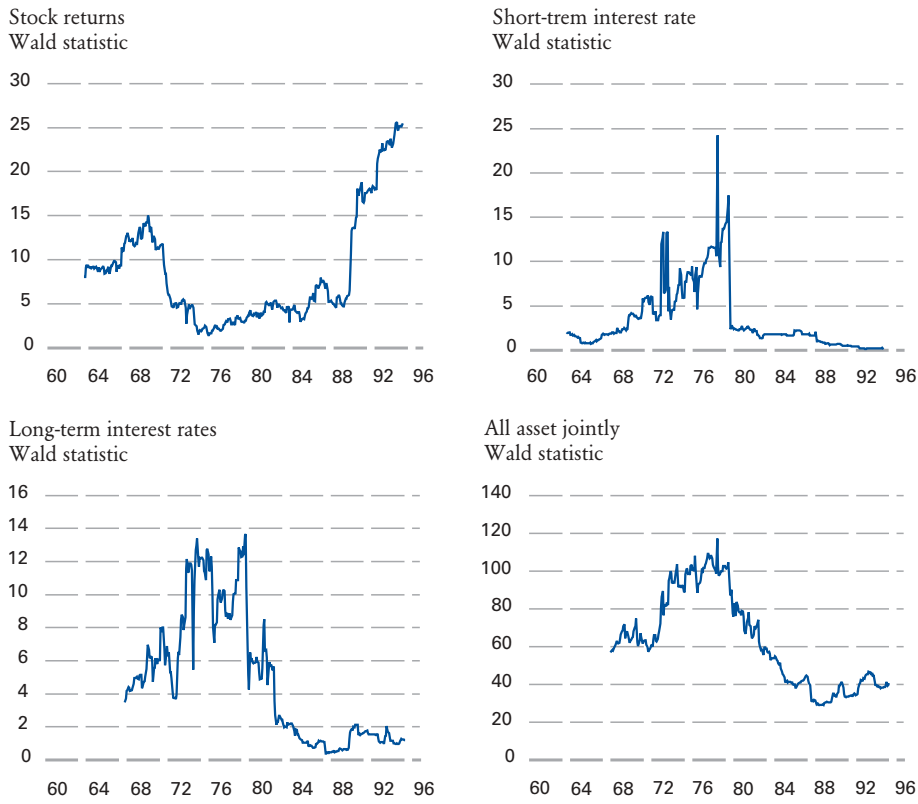
If k is known up front, equation (4) can be used to assess whether the time-series properties of y_t has significantly changed at $t = k$, for instance by means of a Wald test of the hypothesis that some of the coefficient matrices with tildes are non-zero. Of more interest, however, is the case in which k is not known a priori, and is to be estimated from the data. A straightforward way to 'estimate' k is to search for that value of k that maximes the Wald test of the hypothesis of the structural break, ie. that some the coefficient matrices with tildes are non-zero. This can be accomplished by calculating a series of Wald tests for a sequence of k's, and subsequently choosing that value of k that maximes the Wald test of the hypthosis of a structural break. This particular k will be denoted $\hat{k}$. Bai et al. (1998) show that

1. the limiting distribution of is non-standard; fortunately, they provide a way to construct confidence intervals for $\hat{k}$.
2. the precision of $\hat{k}$ increases in the number of variables which is jointly analysed.

In the present paper, we employ both results to determine the date at which Dutch financial markets became more closely related to German financial markets. This can be taken as evidence that from that period onwards, Dutch capital controls have become less effective.

Figure B1 below provides graphical representations of the Wald statistics referred to in the main text.

Figure B1 Evidence on structural breaks in the relationship between Dutch and German financial variables



Appendix C: Overview of financial sector restructuring in Thailand

On 14 October 1997, as part of the IMF's standby arrangement conditionalities, the authorities announced a comprehensive financial restructuring strategy as follows:

1. The establishment of the Financial Sector Restructuring Authority (FRA) and the Asset Management Corporation (AMC) to provide a framework for early disposal of non-performing loans (NPLs) held by finance companies.
2. The announcement of tightened loan classification rules which would require provisioning for all loans more than 6 months overdue, and accrual of interest on NPLs more than six months overdue was prohibited.
3. Resolving the resolution of 58 suspended finance companies.

