Requirements for successful currency regimes:

the Dutch and Thai experiences

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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 U.S. 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 U.S. 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 for
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. Strengthening 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. As 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 accounts without supporting domestic policies aimed at
strengthening 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 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.

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 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.

13. On the road to increased monetary co-operation, exchange rate flexibility may be instrumental in coping with Balassa-Samuelson-type catching-up effects. 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, 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. A popular way to look at this issue is the so-called bi-polar view, which states that in 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 financial 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 (2001) and Kuroda and Kawai (2002) for further details. 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, indeed, is a challenging question, but a comprehensive one as well. Therefore it has been 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 paper is a contribution to the Kobe Research Project.

The present paper – 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

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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.
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 did not succeed in maintaining exchange rate stability in the late 1990s, when it faced a currency crisis. Notwithstanding the fact that the crisis did much damage to the Thai economy, its causes may provide further useful information regarding the requirements for successful currency regimes. Secondly, the paper 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 paper, however, that because of the large differences between the Netherlands (Europe) and Thailand (Asia), drawing any lessons should be done with great caution. The set-up of the 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 impose structure on 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 Dutch and Thai case-studies is elaborated on in Section 3, whereas the Dutch and Thai experiences are presented 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 Appendices C and D some further information on the Thai financial sector and its restructuring 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.

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? 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). 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.

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3 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.

4 In this section, we sidestep the question whether currency regimes matter for economic performance in practice. Leduc (2001) shows that volatility of exchange rates affect 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 nonindustrial countries, however, they show that there is an inflation-growth trade-off in the choice between long currency pegs and floating regimes.

5 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.
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 macroeconomic 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 accommodate 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 microeconomic level, fixed exchange rates are associated with lower exchange rate volatility, which may stimulate cross-border trade and investment.\(^6\)

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\(^7\), the loss in terms of flexibility by adopting a fixed exchange rate is diminished, cf. Devereux and Engel (2001)\(^8\). 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 destabilize 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\(^9\). In Section 4, we will therefore investigate the (changing) degree of exchange rate pass-through in the Netherlands.

\(^6\) The empirical evidence supporting the negative relationship between exchange rate volatility and trade, however, is mixed at best, cf. Wei (1999).

\(^7\) 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.

\(^8\) 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 cycle, the extent of overvaluation of the real exchange rate, and the openness of the economy.

\(^9\) Calvo and Reinhart (2000) argue that the high degree of exchange rate pass-through in emerging explains part of the ‘fear-of-floating’ of these countries.
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 occurrence 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, 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). However, for a currency peg to be credible and lasting, the monetary authorities have to...

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10 Berger et al. (2001) examine a case where an exchange rate peg alters the structure of the economy in the pegging country in such a way that a peg may even become a ‘free lunch’.

11 Monetary and exchange rate policy are intimately linked, and actually should not be considered in isolation.

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...
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 government 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 recently been challenged by Tornell and Velasco (2000). They argue that flexible exchange rates reflect the excesses of fiscal policy faster and in a more transparent way than fixed exchange rates. This means that under flexible exchange rates, the excesses of fiscal policy are paid immediately, 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 rate 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 of 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 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.’s (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.
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 intimately 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. 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 occurrence of banking and currency crises is related to the underlying international illiquidity of the economy, that is, its ability to services its foreign debt. Whether or not the (monetary) 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 aggravate by either the high interest rates required to defend the exchange rate peg or the foreign currency exposure of banks. Similarly, Obstfeld (1994) argues that banks that are already ‘vulnerable’ in the sense of having large unhedged foreign liabilities and/or a unmanageable maturity mismatch between assets and liabilities, may be pushed over the edge by an interest rate hike that goes together with a currency crisis.

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.

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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 Haussmann (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 (2001) as well, who argues that banking-sector problems will limit the resort to interest-rate increases to defend a currency.
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\textsuperscript{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\textsuperscript{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. The previous section, however, indicates that there is more to currency regimes than the traditional Optimal Currency Area criteria. The behaviour of the financial sector turns out to be especially important for their operation. We will therefore also focus on both the process of capital account liberalisation and developments in the banking sector. Issues that are taken up are (1) the extent to which capital restrictions shield the domestic economy and thus enable the monetary authorities to conduct an independent monetary policy while maintaining a currency peg,

\textsuperscript{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.

\textsuperscript{21} See Eichengreen and Mussa (1998) for a review of the pros and cons of capital account liberalisation.
and (2) the role to be played by capital restrictions in a process of restructuring of the domestic economy.

4. The Netherlands
This section presents an account of Dutch exchange rate policy from the 1970s onwards, the process of capital liberalisation, and developments in the banking sector, respectively. We provide inter alia new evidence on the endogeneity of the Optimal Currency Area criteria, mentioned in Section 2, and we use modern econometric techniques to show that Dutch capital controls in the 1960s and 1970s were not very effective.

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 policy 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 5½% 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 allows them to fluctuate within a band of ±2¼% 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.

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 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 with 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 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 strengthening 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.

Figure 2: Interest rate differential between the Netherlands-Germany

![Interest rate differential between the Netherlands-Germany](image)

Source: IFS

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%.

22 Notionally to avoid having to reintroduce border controls on account of diverging domestic agricultural prices within the Benelux customs union, cf. Houben (1999).
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.

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 German 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. 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 the gap between Dutch and German short-term interest rates gradually decreased.

In sum, it appears that Dutch exchange rate policy can to a large 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 a policy of fiscal consolidation, which according 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

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

**Figure 3: The Dutch-German consumer price ratio**

![Graph showing the Dutch-German consumer price ratio](source: IFS)

**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, price differentials between the Netherlands and Germany are very responsive to exchange rate changes, suggesting that the latter economies are highly integrated. Unfortunately, Engel does not present evidence regarding changes in the degree of responsiveness. To assess the latter 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: Pass-through of changes in bilateral guilder exchange rates**

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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.
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 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 losing 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.\footnote{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.}

\textit{Capital account restrictions: a chronology}\footnote{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 subsequently 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 allocation of savings and investments across the world will be sub-optimal. 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 modernized. 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, 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.

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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.
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 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 suggest 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 afterwards, 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.

Figure 6: Dutch and German stock returns: evidence on a structural break

Figure 7: Dutch and German short-term interest rates: evidence on a structural break
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. Figures 6 to 9 present the relevant Wald-statistics, that indicate the likelihood of various break-dates. The peaks of these graphs point towards the likely location of the break date. Figure 6 to 8 refer to the relationship between Dutch and German stock returns, changes in short-term interest rates, and changes in long-term interest-rates, respectively. Figure 9 on the other hand, considers the relationships between the three different financial variables jointly. It therefore indicates when the relationship between the Dutch and German financial markets featured a structural change, that is, when these markets became increasingly integrated. With respect to stock returns, Figure 6 indicates that Dutch and German equity markets have become increasingly integrated near the end of the
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, Figure 7 conveys a clear message: 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 from Figure 8, which concerns the 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. Figure 9 indicates 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 the 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

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29 Note that Figures 6 to 9 only indicate when a structural break in the interrelationships occurred. A comparison between the estimated regression parameters before and after the estimated break date then reveals whether the interrelationship has grown stronger or weaker. An extensive list with all relevant parameter estimates is suppressed, but available from the authors upon request.

30 This section draws heavily on Prast (2000).
A sector of the Dutch economy that had to cope with the vigour of the global economy, as a result of financial liberalisation in Europe, has been the banking sector. In this subsection, we discuss how this sector succeeded.

