Impact of Monetary Regime and Exchange Rates on ASEAN Economic Integration

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Introduction

The ASEAN countries have experimented contrasted exchange rate regimes since the 1990s. The Asian crisis of 1997 has shown the limits of a simple dollar-peg policy without formal institutions. During the 2000s much effort has been devoted to improving monetary and financial cooperation at the regional level, especially with the Chiang Mai initiative and the Asian Bond market. But results have been limited, mainly due to political issues with the underlying competition between China and Japan. The financial crisis of 2008 has given new interest to the question of monetary cooperation at the regional level. Due to the high degree of heterogeneity of East Asian countries, it appears necessary to preserve the possibility of exchange rate adjustments in a future exchange rate regime. Various forms of monetary regime have been proposed from the Asian Currency Unit (ACU) to the common currency basket or the yen block or the yuan block in a long-term perspective, with improvement at the level of institutional forms, such as an Asian Monetary Fund and Asian bond markets. However obstacles remain the same with a lack of political project and the will of China to preserve its autonomy. A long transition period with adjustable exchange rates regime, based on different types of institutions, might be the more likely, before, may be in the long term, the settlement of a yuan block, which does not mean a yuan zone.

The chapter is organized as follows. The first section analyzes the story of East Asian monetary cooperation since the 1990s. Using a Fundamental Equilibrium Exchange Rate (FEER) approach, exchange rate misalignments (ERMs) are estimated and linked to the external performances and growth of East Asian countries. It appears that exchange rate misalignments are more limited in the current period than in the 1990s, in clear contrast with

what is observed between European countries. The second section examines the economic consequences of alternative exchange rate regimes in East Asia using a four-country stock flow consistent (SFC) model of East Asia. The configuration of the 1990s and 2010s can be compared and alternative scenarios for the future of ASEAN integration are discussed.

East Asian Monetary Regimes and Exchange Rate Misalignments

East Asian exchange rate arrangements covered and still cover a wide range of regimes from the dollar peg of the 1990s to the managed floating of Malaysia, Indonesia, and Thailand or the more freely floating of Japan and Korea. A large difference exists between a de jure regime and a de facto one. Vast literature has tried to build a de facto classification (IMF, 2008; Reinhart and Rogoff, 2004). The main conclusion is that East Asian countries have a preference for intermediate regimes with pragmatic inflexions in case of necessity. Indicators of divergence or convergence between East Asian currencies have also been proposed to enlighten the policies followed (Pontines, 2013).

In order to assess the exchange rate policies of the ASEAN countries since the 1990s, the concept of equilibrium exchange rate will be used as a reference in this chapter. It allows the estimation of exchange rate misalignments with periods of overvaluation or undervaluation. Various methodologies can be used (NATREX, BEER, FEER, …). The FEER methodology is preferred because it is based on a structural model of each economy and allows a coherent estimation of these misalignments thanks to the use of a multinational model linking the main trade partners. Furthermore this approach relies on the concept of current account equilibrium, which is a good tool to highlight external performances of each East Asian country. A first paragraph summarizes the methodological background, a second presents the exchange rate misalignments and characterizes the main features of the exchange rate policies.

Methodological Background: A FEER Approach

"Exchange rate misalignment" is defined as the gap, in percentage, between observed exchange rates and equilibrium exchange rates. The Fundamental Equilibrium Exchange Rate is the exchange rate prevailing when the economy simultaneously reaches the external equilibrium (a sustainable current account determined by structural parameters) and the internal equilibrium (full utilization of the productive potential). Its limited relations with the intertemporal optimizing literature are often criticized, but the FEER does not pretend to describe the modality of the return to the equilibrium. It searches only, for each period, to estimate the real misalignment induced by internal and external imbalances in terms of comparative statics.

In order to estimate the ERM, the analysis is conducted in two steps. First, at the word level, a multinational model describing the foreign trade of the main countries and of the Rest of the World is used to calculate the main currencies (dollar, euro, yuan, yen, and pound sterling) and the equilibrium exchange rates (Jeong et al., 2010; Duwicquet et al., 2015). Second, at the level of each East Asian country, an equilibrium exchange rate is estimated, using a simple national model of foreign trade (Aflouk et al., 2010). It is not necessary for a relatively small country at the world scale to use a multinational model to estimate equilibrium exchange rates. Last, based on studies of the medium-term determinants of current account, the equilibrium current accounts are determined by using structural determinants (demographic features, public deficit, net foreign assets, oil products balance, etc.) relying on panel regression techniques. Estimations have been updated up to 2012.