Based on the FRA's recommendation, the Ministry of Finance and the Bank of Thailand announced that 56 out of the 58 finance companies would be permanently closed and that their assets had to be transferred to the FRA. By February 1998, FRA began auctioning off the assets of 56 closed finance companies. As of October 2001, the proceeds from the FRA's sale of assets totaled baht 264 billion with the recovery rate of about 35 percent of the outstanding balance (book value) of about baht 748 billion. The AMC, as bidder of last resort, had purchased assets from FRA totaling baht 33 billion with a book value of baht 197 billion. In January 1998, the Cabinet approved the creation of a fully Government-owned 'good bank,' Radanasin Bank (RSB), which was mandated to purchase and manage the good assets of the 56 closed finance companies. The initial Government ownership of RSB would later be diluted through the sale of shares to the public. One of RSB's advantages was a clean balance sheet. The Bank of Thailand intervened in seven finance companies with solvency problems in May 1998. Krung Thai Thanakit (KTT), a subsidiary of Krung Thai Bank (KTB), agreed to purchase the assets of the seven finance companies at their market value, and would be granted a bank license. In August 1998, the authorities announced the comprehensive financial sector restructuring program with additional five finance companies that were identified as non-viable, partly because they failed to raise new capital. These finance companies, the newly taken over Union Bank of Bangkok (UBB) were integrated with KTT to form a new bank – Bank Thai (BTH) formed in April 1999. By the late 1997, the Bank of Thailand had required recapitalization of undercapitalized financial institutions. For this purpose, foreign equity investment in financial institutions was fully liberalised for a period of 10 years. In March 1998, The Bank

of Thailand issued more stringent rules in governing loan classification and provisioning (LCP, hereafter), and interest accrual for banks and finance companies, which would be phased in through end-2000. Furthermore, the authorities had plans to strengthen the financial system by establishing a deposit insurance scheme and amending the bankruptcy law for expediting foreclosure. In May 1998, the Bank of Thailand intervened in the four Thai commercial banks, Bangkok Metropolitan Bank (BMB), BBC, and Siam City Bank (SCIB) and First Bangkok City Bank (FBCB) by converting FIDF loans to these banks into equity and injected additional capital (*de facto* nationalization). The remaining 11 commercial banks were under pressure for recapitalization and rehabilitation on their own. New share issues were significantly underwritten by foreign financial institutions. Two commercial banks, TDB and Bank of Asia, were acquired by Development Bank of Singapore (50.27 percent) and ABN-AMRO Bank of the Netherlands (75 percent), respectively. Other banks have limited foreign ownership to below 50 percent. Indeed, Bangkok Bank (BBL) and TFB raised tier-1 and tier-2 capital in the international markets.

On 14 August 1998, the Ministry of Finance and the Bank of Thailand announced a comprehensive financial sector restructuring program, consisting of four major components. First, capital adequacy requirements were eased and brought in line with international standards by lowering tier-1 capital requirement for the banks [41]. Second, the Government earmarked baht 300 billion for two capital-support schemes (tier-1 and tier-2 schemes), in order to encourage recapitalization of Thai financial institutions, thereby restoring and maintaining their solvency. Their tier-1 capital support facility was aimed at catalyzing the entry of private capital, whereas the tier-2 capital support facility was aimed at providing financial resources and incentives to accelerate corporate debt restructuring. Third, financial institutions were allowed to establish their own asset management companies (similar to the national Asset Management Corporation mentioned above), which would allow the removal of bad assets from the banks' balance sheets. Asset management companies provided a channel for the banks to separate 'good assets' from 'bad assets,' improving the bank's balance sheets and asset quality. Fourth, consolidation of the banks and finance companies was to be accelerated through additional interventions by the Bank of Thailand and proposed mergers. In particular, the Bank of Thailand intervened in 2 more banks (UBB and Laem Thong Bank (LTB)) and 5 more finance companies, bringing the total number of financial institutions in which the Government intervened to 18 (6 banks and 12 finance companies).

In 2001, as part of the 'Dual Track Plus' development model, the Thai government took the following measures:

1. The Establishment of the Thai Asset Management Company (TAMC), which was set up as a central agency to promote systematic and efficient non-performing loans

(NPLs) resolution of commercial banks, and expedite the corporate debt restructuring process. The benefits of setting-up TAMC are as follows:

- The centralized approach to handle sizable and diversified non-performing assets will enhance the operational efficiency in the management and resolution of NPLs.
- Previously, a single debtor may have to negotiate with many creditors, thereby rendering the debt restructuring process difficult. After the assets transfer to TAMC, the agency can act as a single creditor in dealing with those delinquent debtors.
- The assets transfer at reasonable and fair values to both creditors and debtors will lessen the need for re-capitalization.
- The financial institutions can now focus on their business as financial intermediary.
- TAMC operates under special legal power in accordance with the TAMC Act that will facilitate the debt restructuring process.