During 1951-1973, the Netherlands went through a period of sustained export-led growth, and these years have subsequently been called the ‘Golden Years’ (Van Zanden and Griffiths (1989)). Much in contrast with the situation in its neighbouring countries, the links between industrial firms and the banking system in the Netherlands were rather weak, and banks therefore did not play a key role in the economic recovery after the Second World War; industrial firms mainly used internal funds to finance expansion. However, this situation changed significantly in the 1960s, when corporate lending surged. 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 to be 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)).

After the collapse of the Bretton Woods system and the first oil crisis, the Netherlands, like many other developed countries, entered a period of stagflation. A combination of high inflation rates and high inflation expectations, but relatively low nominal interest rates, resulted in low real interest rates, which elicited a lending boom in the real estate market. When in the late 1970s monetary authorities around the world increasingly emphasised their commitment to curb inflation, the real interest rate started to rise, which lead to a collapse of the Dutch housing market. This had severe repercussions for the specialised mortgage banks. Mortgage banks were mainly funded by issuing mortgage bonds. As the value of the collateral, i.e. real estate, of these bonds dropped considerably, mortgage bonds could only be sold at increasingly higher yields as compared with other bonds, if indeed they could be sold at all (Barendregt and Visser (1997)). As a result, the two main mortgage banks, the Westland Utrecht Hypotheekbank and the Friesch-Groningse Hypotheekbank were ultimately taken over by two insurance companies, Nationale-Nederlanden and AEGON, respectively. This was made possible only after the Dutch central bank in 1982 lifted its ban on banks and insurance companies buying mortgage banks\textsuperscript{31}. At the same time, the world economy faced a debt crisis in a number of less developed countries. Dutch banks were not unduly hurt by this crisis for various reasons. First, they were not heavily involved in the countries experiencing payment difficulties and
their portfolios were well diversified. Second, as from May 1981, the banks had to report their exposure to less developed countries semi-annually to the Dutch central bank, in order to keep tab on these exposures (Barendregt and Visser (1997)). This may have worked as a disciplining device.

The structure of the Dutch banking system changed 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. The importance of this phenomenon is illustrated in Table 1.

Table 1 The emergence of financial conglomerates: mergers and acquisitions in the financial sector in the Netherlands, 1989-1999

<table>
<thead>
<tr>
<th>Year</th>
<th>Mergers and Acquisitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>Merger of NMB Bank and Postbank into NMB-Postbank</td>
</tr>
</tbody>
</table>
| 1990 | - Acquisition by Rabo-bank of insurance company Interpolis  
- Merger between insurance company AMEV and savings bank VSB Group, followed by the merger with Belgian insurance group AG into the later Fortis bank  
- Merger of insurance companies De Centrale Verzekeringen and Concordia beheer, and savings bank Algemene Spaarbank Nederland (ASN) into Reaal Groep.  
- Merger of NMB-Postbank Groep bank with securities company Nationale Nederlanden into Internationale Nederlanden Groep (ING) |
| 1991 | - Strategic alliance between Rabo-bank and securities company Robeco |
| 1992 | - Acquisition by Fortis of the Belgian credit institution NMKN  
- VSB/Fortis participate in Belgian savings bank ASLK |
| 1994 | - Merger of SNS bank with insurance company NOG Verzekeringen into SNS Groep |
| 1995 | - ING takes over Barings Bank |

Unfortunately, no such luck befell Tilburgsche Hypotheekbank, which in 1983 was declared bankrupt.

Unlike many other countries the Dutch central bank is charged not only with monetary policy but also with prudential supervision and so-called structure policy. Prudential supervision is concerned with protecting the banks’ creditors. The Wet Toezicht Kredietwezen, based on the 1948 Bank Act, which came into force in 1952, authorises the Dutch central bank to issue rules on capital-asset ratios and liquidity ratios. Structure policy is aimed at preventing financial combines coming into existence that will be too powerful.
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

This section provides an account of Thai exchange rate policy over the past decades, focussing on the baht-dollar currency peg. Since Thailand succeeded in achieving exchange rate stability over a fairly long period of time, this country, just like the Netherlands, may provide lessons regarding the requirements for exchange rate stability. In 1997, when Thailand faced a currency crisis, the currency peg was discontinued abruptly. It is generally agreed upon that the financial sector played a pivotal role in this crisis. In order to further assess the role played by the financial sector in supporting currency regimes, we therefore discuss 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. The chief monetary policy instruments have been open market operations in the repurchase market, lending by the Bank of Thailand, creation of ceilings on lending interest rates, and through intervention in the exchange market. Over the past five decades, Thailand generally achieved a low

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33 The central bank of Thailand, the Bank of Thailand, has been established in 1942 by the Bank of Thailand Act.
34 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 bond. 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.
35 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.
level of inflation. Figure 10 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.

Figure 10: Thai inflation rate

![Graph showing Thai inflation rate from 1966 to 1998.]

*Source: IFS, annual percentage change*

It was able to do so by pegging its currency, the baht, to the U.S. dollar, 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 after the introduction of the ERM. Figure 11 shows that, indeed, the baht-dollar exchange rate change has been remarkably stable over the past decades, until Thailand in 1997 faced a fierce currency crisis. Note that for presentational purposes, Figure 11 displays the dollar-baht exchange rate.

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 values of the baht in terms of gold with one percent above and below the par value. The government established the Exchange Equalization Fund (EEF) to play an effective role in stabilizing exchange rate movements. The EEF determined the U.S. 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.

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36 In December 1971, the band was raised to plus and minus 2.25 percent.
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 U.S. dollar. The rates were calculated from the average rates in 1962. The declared exchange rate was used until the early 1970s, when a number of adjustments was made due to the prevailing financial situation. These adjustments are summarised in Table 2. 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 U.S. dollar, but to depreciate in terms of gold. Both devaluations aimed to prevent a further deterioration of trade deficits and to help exporters and farmers maintain their earnings in terms of the baht. Moreover, the devaluations would enhance competitiveness of Thai products. A revaluation vis-à-vis the U.S. dollar occurred on July 15, 1973, when major currencies in Europe were floated against the U.S. dollar, and the effective value of the baht further depreciated. The government aimed at restoring the value of the baht against other currencies (with the exception of the U.S. dollar) to its previous level and at preventing an increase in import costs. In 1978, the IMF endorsed the new generalized floating exchange rate system, emphasising greater exchange rate flexibility and a reduction in the role of gold in the international monetary system. The Thai Currency Act was then
amended to be congruent with the IMF agreement and the fixed parity system relative to gold was terminated on March 8, 1978.

To ensure greater stability in the baht value, from March 1978 to November 1978, the baht was tied to a weighted average of currencies of the Thai major trading partners’; though, in practice the baht was 100 percent weighted in the U.S. dollar in that period. It was envisaged that the baht would no longer fluctuate with changes in the value of any particular currencies. The EEF still determined the U.S. dollar rate but with more flexibility.

On November 1, 1978, the EEF switched from a policy of all day standby to sell and buy U.S. dollar, to the daily fixing system, the reason being that the latter system allowed the baht exchange rate to reflect the market supply of and demand for foreign currencies more closely and at the same time contributed to the development of the local foreign exchange market. Under this system, the representatives from the EEF and commercial banks determined the U.S. dollar rate in a daily fixing session. They observed the demand for and supply of U.S. dollars and then fixed a certain exchange rate. The EEF would then intervene by buying and selling at that prevailing rate. The U.S. dollar fixing rate was used as the base rate at which transactions between commercial banks and customers were conducted. Then, buying and selling rates applicable to customers’ transactions in other currencies were determined on the basis of the cross rates between the fixing rate for the U.S. dollar and the exchange rates of the currency concerned in international markets. As of 1981, the value of the baht continued to decline against the U.S. dollar, as the U.S. dollar appreciated substantially compared to other major currencies, due to a major restrictive U.S. monetary stance intended to stop the inflationary trend. The baht, hence, was devalued by 1.07 percent and 8.7 percent in terms of U.S. dollar on May 12 and July 15, 1981 respectively. This exchange rate adjustment was conceived as to boost exports and deter imports. After the devaluation of the baht, the U.S. dollar continued to appreciate, thus forcing the EEF to release an unusual large amount of dollars on the market. Eventually, the daily fixing system was abolished in order to promote financial stability and exports as well as relieve the trade and payments problems.