Exchange Rate Policy and Misalignments

From the 1980s to the Asian Crisis of 1997

To avoid exchange rate misalignments between countries increasingly integrated, a dollar peg policy has been implemented in most of the East Asian countries at the end of the 1980s. Simultaneously financial liberalization has been developed during the 1990s, facilitating the finance of large current deficits. It has also induced short-term indebtedness in dollars, especially of the banking sector, which has appeared highly constraining when the crisis burst. The peg to the dollar of East Asian currencies led to large overvaluation in nominal terms, but less in real effective terms in the 1990s, in relation with important current deficits (see figure 5.1).

Thailand, Philippines, and Malaysia present some similarities with respect to exchange rate policy during the 1980s. The early 1980s were marked by the end of economic boom with current account deficit and overvaluation. The peg to the dollar in the middle of the 1980s allowed a real depreciation and an improvement of their current account, leading to an undervaluation of their currencies between 1985 and 1988, especially in Philippines and to a less extent in Malaysia where the ringgit was close to its equilibrium value. A reversal took place at the end of the 1980s where economic recovery was related to the reappearance of important current deficits. Thailand was the most affected while the phenomenon was less marked in Philippines where the growth was more modest and current deficit more contained. The Malaysian ringgit remained close to equilibrium as before, as Malaysian economy was more trade open, which reduced the amplitude of misalignments. Viet Nam, as an economy in transition during the 1990s, has followed a specific path with a large overvaluation during the first half of the 1990s.

Indonesia, as an oil-exporting country, presents also some specificity. The counter-oil shock in 1986 has degraded its current account, leading to
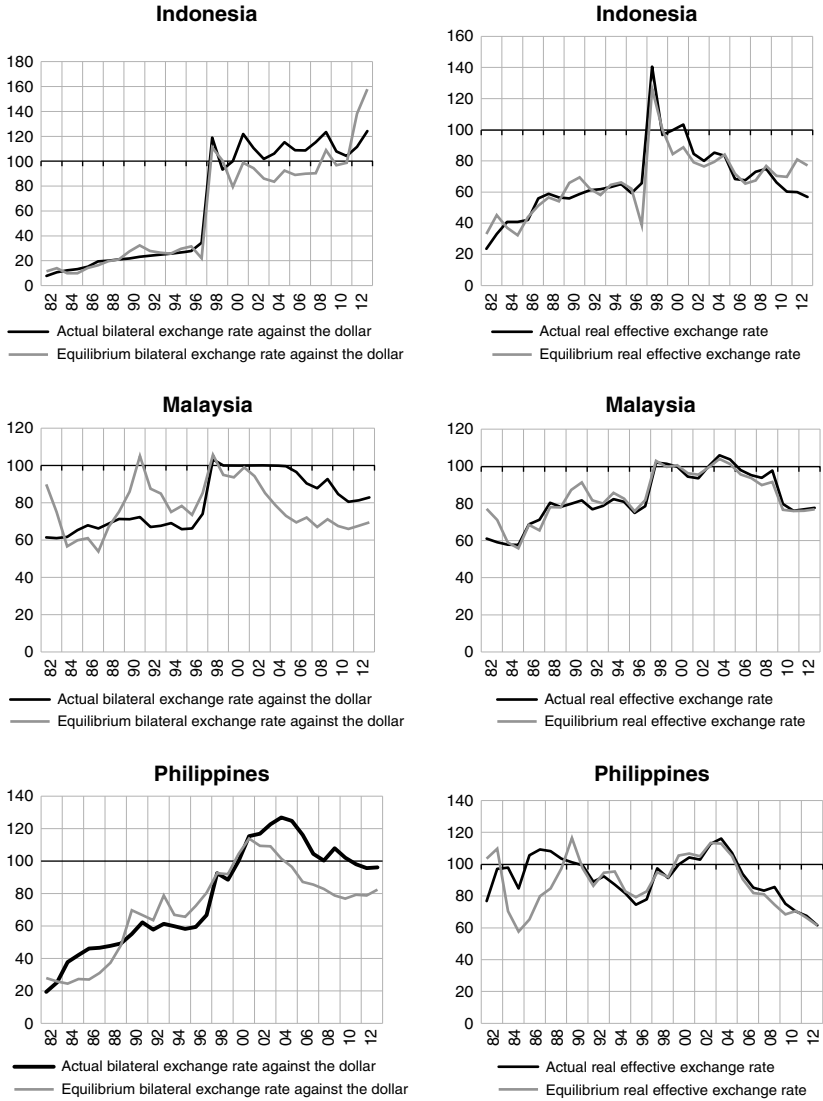
Figure 5.1 Actual and equilibrium real effective and bilateral exchange rates of ASEAN+3 (base 100 in 2000).