2. While the core financial institutions are undergoing restructuring, the Government has emphasized the roles of Specialized Financial Institutions (SFIs) (i.e. the Government Housing Bank, Bank for Agriculture and Cooperatives, Industrial Finance Corporation of Thailand) to support and facilitate the real sector. The Government has worked closely with the Bank of Thailand to enhance the regulatory framework of the SFIs, and promote stronger financial standing.

3. The financial crisis has shown the over-reliance of the Thai economy on the banking sector. Indeed, the bond market needs to be furthered developed to ensure successful placement of large volumes of government bond issues, to fund growth by Thai corporations, to facilitate the conduct of monetary policy by the Bank of Thailand, and to encourage risk diversification at the macro level. Strengthening the capital markets would enhance systemic stability of the financial sector and resiliency of the economy against external financial shocks. The Government has taken the following measures to promote capital market development:

- Corporate income tax of listed or to-be-listed companies in the SET will be reduced from 30 percent to 25 percent of net income. For companies listed in MAI (the new stock exchange in Thailand), corporate income tax will be reduced from 30 percent to 20 percent.
- The Government has established several matching funds with private sector counterparts, or international financial institutions to invest in Thai companies with strong business potential. For example, The US$ 1 billion Thai Equity Fund, and Thailand Opportunity Fund have been established.
- The government has set up programs to promote the upgrading of accounting and auditing standards and practices to make them consistent with international standards, revise relevant laws and regulations and identify mechanisms to ensure compliance. The Government aims to strengthen the business environment by mak-

ing amendments to the Public Companies Act to (i) reduce the thresholds for exercise of minority shareholders' right; (ii) increase accountability of directors; (iii) require sufficient information disclosure to protect the shareholders' interest; (iv) enhance insider trading rules and introduce severe sanctions for false and misleading information disclosure; (v) introduce shareholder approval requirement for major transactions; and (vi) limit the exemption of directors' liability only for cases that do not involve fraud or gross negligence.

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Notes

1 Hernández and Montiel (2001) show that, except for Malaysia, currencies of Asian countries are floating more than before the Asian crisis. Baig (2001) proves that Asian exchange rates are presently not as stable as in the pre-crisis period.

2 Edwards and Savastano (1999) provides a survey of what we know, don't know, and need to know about exchange rates in emerging markets.

3 An important difference between the Netherlands and Thailand is that for the former country the currency of a country *within* the region served as a nominal anchor for monetary policy, while the latter country pegged its currency to the US dollar, the currency of a country *outside* the region. Nevertheless, in both cases the anchor country was the main trading partner.

4 More precisely, factors that impinge on the trade-off between these pros and cons of a currency regime are considered 'requirements' for that particular currency regime. If a specific requirement renders the trade-off for a specific currency regime more in favour of the pros, this requirement is said to increase the success of the currency regime; this factor is then called a requirement for a successful currency regime.

5 In this section, we sidestep the question whether currency regimes matter for economic performance in practice. Leduc (2001) shows that volatility of exchange rates affects economies surprisingly little, although he continues to argue that exchange rate volatility may very well matter for small, open economies, like countries in East Asia or Latin Amerika. Levy-Yeyati and Sturzenegger (2001) demonstrate that for industrial countries, there appears to be no significant link between currency regimes and economic performance. With respect to non-industrial countries, however, they show that there is an inflation-growth trade-off in the choice between long currency pegs and floating regimes.

6 Bacchetta and Van Wincoop (2000) show that if there is pricing-to-market, there is no one-to-one relationship between the levels of trade and welfare across exchange rate systems, while Devereux and Engel (2001) show that in the presence of local-currency-pricing, the expenditure switching role played by the nominal exchange rate may be exaggerated. Both studies analyse the performance of currency regimes in full-fledged micro-based (stochastic) general equilibrium models.

7 The empirical evidence supporting the negative relationship between exchange rate volatility and trade, however, is mixed at best, cf. Wei (1999).