From July 1981 onwards, the baht was again fixed vis-à-vis the U.S. dollar only. The EEF was solely responsible for the determination of the daily U.S. dollar rate, while commercial banks no longer played any role in the exchange rate determination process. The EEF offered to buy or sell an unlimited amount of US dollar at the fixed rate at 23.0 baht per US dollar. After maintaining a fixed exchange rate against the U.S. dollar for about three years, the continued rise in the value of the U.S. dollar led to an overvaluation of baht compared to other currencies and a significant deterioration of the Thai trade balance. Therefore, the Thai authorities devalued the baht to 27.0 baht per U.S. dollar on November 8, 1984.

As of November 1984, the exchange rate system was changed again to a peg to a basket of currencies, as to allow more flexibility to the baht. The basket’s composition was first on a trade-weighted basis. As a result, following the intervention of the G5 in 1985 and the depreciation of the
dollar, the baht rapidly appreciated vis-à-vis the dollar. In order to stabilise the baht vis-à-vis the dollar, the authorities therefore 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 U.S. dollar. Until the mid 1990s, the baht was successfully pegged to the U.S. dollar.

In the 1990s, the U.S. 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. The stable exchange rate and the deregulations of foreign exchange transactions, which will be discussed in some detail below, benefited Thailand’s economy greatly, but also encouraged inflows of short-term capital (sometimes called “hot money”) through interest rate arbitrage: minimal exchange rate risk in combination with the wide interest gap vis-à-vis the U.S. attracted short-term capital inflows to benefit from the interest rate differential. The accumulation of short-term inflows resulted in abundant domestic liquidity, lax lending practices, and improper credit supervision. In short, a bubble economy spreaded throughout the Thai economy. In March 1996, when export growth slowed sharply, concern about the large current account deficit put the baht under steadily growing pressure. With serious imbalances of economic fundamentals, liquidity drained from the market and interest-sensitive sectors such as property. The domino effect weakened many financial institutions and the Thai stock market. The slow-down of output growth led to the expectation of a devaluation of the Thai baht’s and triggered a speculative attack. Consequently, massive amounts of capital flowed out of Thailand. The Bank of Thailand tried desperately to defend the currency, but the attempt was in vain, as can been seen from Figure 11. Instead, the country’s foreign exchange reserves fell sharply in May 1997. 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. The Exchange Equalization Fund no longer sets a mid-rate. Instead, the Bank of Thailand announced a “reference rate” which was calculated simply by averaging the closing rate at which the baht traded at the 15 Thai commercial banks on the previous day. While market forces were now the main determinant of the currency’s level, the Bank of Thailand continued to monitor its movements closely and to intervene in the market when necessary to stabilize the rate within an undisclosed band.
4.3 The baht exchange rate: some explanations
In this section, we will elaborate instead on the questions why Thailand chose to peg the baht to the US dollar in the first place, and why this peg could not be sustained in the late 1990s. The answers to these questions will provide us with additional requirements (supplementing those that can be inferred from the Dutch experiences) for maintaining exchange rate stability.

The decision taken by the Thai authorities to peg the baht to the U.S. dollar can be accounted for a number of reasons. First, the promotion of exports and to relieve trade problems. The U.S. has been Thailand’s major trading partner, as 20-25% of total Thai exports goes to the U.S. Moreover, more than 80% of the international transactions of Thailand is settled in dollars. Put differently, the Thai economy is strongly connected to the U.S. dollar, warranting stabilisation of the baht-dollar exchange rate. Secondly, the baht-dollar currency peg provided Thai monetary authorities a nominal anchor for monetary policy. In view of Thailand’s inflation record over the past three decades, as displayed in Figure 10, this nominal anchor has proved to be rather successful. Indeed, Figure 12 shows that between 1965 and the early 1990s, the Thai-U.S. consumer price ratio has been remarkably stable. This indicates that pass-through of changes in U.S. prices into Thai prices has been rapid, reducing the need of the baht-dollar exchange rate to function as shock absorber.

However, since the early 1990s, developments of U.S. and Thai prices have diverged, as the trend in the US-Thai price ratio after 1990 indicates. In the 1990s, the Thai economy underwent substantial changes. The annual growth rate amounted to an average of 9 percent during 1987-1996, compared to 3 percent during 1980-1986. In this period, Thailand’s economy was also subject to drastic structural changes, i.e. its financial liberalisation and its integration with global economy. For instance, trade-to-GDP ratio increased from 54 percent in 1980 to 84 percent in 1996. Indeed, Thailand received large foreign capital inflows due to its financial integration. Thailand’s net capital inflows grew rapidly from US$10.9 billion in 1990 to US$18.2 billion in 1996. However, liberalisation and globalization of the financial system without precautionary measures, such as effective risk management, and an adequate prudential supervision system, 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.
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 authorized bank, exporters were required to acquire a Certificate of Exportation from an authorized 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.

Notwithstanding 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, limited foreign exposure of commercial banks, and actively influenced the allocation of bank credit across sectors.\footnote{We will elaborate on this issue below.}

In 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

\footnote{We will elaborate on this issue below.}
current operations of financial institutions, developing the domestic financial structure, boosting competition and liberalisation of Thai financial system, promoting the redistribution of economic prosperity from the center to the countryside, correcting oversights in 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: 7 percent for domestic banks and 6 percent for foreign banks. Then, in 1993, the capital account was further liberalised through the introduction of BIBF, the Bangkok International Banking Facilities, which aimed to be a new financial center of the region. The BIBF fostered borrowing and lending in foreign currencies, and provided other investment banking services, such as advice on mergers and acquisitions. The 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 (PIBFs). Similar to the BIBF, the PIBF’s funding must be from overseas. In contrast, the PIBF was allowed to extend credits both in baht and in foreign currencies, whereas the BIBF was allowed to engage in the latter activity only.

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38 These percentages were later increased to 7.5 percent and 6.5 percent, respectively.
39 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.
Table 3: Net Flows of Portfolio Investment and Foreign Direct Investment

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio Investment</td>
<td>450</td>
<td>36</td>
<td>454</td>
<td>2,682</td>
<td>-409</td>
<td>2,120</td>
<td>1,123</td>
<td>3,875</td>
<td>449</td>
</tr>
<tr>
<td>FDI</td>
<td>2,531</td>
<td>2,016</td>
<td>2,116</td>
<td>1,732</td>
<td>1,323</td>
<td>2,004</td>
<td>2,270</td>
<td>3,645</td>
<td>4,810</td>
</tr>
</tbody>
</table>

Notes: Source: Bank of Thailand; in millions of US$.

The liberalisation program, which entailed a simultaneous liberalisation of the domestic financial sector and the capital account, resulted in a surge in private capital inflows and rapid credit growth. Table 3 shows that capital inflows via portfolio investment rose from an average of 313.3 million of US$ during 1990-92 to an average of 1,878 million of US$ during 1993-1997. Table 4 indicates that the share of the short-term component in Thailand’s external debt rose from around 36 percent in 1990 to 50 percent in 1995, and that the country’s external debt surged from US$ 29.3 billion in 1990 to US$ 93.4 billion in 1997.