Source: Authors' calculations with data from IFS for bilateral exchange rates, provisional data for 2013.
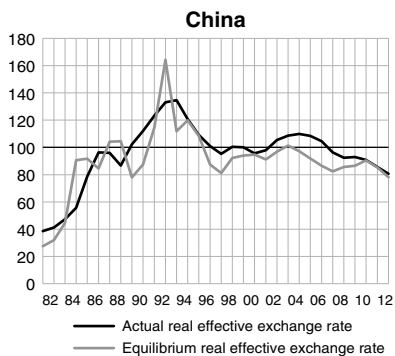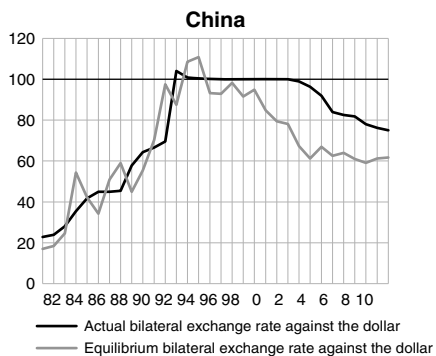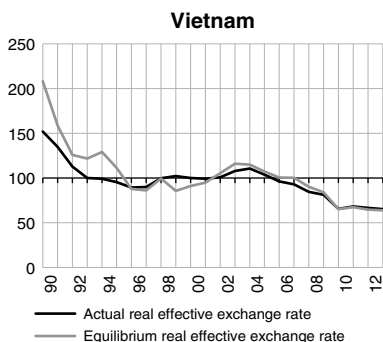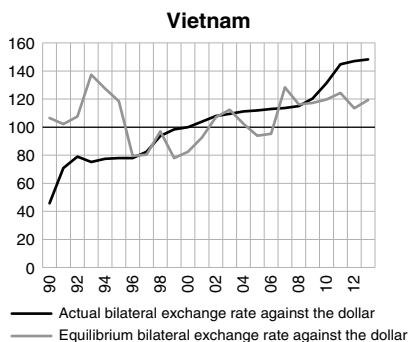
Thailand

Actual bilateral exchange rate against the dollar
Equilibrium bilateral exchange rate against the dollar

Thailand

Actual real effective exchange rate
Equilibrium real effective exchange rate

Vietnam

Actual bilateral exchange rate against the dollar
Equilibrium bilateral exchange rate against the dollar

Vietnam

Actual real effective exchange rate
Equilibrium real effective exchange rate

China

Actual bilateral exchange rate against the dollar
Equilibrium bilateral exchange rate against the dollar

China

Actual real effective exchange rate
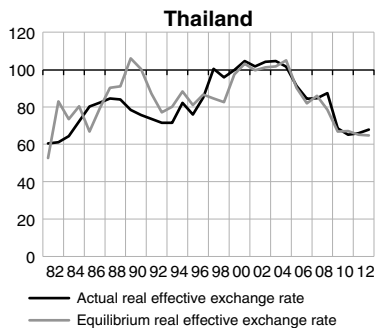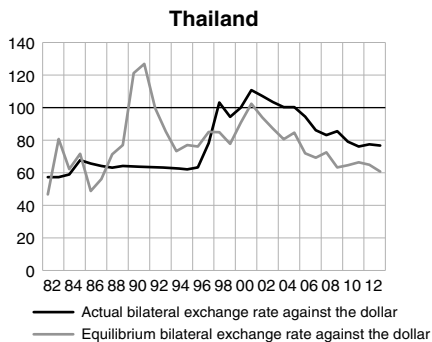Equilibrium real effective exchange rate
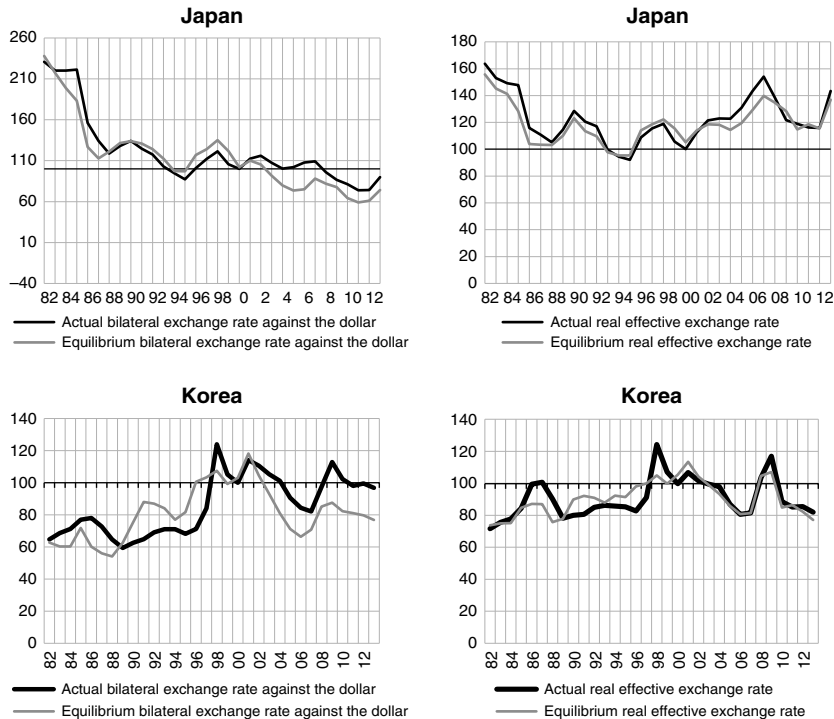
Figure 5.1   Continued