8 Engel (2001) surveys the responsiveness of consumer prices to exchange rate in a number of recent new open-economy macro models, and concludes that both the degree of exchange rate pass-through and the amount of substitutability between imported and locally-produced goods determines the scope for the expenditure-switching effect of the nominal exchange rate.

9 Goldfajn and Werlang (2000) show that the pass-through from a currency depreciation to inflation is non-constant and depends, among other things, on the position of the business cyclical, the extent of overvaluation of the real exchange rate, and the openness of the economy.

10 Calvo and Reinhart (2000) argue that the high degree of exchange rate pass-through in emerging economies explains part of the 'fear-of-floating' of these countries.

11 Monetary and exchange rate policy are intimately linked, and actually should not be considered in isolation. Exchange rate policy has to be consistent with the overall macroeconomic framework, as any currency regime that is not consistent with the overall macroeconomic policy cannot be sustained, cf. Fisher (2001).

12 Kuttner and Posen (2001) present empirical evidence indicating that a combination of central bank autonomy, inflation targeting, and a free float might offer the same benefits in terms of price and exchange rate stability as currency pegs, without the tendency of occasional large depreciations.

13 Clarida, Galí and Gertler (2001) consider optimal monetary policy rules for small open economies. They argue that how aggressively a central bank should adjust the interest rate in response to inflationary pressures depends on the degree of openness; international factors are relevant to the extent that they affect domestic inflation or the equilibrium real interest rate. Furthermore, to the extent that there is perfect exchange rate pass-through, they find that the central bank should target domestic inflation and allow the exchange rate to float. Adolfson (2001a,b) finds that if exchange rate pass-through is incomplete, the optimal interest rate response to foreign shocks declines. In addition, adding the exchange rate to the list of policy objectives results only in a small welfare gain. Last, Devereux and Lane (2001) contend that when exchange rate pass-through is high, a monetary policy in emerging market economies of non-traded goods inflation targeting does best in stabilizing the economy, and is better in welfare terms. However, when pass-through is low, a policy of strict CPI inflation targeting is

better. In all cases, a fixed exchange rate is undesirable.

14 Loungani and Swagel (2001) show that if developing countries depart from fixed exchange rate regimes, this move can be inflationary unless the new monetary arrangement is able to assume some of the role that the exchange rate peg played in moderating the impact of money shocks on inflation.

15 Canzoneri et al. (2001) is an extension to the open economy of the fiscal theory of the price level. See Kocherlakota and Phelan (1999) for an introduction to the fiscal theory of the price level.

16 See Glick and Hutchison (1999) for a concise review of the literature on 'twin' crises.

17 This is similar to the so-called first-generation models of balance-of-payments crises, which emphasise macroeconomic mismanagement as the primary cause of the crisis, see Mark (2001, chapter 11).

18 Because of uncertainty about the future value of the domestic currency, the domestic currency in emerging markets is often prevented from being used to borrow abroad or to borrow long term domestically. Eichengreen and Hausmann (1999) have called this the 'original sin' hypothesis. As a result of this original sin hypothesis, the balance sheets of banks may to a large extent be denominated in foreign currency, and hence deteriorate sharply when a fixed exchange rate regime collapses.

19 This point has been raised by Eichengreen (2001b) as well, who argues that banking-sector problems will limit the resort to interest-rate increases to defend a currency.

20 Glick and Hutchison (2000) find that restrictions on capital flows do not insulate economies from currency problems: rather, they appear to increase the vulnerability of economies to speculative attacks.

21 See Eichengreen and Mussa (1998) for a review of the pros and cons of capital account liberalisation.

22 Notionally to avoid having to reintroduce border controls on account of diverging domestic agricultural prices within the Benelux customs union, cf. Houben (2000).

23 See Wellink (1994) and the references cited therein.

24 See Berk and Winder (1994).

25 Engel (2000) employs monthly observations on prices indices for 22 categories of goods for nine European countries: Belgium, Denmark, Germany, Spain, France, Italy, the Netherlands, Portugal, and the UK. Many of the series run from January 1981 to July 1995.