Table 4: External Debt Outstanding

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Sector</td>
<td>11,514</td>
<td>12,810</td>
<td>13,068</td>
<td>14,171</td>
<td>15,714</td>
<td>16,402</td>
<td>16,805</td>
<td>17,166</td>
<td>20,290</td>
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<tr>
<td>Long-term</td>
<td>11,257</td>
<td>12,105</td>
<td>12,518</td>
<td>14,171</td>
<td>15,534</td>
<td>16,317</td>
<td>16,751</td>
<td>17,146</td>
<td>20,140</td>
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<tr>
<td>Short-term</td>
<td>257</td>
<td>705</td>
<td>550</td>
<td>-</td>
<td>180</td>
<td>85</td>
<td>54</td>
<td>20</td>
<td>150</td>
</tr>
<tr>
<td>Private Sector</td>
<td>17,793</td>
<td>25,068</td>
<td>30,553</td>
<td>37,936</td>
<td>49,152</td>
<td>66,166</td>
<td>73,731</td>
<td>69,093</td>
<td>54,666</td>
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<tr>
<td>Long-term</td>
<td>7,633</td>
<td>10,382</td>
<td>12,189</td>
<td>15,302</td>
<td>20,153</td>
<td>25,155</td>
<td>36,172</td>
<td>34,277</td>
<td>31,293</td>
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<tr>
<td>Short-term</td>
<td>10,160</td>
<td>14,686</td>
<td>18,364</td>
<td>22,634</td>
<td>28,999</td>
<td>41,011</td>
<td>37,559</td>
<td>34,816</td>
<td>23,373</td>
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<tr>
<td>Commercial Bank</td>
<td>4,233</td>
<td>4,477</td>
<td>6,263</td>
<td>5,279</td>
<td>9,865</td>
<td>14,436</td>
<td>10,682</td>
<td>9,488</td>
<td>7,074</td>
</tr>
<tr>
<td>Long-term</td>
<td>286</td>
<td>338</td>
<td>731</td>
<td>1,263</td>
<td>3,451</td>
<td>4,443</td>
<td>2,314</td>
<td>3,824</td>
<td>3,753</td>
</tr>
<tr>
<td>Short-term</td>
<td>3,947</td>
<td>4,139</td>
<td>5,532</td>
<td>4,016</td>
<td>6,414</td>
<td>9,993</td>
<td>8,368</td>
<td>5,664</td>
<td>3,321</td>
</tr>
<tr>
<td>BIBF</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7,740</td>
<td>18,111</td>
<td>27,503</td>
<td>31,187</td>
<td>30,079</td>
<td>21,892</td>
</tr>
<tr>
<td>Long-term</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1,385</td>
<td>2,969</td>
<td>3,799</td>
<td>10,697</td>
<td>10,317</td>
<td>6,946</td>
</tr>
<tr>
<td>Short-term</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6,355</td>
<td>15,142</td>
<td>23,704</td>
<td>20,490</td>
<td>19,762</td>
<td>14,946</td>
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<tr>
<td>Non-Bank</td>
<td>13,560</td>
<td>24,290</td>
<td>24,290</td>
<td>24,917</td>
<td>21,176</td>
<td>24,227</td>
<td>31,864</td>
<td>29,526</td>
<td>25,700</td>
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<tr>
<td>Long-term</td>
<td>7,347</td>
<td>11,458</td>
<td>11,458</td>
<td>12,654</td>
<td>13,733</td>
<td>16,913</td>
<td>23,161</td>
<td>20,136</td>
<td>20,594</td>
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<tr>
<td>Short-term</td>
<td>6,213</td>
<td>12,832</td>
<td>12,832</td>
<td>12,263</td>
<td>7,443</td>
<td>7,314</td>
<td>8,701</td>
<td>9,390</td>
<td>5,106</td>
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<tr>
<td>Monetary Authorities</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7,157</td>
<td>11,204</td>
<td></td>
</tr>
<tr>
<td>Use of IMF credit</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3,239</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7,965</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>29,308</td>
<td>37,878</td>
<td>43,621</td>
<td>52,107</td>
<td>64,866</td>
<td>82,568</td>
<td>90,536</td>
<td>93,416</td>
<td>86,160</td>
</tr>
<tr>
<td>Long-term</td>
<td>18,891</td>
<td>22,487</td>
<td>24,707</td>
<td>29,473</td>
<td>35,687</td>
<td>41,472</td>
<td>45,293</td>
<td>58,580</td>
<td>62,637</td>
</tr>
<tr>
<td>Short-term</td>
<td>10,417</td>
<td>15,391</td>
<td>18,914</td>
<td>22,634</td>
<td>29,179</td>
<td>41,096</td>
<td>37,613</td>
<td>34,836</td>
<td>23,523</td>
</tr>
<tr>
<td>Bank foreign assets</td>
<td>2,213</td>
<td>2,699</td>
<td>2,563</td>
<td>5,833</td>
<td>6,856</td>
<td>9,672</td>
<td>7,362</td>
<td>8,887</td>
<td>12,836</td>
</tr>
<tr>
<td>Gross official reserves</td>
<td>14,273</td>
<td>18,416</td>
<td>21,182</td>
<td>25,439</td>
<td>30,279</td>
<td>37,027</td>
<td>38,725</td>
<td>26,968</td>
<td>29,536</td>
</tr>
</tbody>
</table>

Source: Bank of Thailand

The capital inflows, in turn, were one of the driving forces behind the rapid growth of credit (the credit to GDP ratio rose from 64 percent in 1987 to 142 percent in 1996). An increase in foreign
borrowing and rapid credit growth resulted in high leverage as well as asset price bubbles. The debt to equity ratio of Thai corporates increased significantly, rising from 1.6 in 1988 to 2.3 in 1996.

By the end of 1996, therefore, Thailand’s firms were highly susceptible to liquidity and interest rate shocks. Hence, the Bank of Thailand introduced a series of capital restrictions focusing on short-term capital. Furthermore, it required commercial banks to deposit 7 percent reserve requirement of their non-resident baht deposits with maturity of less than 1 year at the Bank of Thailand which increased the cost of raising short-term deposit from abroad.

The currency crisis in 1997 illustrated the negative impact of large and volatile capital inflows, especially when the exchange rate was fixed. Although short-term interest rates in Thailand climbed to as high as 20 percent during the crisis, lower investor confidence induced debt repayment, thus igniting net capital outflows. For example, as shown in Table 4, portfolio investment net inflows jumped in the second and third quarter of 1997 as the price per earnings ratio in the stock market fell below 10 for the first time in the 1990s. However, portfolio investment decreased dramatically in 1998 as Thai economic growth in 1998 dropped to –8 percent. The sentiment, in particular, was very unfavourable for financial institutions, as debtors could not borrow from international capital markets to rollover short-term debts or meet current debt service obligation. Due to the credit default, non-performing loans in the financial institutions grew to a high level. At the same time, the boom of the US economy and the US stock market led to a repatriation of investment funds from emerging economies including Thailand.

Nevertheless, foreign direct investment remained unaffected from the economic recession. It actually grew to a remarkable level after the baht was floated in the middle of 1997. It has been attributed to a number of long-term commitment projects and a number of mergers and acquisitions. Also, foreign direct investment registered net inflows to recapitalize foreign companies in Thailand and commercial banks, i.e., Bank recapitalization accounted for US$ 2.291 billion in 1998 and US$ 1.555 billion during the first 9 months of 1999. This increase in foreign direct investment helped to compensate for the private sector’s net outflows in other capital categories.