Figure 5.1   Continued.

overvaluation of its currency in the beginning of the 1990s. At that time, with sustained growth and current account more under control, overvaluation became weak and did not seem to have played a large role in the crisis of 1997. However the currency the most affected by the crisis has been the Indonesian rupee, which might be explained more by political reasons and other economic imbalances. The devaluation of the Indonesian rupee, in real and nominal terms, was of the most significant amplitude among the East Asian countries. It resulted in a rather limited amelioration of the current account and in an undervaluation of the rupee, which could be regarded as modest, compared with the amplitude of the shock. This result could reflect the destructive effects of the crisis on the Indonesian productive system.

In China the beginning of the 1980s is difficult to interpret due to the mode of regulation of the external trade that prevailed at that time. However, the yuan seemed to be overvalued in the middle of the 1980s with a massive current account deficit. Continued devaluations and the increasing usage of the swap centers exchange rate in China allowed the actual exchange rate to keep up with the depreciation of the equilibrium

exchange rate and to preserve undervaluation during most of the time in a context of degradation of the current account and of high inflation, so that in 1994, the year of the unification of the exchange rate system, the yuan was even undervalued in nominal and real terms. The second half of the 1990s, in particular since 1997, marked a turning point. The economic boom and the return of current surplus illustrated the success of the trade openness policy of the past years. This explained the revaluation of the equilibrium exchange rate of the yuan during the second half of the 1990s, both in nominal and real terms, in sharp contrast with the previous period. This diagnostic helps to find an explanation of the resistance of the yuan facing the Asian crisis of 1997–1998 during which the yuan was already undervalued. However this undervaluation has been temporally reduced after the Asian crisis and the large devaluations of most of the East Asian competitors.

In Republic of Korea, a period of undervaluation of the won during the 1980s, linked to the export growth strategy, was followed by a rather marked overvaluation, both in nominal and real terms. But, at the opposite of the Japanese case, this occurred after a real depreciation during the first half of the 1980s and, then, a stable dollar-won parity. This overvaluation of the won has been regarded as one of the factors explaining the Korean crisis in 1997.

Overaccumulation, diffusion of the slowdown through high economic interdependency, contagion effects, and capital flights have played a major role to explain the generalization of the crisis. The stabilization plans imposed by the IMF have amplified the economic slowdown and given a new impulsion to the financial liberalization and the deregulation. The lack of appropriate tools to solve the liquidity problems has been underlined while East Asia, as a whole, had sufficient reserves and net foreign assets to face the problems of the countries in deficit. It can also be noticed that intra-East Asia imbalances were too generalized at that time and made the intrazone finance more complex to organize.

From the 2000s to the Financial Crisis of 2008

The recovery has been rather quick after the Asian crisis, thanks partly to large devaluations that boosted exports. After these huge devaluations, pragmatic exchange rate policies were implemented with more diversity between countries than before, from rather strict dollar peg in Malaysia and China until 2005 to more floating regime like in the Republic of Korea. The result has been, on the whole, a general undervaluation against the dollar and, even if it is less marked, in real effective terms. This was very different from the 1990s and has given more room of maneuver to East Asian economies, with large current account surpluses, but at the expense of the Rest of the World. Actually the relative positions of various countries were rather contrasted.