26 Our explanation for the change in the degree of pass-through of exchange rate movements into relative prices runs counter to that presented by Corsetti and Pesenti (2002), who argue that in a currency union zero pass-through is optimal in terms of welfare. Basically, Corsetti and Pesenti assume that the nominal exchange rate always moves to equalise relative prices, à la Friedman. This implies that if there is zero pass-through, monetary authorities in both countries will pursue similar policies, rendering these countries a currency union in practice. We take a fundamentally different view, and allow the nominal exchange rate to be hit by random shocks, pushing it away from its equilibrium value. In that case, exporters will adopt that pricing strategy that can cope best with these random shocks.

27 This section draws heavily on Bakker (1996) and Bakker and Chapple (2002).

28 See for instance Edwards (1998) and Kaminsky and Schmukler (2000). Edwards assesses the effectiveness of the Chilean capital controls by investigating the dynamic properties of the differential between dollar and peso denominated interest rates. He uses rolling regressions to estimate the parameters of an AR(1) process for this interest rate differential. He is able to show that the process has become more persistent, and he hence concludes that the capital controls indeed had granted Chile increased control over its short-run monetary policy. Kaminsky and Schmukler examine whether capital controls have reduced financial instability in a number of emerging countries. They estimate the degree of comovement in the short-, medium-, and long-run between fluctuations in domestic stock prices and interest rate and their foreign counterparts. They conclude that if capital controls create a barrier between fluctuations in the region and fluctuations in the domestic stock market, this barrier is, at most, present at high frequencies. Futhermore, as with stock markets, capital controls do not seem to enhance the insulation of money markets either.

29 Note that the graphs in Figure B1 in Appendix B only indicate when a structural break in the interrelationships occured. A comparison between the estimated regression parameters before and after the estimated break date then reveals whether the interrelationship has grown stronger of weaker. An extensive list with all relevant parameter estimates is suppressed, but available from the authors upon request.

30 This section draws on Prast (2000).

31 The central bank of Thailand, the Bank of Thailand, has been established in 1942 by the Bank of Thailand Act.

32 The Bank of Thailand acts as a sole dealer in the repurchase market for government bonds. Until 1986, the central bank's operations in the repurchase market largely involved matching the demand and supply of repurchases, with limited intervention on its own account for monetary control purposes. However, following the substantial improvements of Thailand's external position and the liquidity of the banking system, respectively, the central bank actively absorbed liquidity through government bond repurchases. In addition, in 1987 the Bank of Thailand started to sell its own bonds. The importance of open market operations steadily increased during the 1980s, as the volume of transactions rose six-fold between 1980 and 1990, to Baht 600 billion.

33 The Bank of Thailand lends to financial institutions through a general loan window and a refinancing facility. The former provides short-term liquidity using government securities as collateral, and banks must use this loan window as a 'last resort' funding source. The refinancing facility, on the other hand, is designed to allocate financial resources to priority sectors such as exports (receiving 90 percent of refinancing facility), manufacturing, and agriculture. The central bank provides credits to commercial banks at preferential interest rates against their promissory notes. In 1989, the refinancing facility was scaled down in order to lower direct subsidy provided. In addition, the distribution of financial assistance was changed in favour of small-scale industries and rural development.

34 For presentational purposes, Figure 7 displays the dollar-baht exchange rate.

35 In December 1971, the band was raised to plus and minus 2.25 percent.

36 This highlights one the fundamental weaknesses of pegged exchange rates: the need to revalue the peg in order to realign the exchange rate with underlying fundamentals.

37 In addition, the rise in the trade-to-GDP ratio from 54 percent in 1980 to 84 percent in 1996 illustrates Thailand's integration in the world market.

38 To be precise, activities of the BIBF included: (i) taking deposits or borrowing in foreign currencies from abroad, then lending in foreign currencies in Thailand (out-in lending) and abroad (out-out lending), non-Baht cross-currency foreign exchange transactions, (ii) providing guarantees against any debts denominated in foreign currencies to persons residing abroad, undertaking financial transactions which involve international trade in the cases where buyers and sellers reside abroad, and (iii) seeking loans from foreign sources, as well as acting as fund managers in arranging loans.

39 See for example Krugman (1998).

40 Bai *et al.*'s (1998) technique can also be applied to systems of cointegrated variables.

41 Capital adequacy ratios were to remain at 8.5 percent for banks and at 8 percent for finance companies. But tier-1 capital requirement for banks were lowered from 6 to 4.25 percent, and the tier-2 component was raised from 2.5 to 4.25 percent in line with the Basle standards. The 1 percent provisioning requirement for performing loans was qualified for tier-2 capital.