The number of foreign exchange transactions, however, substantially declined after the crisis. Foreign exchange transactions including spot, forward, and swap fell from US$ 9.0 billion per day in January 1997 to US$ 1.9 billion per day in October 1999. In addition, the volume of transactions, gross inflow and gross outflow, of non-resident baht account fell from the peak of US$ 6.7 billion per day in 1995 to US$ 0.9 billion per day in 1999.

After the attack on the baht, the Bank of Thailand imposed some capital account restrictions in order to prevent speculation on the baht. It separated the foreign exchange market into “onshore” and...

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40 For example, it raised the minimum amount of loans made through BIBFs out-in from no less than $500,000 to no less than US$ 2 million in order to get rid of small borrowers from oversea borrowings, thus getting higher qualified borrowers with low default risk repayment.
“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.

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 as in Table 2. This favorable change in the nature of capital inflows, together with the continuous surplus in the country’s current account balance as shown in Figure 13 has enabled monetary authorities to maintain the use of a low interest rate policy to help the country’s economic recovery process.

**Figure 13: Current account Thailand**

![Figure 13: Current account Thailand](image)

*Source: Bank of Thailand*

Economic stability has been gradually enhanced over the first half of 1998. The net outflow of private capital slowed down as the confidence of foreign investors in economic policy has been restored. This allows an improvement in the roll-over rate of foreign debt and encourages more foreign direct investment.

To summarise, the Thai financial system has significantly changed over the past three decades. In the past, it was fairly intensely regulated as a result of, among other things, the ceilings on interest rates, the limitations of credit allocation, and the restrictions on branches. Following the economic expansion and the integration of 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, rapid liberalisation of capital accounts which was not supplemented by proper supervision and regulation brought about the financial crisis in Thailand in the middle of 1997. As we will explain below, 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.
**Developments in the Thai banking sector**

The aim of this section is to demonstrate the consequences for the banking sector of the process of financial liberalisation which the Thai authorities initiated in the early 1990s.

At present, the financial system in Thailand comprised of the Bank of Thailand (central bank); 13 Thai commercial banks; 18 foreign branch banks; 21 finance and securities companies; 6 specialized banks and financial institutions owned by the Government\(^{41}\); 9 credit foncier companies, 26 life insurance companies, and 390 pawn shops.

As of the end 2001, commercial banks predominated the financial system accounting for roughly 70.5 percent of total financial system assets while finance and securities companies and specialized government banks accounts for 6 percent and 16 percent of the total financial system assets, respectively. A major change in the composition of the assets owned by these institutions is the significant reduction of the assets of the finance companies since the crisis in 1997 (total assets of finance companies at end-1996 were Baht 1,811 billion). This is due to the fact that finance companies were most severely impacted by the crisis as they operated in a higher risk business.\(^{42}\) Specialized financial institutions also see a greater role in the financial system since the crisis as their assets increase significantly.

<table>
<thead>
<tr>
<th>Financial Institutions</th>
<th>Year Operation Began</th>
<th>Deposits or Depsits equivalent</th>
<th>Household Saving Mobilized</th>
<th>Credit Extended</th>
<th>Total Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Banks</td>
<td>1988</td>
<td>5,109,973</td>
<td>3,720,026</td>
<td>4,298,974</td>
<td>6,747,819</td>
</tr>
<tr>
<td>Finance Companies</td>
<td>1969</td>
<td>328,777</td>
<td>141,681</td>
<td>359,511</td>
<td>571,724</td>
</tr>
<tr>
<td>Credit Foncier Companies</td>
<td>1969</td>
<td>4,021</td>
<td>3,388</td>
<td>3,328</td>
<td>5,653</td>
</tr>
<tr>
<td>GSB</td>
<td>1946</td>
<td>483,272</td>
<td>454,067</td>
<td>228,788</td>
<td>548,192</td>
</tr>
<tr>
<td>Life Insurance Companies</td>
<td>1929</td>
<td>208,857</td>
<td>208,857</td>
<td>39,548</td>
<td>243,048</td>
</tr>
<tr>
<td>Agricultural / Saving Cooperatives</td>
<td>1916/1946</td>
<td>410,437</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAAC</td>
<td>1966</td>
<td>242,291</td>
<td>128,163</td>
<td>276,560</td>
<td>372,767</td>
</tr>
<tr>
<td>IFCT</td>
<td>1959</td>
<td>-</td>
<td>-</td>
<td>153,555</td>
<td>210,710</td>
</tr>
<tr>
<td>SIFC</td>
<td>1992</td>
<td>-</td>
<td>-</td>
<td>5,347</td>
<td>6,035</td>
</tr>
<tr>
<td>GHB</td>
<td>1953</td>
<td>193,423</td>
<td>141,989</td>
<td>277,518</td>
<td>335,730</td>
</tr>
</tbody>
</table>

\(^{41}\)Specialized Financial Institutions (SFIs) are Government Saving Bank (GSB), Bank for Agriculture and Agricultural Cooperatives (BAAC), Government Housing Bank (GHB), the Export-Import Bank of Thailand (Exim Bank), the Industrial Finance Corporation of Thailand (IFCT) and Small Industrial Finance Corporation (SIFIC).

\(^{42}\)Before the crisis, there were 91 finance companies. After financial sector resolution measures, 58 were either closed down or merged, and their assets were liquidated or transferred to asset management companies.
Thailand’s banking industry was highly concentrated, with the 5 largest domestic banks accounting for three-fourths of total bank assets as of end-1998. In this past, the Thai banking sector had been extremely difficult to penetrate, and highly protected by the authorities: prior to the financial crisis in 1997, only one new bank has been established in the 25 years period. Furthermore, financial regulations had shielded foreign competition through restriction on opening of foreign banks’ branch, and also limited foreigners to less than 25 percents share-holding in the Thai banks.

As a result, the Thai banking sector was highly concentrated with few large banks dominated in all facets of banking activities – interbank lending, corporate and household finance, and foreign exchange. Like in other countries, Thai banks has traditionally financed their activities mainly via deposits (time, saving and demand), and relied less on foreign borrowing, borrowings from the BoT and other financial institutions. In any case, financial liberalization, particularly the introduction of BIBFs in 1992, has significantly altered the operational nature of Thai banks. As deposits were not growing at a sufficient level, commercial banks turned to foreign borrowing through the window of BIBFs during the mid-1990s. By 1997, the ratio of foreign borrowing to deposits is 0.5, while the same ratio at end-2001 is less than 0.1.

Table 6: Operations of Commercial Banks

<table>
<thead>
<tr>
<th>Sources of fund</th>
<th>1990</th>
<th>1996</th>
<th>1997</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>--Deposits</td>
<td>1,789.6</td>
<td>5,626.7</td>
<td>7,397.1</td>
<td>6,541.7</td>
</tr>
<tr>
<td>--Foreign borrowing</td>
<td>1,426.0</td>
<td>3,643.3</td>
<td>4,224.7</td>
<td>5,009.1</td>
</tr>
<tr>
<td>Uses of fund</td>
<td>1,789.6</td>
<td>5,626.7</td>
<td>7,397.1</td>
<td>6,541.7</td>
</tr>
<tr>
<td>--Private credit (ex. BIBFs)</td>
<td>1,479.0</td>
<td>4,103.8</td>
<td>4,649.3</td>
<td>4,171.0</td>
</tr>
<tr>
<td>--BIBFs (out-in)</td>
<td>none</td>
<td>807.6</td>
<td>1,411.6</td>
<td>276.9</td>
</tr>
</tbody>
</table>

Unit: billions of Baht

Although finance and securities companies were the second largest segment of the financial system, they merely accounted for only 6 percent of total assets in the financial system as of end-2001. However, prior to the crisis, the finance companies played very significant role in the financial system.