The yuan has been stable against the dollar until 2005 and has moderately appreciated until 2008. It remained largely undervalued, in spite of a

real effective appreciation. This apparent paradox is simply explained by the larger revaluation of the equilibrium exchange rate of the yuan due to the remarkable improvement of the Chinese productive system's efficiency. This exchange rate policy can be easily understood from the Chinese point of view but it contributed to the persistency of global imbalances. The yen was also undervalued, but for a different reason and to a less extent, thanks to the real effective depreciation of the yen. This export-led growth strategy was used to help the Japanese economy to partly recover from the long stagnation of the 1990s. The Korean won was the less undervalued East Asian currency, following a rather sharp appreciation in nominal and real terms after 1999. The Korean exchange rate policy, with a won more freely floating, was more equilibrated from a global point of view, but put more constraints on the Korean economy.

The large devaluations following the Asian crisis contributed to the reconstitution of important current surpluses in Thailand and Malaysia, but not durably in Philippines and Viet Nam. The bath, the dong, and, to a less extent, the ringgit became undervalued, but not the Philippine peso as Philippines faced more structural problems at that time. The situation in Indonesia has been progressively normalized afterward, the country taking advantage of the rising oil prices during the 2000s. The undervaluation of the Indonesian rupee against the dollar was in line with the other East Asian countries at the end of the 2000s, but slightly less pronounced in real terms.

On the whole, during the 2000s, in spite of a general movement of appreciation, the East Asian currencies remained undervalued against the dollar (around 20–30 percent), but much less in real effective terms. Compared with the Chinese yuan, they appeared far less undervalued, which induced a bias in the international competition among East Asian countries. Beyond this general undervaluation against the dollar, the relative divergence between East Asian currencies reflected that the pragmatic exchange rate policy adopted didn't avoid some distortions between area's countries. The East Asian countries have undertaken two main initiatives at the regional level in order to be able to mobilize local resources in case of countries facing problems of payments, the Chiang Mai initiative (signed in 2000 at the level of the ASEAN+3), and the Asian Bond Market initiative. The Asian Bond Market initiative was the second major step in 2002. Its aims were multiple: give a regional alternative to the finance of national economies; avoid the asymmetries in currencies (which implies to borrow in foreign currency for financing the economy in local currency) and the asymmetric of maturity (which refers to short-term borrowing for supplying long-term loans); help the ASEAN's small countries whose size is too limited to develop bonds markets (Jetin, 2010).

The impact of the financial crisis of 2008 on East Asia has been more limited, although significant at short term and unequal according to the countries. The appreciation of the yen against the dollar has penalized the Japanese growth before a new turn with the Abenomics and the yen

depreciation. The undervaluation of the yuan has been preserved and then progressively reduced. Combined with the huge Chinese recovery plan of 2008, it has allowed China to preserve a high growth and to escape the crisis. The evolutions of the other East Asian currencies have been also differentiated. Most of the ASEAN currencies slightly appreciated against the dollar, except the Vietnamese dong, which depreciated progressively, while stabilizing its real exchange rate. In 2008 the Korean won has depreciated sharply, both against the dollar and in real terms. Indeed, the Korean economy has been badly affected by the crisis and has suffered, more than other East Asian countries, due to capital flights in 2008. The regional institutions, especially the Chiang Mai initiative, were unable to contribute to solve the problems of the Korean banking sector. Loans from the Federal Reserve Bank of New York (FED) and the Japanese and Chinese central banks were necessary. The won depreciation, under markets' pressure, helped the export sector, with a financial cost for the banks, and was followed by a stabilization, which, on the whole, preserved a slight real undervaluation.

On the whole, the divergence between East Asian nominal exchange rate evolutions must not be overestimated since the 2000s. In some countries (Malaysia, Philippines, Thailand, and China since 2005) the currencies have appreciated while in others (Viet Nam and, partly, Indonesia) depreciation is observed. In terms of real effective exchange rates, the appreciation trend is more general. Republic of Korea and Japan appeared rather specific with larger fluctuations of their currencies, both in nominal and real terms, reflecting a more floating regime, which doesn't exclude targeted interventions. Regarding exchange rate misalignment, East Asian currencies remained undervalued against the dollar during the 2000s. This has lasted since the burst of the financial crisis, except in Indonesia. However, in term of real effective rates, which is the more pertinent concept, exchange rate misalignments are more limited than before, even for the yuan whose real undervaluation has been reduced. The only exceptions seem to be Indonesia, where the real overvaluation appears important since 2009, and Viet Nam during the 2000s.