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43 As of end-1998, the top-five largest Thai commercial banks in terms of total assets were Bangkok Bank (Bt 1,266 billion), Krung Thai Bank (Bt 1,067 billion), Siam Commercial Bank (Bt 706 billion), Thai Farmers Bank (Bt 704 billion), and Bank of Ayudhaya (Bt 483 billion).
Their total assets in 1996 peaked at Bt 1,824 billion or 25 percent of total assets in the financial system. This reduction in assets is due to the closure of many non-viable finance companies by the authorities.

In contrast to the banking sector, finance companies faced stiff competition among themselves and from Thai banks that began to offer similar services. Moreover, finance companies faced a credible threat to entry as new institutions entered the market. Unlike commercial banks, finance and securities companies were not allowed to take direct deposits from the public. Thus, they funded their operations primarily through the issuance of large and small-denomination promissory notes and credit from commercial banks and funding from other financial institutions. Due to their relatively higher funding cost and other regulatory disadvantages relative to the banks, finance companies tended to seek profits by allocating a major share of their portfolio into high(er) risk areas, including construction and real estate, margin loans and hire-purchase and personal finance.

Regulation of financial institutions

During the 1980s, the regulatory environment of financial institutions included interest rate controls and allocated lending to priority sectors, and additional prudential regulatory requirements. The deposit rate and the lending rate were subject to ceilings imposed by the Bank of Thailand. Furthermore, the central bank also regulated 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 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) access to preferential refinancing at the central bank for lending to priority sectors.

Prior to November 1997, Thai law restricted foreign ownership and control of banks, permitting foreign investors to hold no more than 25 percent of shares sold. This was liberalized in November 1997 to permit 100 percent foreign shareholding for a period of 10 years. After 10 years, they will not be required to divest their shares, but if they hold more than 49 percent of shares sold they are not permitted to acquire any additional shares.

The 1983-1987 banking crisis, and its resolution

Starting in October 1983, Thailand experienced a financial crisis that was associated with a slowdown in the economy, high interest rates, and mismanagement of several failed finance companies and banks. By the end of the crisis, a total of 24 finance companies were closed, and nine other merged into two new companies. Affected financial institutions accounted for 25 percent of total financial system assets. The crisis led the BoT to create the Financial Institution Development Fund (FIDF) in 1985—a separate legal entity under the BoT with a mandate to provide liquidity support to financial institutions. The FIDF established a special financial support scheme—the “April 4 Lifeboat Scheme.”—which
provided concessional loans to the insolvent financial institutions. Depositors of commercial banks and of 25 finance companies were largely bailed out, thus reinforcing expectations of an implicit guarantee by the government. The only depositors to suffer any losses (in the form of foregone interest and illiquidity) were the creditors of the 24 finance companies that were closed. In the aftermath of the banking crisis, this resulted in moral hazard and led to excessive risk-taking by the financial institutions.

**The 1997 banking and currency crises**

Similar to the crisis experiences in many countries, the Thai banking crisis had preceded the currency crisis, and peaked or made worsened by the currency crisis. The onset of the banking crisis began in March 1996 as the BoT ordered the immediate recapitalization of the Bangkok Bank of Commerce (BBC) through the Baht 5.4 billion FIDF assistance. In May 1996, the Parliamentary censure debate touched upon the possible irregularities and mismanagement of BBC, and the subsequent recapitalization with public funds. The general public began to lose its confidence on BBC leading to debilitating deposit run on the bank. As a consequence, the BoT had to order another Baht 22.5 billion recapitalization of BBC by the FIDF in August 1996. Panic began to spread in the domestic financial system as small-sized finance companies were experiencing massive deposit run – a “flight to quality” led to deposits being moved to larger finance companies or commercial banks.

The banking crisis grew worsened and became systemic after the de facto bath devaluation on 4 July 1997. The authorities had began the liberalisation program of domestic financial markets and capital account transactions starting from the late 1980s. Thus, financial institutions began to operate in a more liberal environment with increased business opportunities vis-à-vis corporate and individual customers as well as the more favorable funding terms from domestic and foreign sources. Consequently, there were large inflows of deposits and foreign funds as well as significant expansion of domestic credit. Rapid decline in the value of local currency against major currencies had increased the debt burden of foreign borrowing in terms of Baht and led to widespread and uncontrollable financial panic.

In August 1997, the International Monetary Fund (IMF) arrived to the scene to rescue the faltering Thai economy, pledging US$17.2 billion financial package attached with stringent conditionalities on economic and financial reforms. Since then, the financial system reform has progressed steadily. The reform plan included three broad objectives:

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44 To join the Lifeboat Scheme, participating institutions had to agree to write off their losses, provide reserves for dubious accounts, strengthen credit and collection procedures, suspend dividends, and submit a viable financial restructuring plan. In addition, the value of their shares was reduced, and 25 percent of the shares plus 50 percent of the voting rights were transferred to the Ministry of Finance. The voting rights were later to be returned to the original owners, at a price to be determined by the Ministry of Finance. Thus, although the claim of existing shareholders was diluted, they retained the hope of recovering the value of their shares later on. In return, they were eligible for credits at market interest rates to offset deposit withdrawals; capital injections
After the brief overview of the Thai banking crisis, we will now elaborate on five specific issues, namely; (1) the structural weakness of the financial sector prior to the crisis; (2) early measures of crisis resolution; (3) the August 14 financial assistance program; (4) financial sector restructuring after the crisis; and (5) updates on financial sector restructuring.

**Structural weakness of the Financial Sector**

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. At the same time, financial institutions increasingly relied on borrowings to supplement their insufficient deposits. As a result, their loan-deposit ratio rose to a high level.

Broadly speaking, the origins of the financial sector’s weaknesses fall into two categories, namely, (i) rapid credit expansion without prudent internal management of assets and liabilities, and (ii) inadequate regulatory and supervision frameworks. Therefore, a sizable proportion of credits were directed to unproductive sectors and/or speculative investments such as real estate, construction, and consumer loans; excessive short-term foreign borrowings have resulted in a risky maturity and currency mismatch (increasing possibility for mismanagement of the liabilities).

**Early Measures of Financial Crisis Resolution**

In the midst of widespread panic, the Thai government had implemented a number of urgent policies and measures to address the immediate issues. Shortly before Thailand entered the IMF program, the authorities ordered a temporary suspension of 42 finance companies (bringing the total of suspended finance companies to 58) and declared full and explicit guarantee of depositors and creditors of all remaining Thai financial institutions. Facing with increased demand for its resources, the FIDF had to increase the required contribution from financial institutions from 0.1 percent to 0.4 percent of total deposits and other liabilities.

The authorities established Financial Restructuring Authority (FRA) and the Asset Management Corporation (AMC) to provide a framework for effective disposal of NPLs held by the closed finance companies. The FRA would provide recommendation to the authorities regarding the resolution of the 58 suspended finance companies, setting the criteria for assessing the rehabilitation through equity participation by the government owned Krung Thai Bank; and direct subsidies from the Bank of
plans and the reopening of the suspended finance companies (Based on the FRA’s recommendation made at the end of November, the Ministry of Finance and the Bank of Thailand announced on 8 December that 56 out of the 58 finance companies would be permanently closed). The FRA then acted as an auctioneer and coordinated the deposition and selling of the assets to the public. The AMC functioned as bidder of last resort to ensure of fair pricing of the disposed assets. 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 had purchased assets from FRA totaling baht 33 billion with book value of baht 197 billion.