These reduced exchange rate misalignments for East Asian countries are in sharp contrast with what is observed in the euro zone since the 2000s. In spite of a euro only slightly undervalued for the whole euro area, overvaluation of the euro in Southern European countries (Spain, Portugal, Greece, France) is opposed to the undervaluation of the euro in the German block (Duwicquet et al., 2013). The euro zone crisis illustrates the failure of a rigid single currency system without appropriate adjustment mechanisms or forms of fiscal federalism. On the contrary, East Asian countries have adopted intermediate exchange rate regimes with a rather wide spectrum (crawling peg, managed floating, more freely floating). These exchange rate managements are rather asymmetric. By "fear of appreciation," East Asian countries have tried to limit the appreciation trend of their currencies and have accumulated huge foreign reserves, thanks to the current surpluses.

But these current surpluses have been reduced since the burst of the financial crisis and the world slowdown. These pragmatic exchange rate regimes have given useful room of maneuver to each country. However, there is a need of more exchange rate coordination due to the high level of economic and financial integration and to the risk of contagious crisis. There is no consensus on the way this coordination could be organized. But the experience of the 1990s, the high heterogeneity of the East Asian zone, and the failure of the euro zone show that a too rigid exchange rate system and a fortiori a project of monetary union are not appropriate. This question of the economic consequences of alternative exchange rate regimes in East Asia will be reexamined using a four-country stock flow consistent model of East Asia. The configuration of the 1990s and 2010s will be compared and alternative scenarios for the future of ASEAN integration will be discussed.

Alternative Exchange Rate Regimes in East Asia: A Four-Country Stock Flow Consistent Approach

Since the burst of the financial crisis in 2008, the development of monetary and financial cooperation in East Asia has gained interest. First, some measures aimed at giving more formal structures to the Chang Mai initiatives have been taken. Second, the project of an Asian Monetary Fund to face short-term adjustment problems has been relaunched. However, the great heterogeneity of East Asia, both in terms of level of development and of countries' size, pleads for keeping an adjustable exchange rate system in the future monetary regime, at least for a long transition period. To go beyond the present system based on managed floating with various forms according the different countries, two main forms of monetary cooperation have been proposed, one based on a common currencies basket (Williamson, 1998), the other based on the Asian Currency Unit (ACU).

The ACU project is the more ambitious. Since the end of the 2000s, in the context of financial crisis, it has gained interest (Shimizutani, 2009). It is a long-term project. The first step would be centered on the rebuilding of the institutions created with the Chiang Mai initiative and on the reinforcement of financial supervision. The second step, to be taken after 2020, would be the settlement of the ACU composed of the yen, yuan, won, and other East Asian currencies and its promotion for public and private uses. These years would be used to achieve the financial liberalization and reinforce the financial regulation before the transition to an exchange rate regime based on the ACU in the 2030s. Even at this long term, the perspective of a single currency seems problematic at the level of an area that will always be characterized by huge heterogeneity. On the contrary, the use of the ACU in an East Asian monetary regime where the national currencies would be preserved and would be in a system of fixed, but adjustable, exchange rates against the ACU would be a more realistic project. The

nature of the ACU remains open. It could be, as it is now planned, a currency basket. It could also be a new international currency floating against the dollar and the euro.

Concretely, a possible alternative to the ACU in the long term could be the yuan, once it has become fully convertible and the Chinese banking and financial system have been restructured and consolidated. Another possibility could be that of the "block yuan," where the yuan would be used as an anchor for the other East Asian currencies, while the yen would be in a position rather similar to the one of the pound sterling against the euro. The point in debate is what should be the level of rigidity or flexibility of this regime. Whereas a rigid one would mean that this block yuan would be close to a yuan zone with fixed exchange rates (which would not be suitable for the heterogeneity of the zone), a more flexible one would give more room of maneuver to face asymmetric economic performances.

The problem raised by these flexible monetary regimes, whether with an anchor on the yuan or an ACU, is the risk of instability associated to capital flights and recurrent exchange rate adjustments. Hence, some form of capital controls would have to be maintained to provide the system with more stability.

To investigate the main impact of various exchange rate regimes on ASEAN countries and more generally of East Asia, we construct a four-country stock flow consistent model, which consists of four areas (two ASEAN countries, China, and the Rest of the World, including the United States). The simulations analyze the adjustment mechanisms following demand or supply shocks. Various forms of exchange rate regimes are considered for East Asia (yuan/dollar fixed or floating or managed; ASEAN currencies/dollar fixed or floating; ASEAN currencies/yuan fixed or managed; alternative ACU regimes with fixed, but adjustable exchange rates beyond a certain threshold). We study the adjustment mechanisms and the interactions among regions and especially among ASEAN countries under each alternative setting. First, the theoretical background is summarized. Second, the alternative monetary regimes and the associated closures of the four-country SFC model are presented. Third, the results of the simulations are given before concluding.

Theoretical Background

The stock flow consistent approach, which a growing literature has been using in recent years, has several virtues. Especially, it can track the trajectory of flows and stocks, and model the financial sector explicitly as well as the production sector. The general methodology of SFC models is well explained in the book by Godley and Lavoie (2007b). SFC models comprise a set of behavioral equations that describe the transactions and decisions of institutional agents (households, firms, government, banks, central bank, Rest of the World) within the accounting framework in flows and stocks framed in complete balance sheets.

The contributions of Godley and Lavoie (2007a) and Lavoie and Zhao (2010) are seminal to analyze international monetary regimes with the SFC approach. They construct a three-country model based on the portfolio balance models that incorporate the imperfect asset substitutability and valuation effects caused by the changes of exchange rates. In contrast to Blanchard et al. (2005) they endogenize GDP and the supply of securities, and thereby the interaction between the real and financial variables can be considered more explicitly. They examine the impact of the diversification of the foreign reserves of China through some simulation experiments.

Mazier and Tiou-Tagba (2012) generalized the previous work by introducing the managed floating exchange rate system with the target variable such as foreign reserves or a current account surplus and by analyzing the cases with flexible prices instead of constant prices. These three-country models are extended to four-country models. Mazier and Valdecantos (2015) describe the institutional setting of the Eurosystem in detail in order to reproduce some of the events that happened during the crisis of the Eurozone. Mazier and Valdecantos (2014) analyze the implications regarding the intrazone imbalances in the euro area. They divide the euro area into two parts, North and South, and compare various alternative exchange rate regimes (monetary union, EMS, multiple euros, eurobancor), which can be thought as a way out of the current crisis.

Monetary Regimes in East Asia and SFC Model

The world economy is divided in four areas: China, East Asia 1 and 2 (as representative of ASEAN divided in two countries) and the Rest of the World. Areas have their own currencies. The whole structure of the SFC model is close to the one used by the previous authors and will not be described in detail. The main equations are presented in Mazier et al. (2014). Households receive wages and interests, pay taxes, consume and hold cash and bank deposits. Firms accumulate capital, pay taxes and interests, finance their investments with undistributed profits and credit. Government expenditures are financed by taxes, after payments of interests, and by issuing public bonds to cover their deficit. These public bonds are the main international financial assets. Commercial banks receive households' deposits, hold reserves at the central bank, supply credit to the firms without restriction, hold domestic or foreign bonds with a portfolio behavior, and can be refinanced by the central bank. Banks' profits are redistributed to households as dividends. The central bank provides cash to households, receives reserves from the commercial banks and refinances them, holds domestic bonds and foreign reserves. Bonds issued by the Rest of the World government work as the unique foreign reserve. Profits of the central bank coming from interest payments are paid as taxes to the government. Interest rates are supposed constant. International trade is described through bilateral imports with demand effects and price effects linked to bilateral exchange rates. The flow of funds and the accumulation of capital,

financial assets and liabilities, and wealth are described in an SFC manner, including the reevaluation effects due to exchange rates variations.

Five basic monetary regimes can be considered for East Asia:

1. The regime XX, where the yuan and the East Asian currencies are both pegged to the currency of the Rest of the World (representative of the dollar) in a fixed regime. This reflects broadly the middle of the 1990s when the yuan was anchored to the dollar after a long period of devaluation and adjustment, while East Asian currencies were also pegged to the dollar. This was seen as an informal form of cooperation between them.
2. The regime XL, where the yuan is pegged to the currency of the Rest of the World while the East Asia and Rest of the World currencies are floating. This situation corresponds roughly to what prevailed during the end of the 1990s and the beginning of the 2000s.
3. The regime LL, which is a rather hypothetical regime where the yuan and the East Asian currencies are both supposed to be freely floating. This could be thought as a situation where the yuan has achieved its long transition period toward internationalization and is floating against the dollar. As in the regime XL, the East Asian currencies float. This regime would correspond to a world economy dominated by the market without forms of control.
4. The regime LX is another long-term scenario where the yuan is also floating after a complete liberalization. But the East Asian currencies would now be pegged to the yuan. In other words China and East Asia are supposed to have formed a yuan zone in a long-term perspective.
5. The ACU regime is a new one, based on a currency basket composed of the yuan and the East Asian currencies. Each East Asian currency, including the yuan, is in a fixed, but adjustable, exchange rate against the ACU. Two other alternative ACU regimes can be considered when the yuan or one of the two East Asian currencies doesn't belong to the ACU basket.