In February 1998, the BoT ordered the equity write-downs (de facto nationalization) of four Thai commercial banks (Bangkok Bank of Commerce; Bangkok Metropolitan Bank; Siam City Bank; and First Bangkok City Bank), and FIDF recapitalized these four banks with a total of Baht 87 billion. The government approved the establishment of a wholly state-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 sale of shares to the public. One of RSB’s advantages was a clean balance sheet.

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 (see Table 5). Furthermore, the authorities had plans to strengthen the financial system by establishing a deposit insurance scheme and amending the bankruptcy law for expediting foreclosure.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Period Overdue</th>
<th>Old Provision (%)</th>
<th>New Provision (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass</td>
<td>Under 1 month</td>
<td>0</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
</tr>
<tr>
<td>Special Mentioned</td>
<td>1-3 months</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Substandard</td>
<td>3-6 months</td>
<td>15-20</td>
<td>20</td>
</tr>
<tr>
<td>Doubtful</td>
<td>6-12 months</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Loss</td>
<td>Over 12 months</td>
<td>100 (or write-off)</td>
<td>100 (or write-off)</td>
</tr>
</tbody>
</table>

Note: As of 1 July 1998, all accounts on which interest or principal due have not received within three months (as opposed to six months as required previously) from the due date, will be recorded as non-performing. Interest overdue by more than 3 months will not be recognized as income. Announced on 14 August 1998, financial institutions must adopted up front the end-2000 LCP standards would be entitled to obtain public funds for tier-1 recapitalization.

Thailand in the forms of soft loans that had to be invested in government securities.
In May 1998, the BoT intervened and ordered equity write-off of the additional seven finance companies with solvency problems; FIDF contributed a total of Baht 11.4 billion in capital for recapitalization of these seven finance companies, and preparing them for merger with Krung Thai Thanakit (KTT), a subsidiary finance company of the state-owned Krung Thai Bank (KTB). As part of the August 14 financial restructuring plan, these seven finance companies, KTT, additional five intervened financial companies, and the Union Bank of Bangkok (UBB) eventually merged, and formed a new commercial bank named Bank Thai in April 1999.

The August 14 Financial Restructuring Plan

On 14 August 1998, the Ministry of Finance announced a comprehensive plan for financial sector restructuring. The details of the August 14 Plan are as follows:

- Capital write-off of Union Bank of Bangkok (UBB), and Bt 12.332 billion recapitalization by the FIDF.
- Capital write-off of Laem Thong Bank, and Bt 15.065 billion recapitalization by the FIDF.
- Capital write-off of five finance companies, and Bt 16.75 billion recapitalization by the FIDF.
- Capital write-off of Siam City Bank, and Bt 31.4 billion recapitalization by the FIDF.
- Capital write-off of Bangkok Metropolitan Bank, and Bt 39.19 billion recapitalization by the FIDF.

Under the comprehensive plan, BMB and Siam City Bank would be sold to private strategic partners (this plan has so far not been realized; BMB has recently merged with Siam City Bank), the good assets and deposits of BBC were transferred to KTB, and FIDF converted its lending to BBC to new KTB equity. The bad assets of BBC were separated and managed by an AMC. First Bangkok City Bank was merged with KTB, and Laem Thong Bank was merged with Radanasin Bank. Overall, financial institutions were allowed to establish their own asset management companies, which would allow for 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.

Furthermore, the Ministry of Finance and the Bank of Thailand had earmarked Bt 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. The terms and conditions for tier-1 capital support facility required an equivalent official and private participation aiming at catalyzing the entry of private capital. The tier-2 capital support facility was aimed at providing financial resources and incentives to accelerate corporate debt restructuring.

45 In January 2001, the Government announced a new provisioning rule that the commercial banks may exercise their own risk management system in making provision for pass and special mentioned at less than 1 percent, 2 percent, respectively.
As of 31 December 2000, an official deadline of the August 14 capital support program, two commercial banks (Siam Commercial Bank and Thai Military Bank) and two finance companies (Tisco Finance and Securities Company Limited and Asia Credit Finance and Securities Company) have recapitalized their tier-1 capital using Bt 61 billion of official assistance (20.4 percent of Bt 300 billion allocated for the program).

### Table 8: Financial Institutions Under the August 14 Tier-1 Capital Support Plan

<table>
<thead>
<tr>
<th>Financial Institutions</th>
<th>SCB</th>
<th>Tisco</th>
<th>TMB</th>
<th>Asia Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government participation</td>
<td>32,500</td>
<td>3,000</td>
<td>5,884</td>
<td>19,920</td>
</tr>
<tr>
<td>Number of shares</td>
<td>1,250</td>
<td>300</td>
<td>511.70</td>
<td>1991.9</td>
</tr>
<tr>
<td>Price per share</td>
<td>Bt 26</td>
<td>Bt 10</td>
<td>Bt 11.50</td>
<td>Bt 10</td>
</tr>
<tr>
<td>Percentage of share-holding</td>
<td>40.96%</td>
<td>42.84%</td>
<td>32.17%</td>
<td>49.84%</td>
</tr>
<tr>
<td>Date of purchase</td>
<td>10 May 1999</td>
<td>1 June 1999</td>
<td>23 Nov. 1999</td>
<td>19 May 2000</td>
</tr>
</tbody>
</table>

*Unit: millions, otherwise indicated*

**Financial Restructuring After the Crisis**

Subsequent to the August 14 Plan, the remaining 11 commercial banks were under pressure for recapitalization and rehabilitation on their own. The authorities permitted increased foreign participation in the Thai financial sector for a period of 10-years, so new share issues were significantly underwritten by foreign financial institutions. Two commercial banks, TDB and Bank of Asia, were invested by Development Bank of Singapore (50.27 percent) and ABN-AMRO Bank of the Netherlands (75 percent), respectively. Other banks have limited the foreign ownership to below 50 percent. Bangkok Bank (BBL) and Thai Farmers Bank (TFB) raised tier-1 and tier-2 capitals in the international markets.

The authorities took further actions against non-viable financial institutions, and injected capital to the newly established and state-owned commercial banks. The FIDF provided funds for recapitalization to the commercial banks: Bt 77 billion debt conversion of BBC owed to FIDF into KTB shares in December 1998; Bt 37 billion recapitalization of Bank Thai in April 1999; capital write-off and Bt 7 billion recapitalization of Nakornthon Bank in July 1999; total purchase of Radanasin shares from MoF in July 1999; and Bt 108 billion recapitalization of KTB in August 1999.

In September 1999, the FIDF sold its 75 percent stakes in Nakornthorn Bank to Standard Charter Bank. According to the sale agreement, the authorities allowed for the non-performing assets to remain in the “covered asset pool” (CAP); this means the government would provide Gain/Loss Sharing and Yield Maintenance with the Standard Charter Bank. The FIDF sold 75 percent of the Radanasin Bank shares to the United Overseas Bank, and its non-performing assets were separated and managed by an AMC wholly owned by FIDF.
Updates on financial sector restructuring

In February 2001, Thailand has a new government under the leadership of Prime Minister Thaksin Shinawatra. The new government took the following measures to further the reform of the financial sector in Thailand:

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.

As of April 2002, TAMC had received the transfer of NPLs from financial institutions in the amount of Bt 698 billion in book value from 4,565 creditors. TAMC has so far successfully restructured 258 creditors with Bt 132 billion in book value. Majority of restructured debts are from the real estate sector (34.92 percent) and industrial sector (32.32 percent).

2. While the core financial institutions are undergoing restructuring, the Government has emphasized the roles of Specialized Financial Institutions to support and facilitate the real sector. The Government has worked closely with the Bank of Thailand to enhance regulatory framework on 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 the 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 business environment by making 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 introducing 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.
5 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 of 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 U.S. 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 U.S. 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 for maintaining exchange rate stability.

4. The Thai experience illustrates that a strong and competitive financial sector is pivotal for cushioning external shocks properly, without endangering exchange rate stability. Strengthening 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. As 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 lead 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, we would like to stress that Europe and Asia differ in many respects, and that one should thus be very cautious 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 pegged their currencies to the U.S. 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 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 empirical evidence indicating 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 in coping with Balassa-Samuelson-type catching-up effects. 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 in 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 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 CPI-inflation differential at time $t$, denoted $\pi_t$, 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 $E_{t-1}(\pi_t)$. 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 $\varepsilon^b_t$, whereas the external shock is $\varepsilon^x_t$. Finally, there is the inflation shock in period $t$, $\varepsilon^e_t$, 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, $\gamma_t$. In sum,

\begin{align}
\gamma_t &= E_{t-1}(\gamma_t) + \varepsilon^b_t, \\
\Delta e_t &= E_{t-1}(\Delta e_t) + b_1 \varepsilon^b_t + \varepsilon^e_t, \\
\pi_t &= E_{t-1}(\pi_t) + c_1 \varepsilon^b_t + c_2 \varepsilon^e_t + \varepsilon^x_t.
\end{align}

Put differently, we assume that the inflation differentials, the output gap differentials, and the exchange rate fluctuations can be adequately 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, which are denoted $y_t$, can adequately modelled as a vector autoregression (VAR) conditional on the German financial variables, denote $x_t$, allowing for a single structural break in the parameters, that is,

$$ y_t = A_0 + A_t(L)y_{t-1} + B(L)x_t + d_t(k)\hat{A}_0 + \hat{A}_t(L)y_{t-1} + \hat{B}(L)x_t + \epsilon_t $$

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 $\hat{A}_0$ are scalars, $A_t(L)$ and $\hat{A}_t(L)$ are polynomials in the lag-operator with scalar coefficients, and $\epsilon_t$ 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 $\epsilon_t$ 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\(^{46}\). Results from econometric tests for stationarity, which are available upon request, indeed 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 maximises the Wald test of the hypothesis of the structural break, i.e. 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 maximizes the Wald test of the hypothesis of a structural break. This particular \( k \) will be denoted \( \hat{k} \). Bai et al. (1998) show that

1. the limiting distribution of \( \hat{k} \) 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.

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**Appendix C: Financial Institutions in Thailand, as of March 1, 2002**

<table>
<thead>
<tr>
<th>Item</th>
<th>Regulator</th>
<th>Law Related</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 The Bank of Thailand</td>
<td>Ministry of Finance</td>
<td>Bank of Thailand Act B.E. 2485 and amended.</td>
</tr>
<tr>
<td>2 Commercial Banks</td>
<td>Bank of Thailand</td>
<td>Commercial Banking Act B.E. 2505 and amended.</td>
</tr>
<tr>
<td>3 Foreign Bank branches</td>
<td>Bank of Thailand</td>
<td></td>
</tr>
<tr>
<td>4 Bangkok International Banking Facilities (BIBFs)</td>
<td>Bank of Thailand</td>
<td></td>
</tr>
<tr>
<td>5 Provincial International Banking Facilities (PIBFs)</td>
<td>Bank of Thailand</td>
<td></td>
</tr>
<tr>
<td>7 Finance &amp; Securities Companies</td>
<td>Bank of Thailand</td>
<td></td>
</tr>
<tr>
<td>8 Credit Foncier Companies</td>
<td>Bank of Thailand</td>
<td></td>
</tr>
<tr>
<td>10 The Bank for Agriculture and Agricultural Cooperatives (BAAC)</td>
<td>Ministry of Finance/Bank of Thailand</td>
<td>The Bank for Agriculture and Agricultural Cooperatives Act, B.E.2509</td>
</tr>
<tr>
<td>13 The Industrial Finance Corporations of Thailand (IFCT)</td>
<td>Ministry of Finance/Bank of Thailand</td>
<td>The Industrial Finance Corporation of Thailand Act, B.E.2502</td>
</tr>
<tr>
<td>15 The Small Industry Credit Guarantee Corporation</td>
<td>Ministry of Finance/Ministry of Industry</td>
<td>The Small Industry Credit Guarantee Corporation Act,</td>
</tr>
</tbody>
</table>

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46 Bai et al.’s (1998) technique can also be applied to systems of cointegrated variables.
<table>
<thead>
<tr>
<th>Number</th>
<th>Authority</th>
<th>Department/Commission</th>
<th>Regulatory Framework</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Secondary Mortgage Corporation (SMC)</td>
<td>Ministry of Finance/Bank of Thailand</td>
<td>Emergency Decree on Secondary Mortgage Corporation B.E. 2540</td>
</tr>
<tr>
<td>17</td>
<td>Asset Management Corporation (AMC)</td>
<td>Ministry of Finance/Bank of Thailand</td>
<td>Emergency Decree on the Asset Management Corporation B.E. 2540</td>
</tr>
<tr>
<td>18</td>
<td>Asset Management Companies (only if held by Financial Institutions Development Fund)</td>
<td>Ministry of Finance/Bank of Thailand</td>
<td>Emergency Decree on the Asset Management Company B.E. 2541</td>
</tr>
<tr>
<td>19</td>
<td>Money Changers</td>
<td>Ministry of Finance/Bank of Thailand</td>
<td>Exchange Control Act, B.E. 2485</td>
</tr>
<tr>
<td>20</td>
<td>The Financial Sector Restructuring Authority (FRA)</td>
<td>Ministry of Finance/Bank of Thailand</td>
<td>Emergency Decree on Financial Sector Restructuring B.E. 2540</td>
</tr>
<tr>
<td>21</td>
<td>Securities Companies</td>
<td>Securities and Exchange Commission</td>
<td>The Securities and Exchange Act, B.E. 2535</td>
</tr>
<tr>
<td>22</td>
<td>Mutual Fund Management Companies</td>
<td>Ministry of Commerce</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Life Insurance Companies</td>
<td>Ministry of Commerce</td>
<td>Life Insurance Act B.E. 2510 and amended</td>
</tr>
<tr>
<td>24</td>
<td>Agricultural Cooperatives</td>
<td>The Department of Cooperatives Promotion and the Department of Cooperative Auditing, Ministry of Agriculture and Cooperatives</td>
<td>Cooperative Act, B.E. 2511</td>
</tr>
<tr>
<td>25</td>
<td>Savings Cooperatives</td>
<td>Ministry of Commerce</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Provident Fund</td>
<td>Securities and Exchange Commission</td>
<td>Provident Fund Act, B.E. 2530</td>
</tr>
<tr>
<td>27</td>
<td>Social Security Fund</td>
<td>Ministry of Labour and Social Welfare</td>
<td>Social Security Act, B.E. 2533</td>
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<tr>
<td>28</td>
<td>Pawnshops</td>
<td>Ministry of Interior</td>
<td>Pawn-shop Act, B.E. 2505</td>
</tr>
<tr>
<td>29</td>
<td>Small Industry Credit Guarantee Corporation (SICGC)</td>
<td>Ministry of Finance</td>
<td>Small Industry Credit Guarantee Corporation Act, B.E. 2534</td>
</tr>
</tbody>
</table>

*Source: Bank of Thailand*
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