Alternative Closures of the East Asian Exchange Rate Regimes

In SFC models the exchange rate determination is based on the adjustment between supply and demand of bonds on the different markets. It can be shown also that this is equivalent to a more traditional determination where exchange rates result from the sum of the flows in and out linked to trade, income, and capital movements. Since there are four areas, six bilateral exchange rates should be determined for fulfilling transactions: $1UC^{RW} = E_1UC^{EA2}$; $1UC^{RW} = E_2UC^{CH}$; $1UC^{EA2} = E_3UC^{CH}$; $1UC^{RW} = E_4UC^{EA1}$; $1UC^{EA1} = E_5UC^{CH}$; $1UC^{EA2} = E_6UC^{EA1}$ (UC, unit of currency).

The Regime XX (Yuan/Rest of the World and
ASEAN/Rest of the World Fixed)

The starting point is the regime XX, where the exchange rates between both the yuan E_2 and the ASEAN currencies E_1 and E_4 against the Rest of the World are fixed. This regime can be interpreted as the one prevailing in the middle of the 1990s, when the yuan was anchored to the dollar, but also most of the East Asian currencies. This peg of the East Asian currencies on the dollar was regarded as a de facto form of regional cooperation for

countries already economically integrated. As a consequence, the exchange rate of the ASEAN currencies against the yuan is also fixed.

To keep fixed their exchange rates against the dollar, the ASEAN and Chinese central banks adjust their foreign reserves and purchase or sell bonds issued by the US government. The ASEAN and Chinese bond markets are cleared by the demand of the domestic bonds by the central banks.

The Regime XL (Yuan/Rest of the World Fixed, ASEAN/Rest of the World Floating)

We now turn to the regime XL where the ASEAN currencies float against the Rest of the World (dollar) while the yuan remains fixed against the Rest of the World, as it was in the end of the 1990s and beginning of the 2000s. Since the exchange rates between ASEAN currencies and the Rest of the World (E_1 and E_4) are floating, foreign reserves held by the ASEAN central banks are constant while their balance sheet equilibrium determine the domestic bonds they hold. E_1 and E_4 are determined equating the demand of ASEAN bonds by Rest of the World banks and the supply of these bonds to Rest of the World banks given by the equilibrium of their markets.

The Regime LL (Yuan/Rest of the World and ASEAN/Rest of the World Floating)

The transition from a fixed regime to a floating regime reflects the tendency toward financial liberalization. It corresponds to a regime that could be implemented only at the end of a long period of transition. Building this version of the model is quite easy. With E_2 determined under the floating regime, the foreign reserves of the Chinese central bank are now constant while its balance sheet equilibrium determines the domestic bonds it holds. E_2 is determined by equating the demand of Chinese bonds by Rest of the World banks and the supply of these bonds to Rest of the World banks given by the equilibrium of their market.

The Regime LX (Yuan Area)

On the one side, the exchange rate regime between China and Rest of the World is liberalized and the yuan is floating. On the other side, the regional cooperation between East Asian countries is highly developed in order to form a yuan area with fixed exchange rates. The modeling of the floating yuan has already been presented and requires no change. However, as the yuan is now floating, the modeling of the yuan area with fixed exchange rates E_3 and E_5 between ASEAN and yuan has to be slightly changed, compared with the previous ones. The exchange rates E_1 and E_4 between ASEAN and Rest of the World are derived from the exchange rate E_2 between yuan and the Rest of the World with the fixed exchange rate E_3 and E_5 between ASEAN and yuan.

The ACU Regime

The Asian Currency Unit (ACU) is a currency basket composed of the yuan and the ASEAN currencies ($1UC^{RW} = E_{10}$ ACU), which is used only as a

unit of account. The ACU/Rest of the World exchange rate (E_{10}) is built as a weighted average of the yuan (E_2) and ASEAN currencies (E_1 and E_4)/ Rest of the World exchange rates. The yuan and the ASEAN currencies are floating against the Rest of the World currency and are pegged to the ACU (1 ACU = $E_7 UC^{EA2}$ = $E_8 UC^{CH}$ = $E_9 UC^{EA1}$). For sake of simplicity it is supposed there is no fluctuation margin but these exchange rates are adjustable when the current account in percent of GDP is permanently under a certain threshold. The yuan exchange rate is determined as previously in a floating regime. The ASEAN currencies/yuan exchange rates are fixed, but adjustable. Consequently the ASEAN currencies/Rest of the World exchange rates can be simply deduced from the yuan exchange rate. Under this hybrid regime ASEAN central banks accumulate foreign reserves under the form of bonds issued by the Rest of the World government.

$$\frac{1}{E_{10}} = \frac{Y^{EA2}}{Y^{EA2} + Y^{CH} + Y^{EA1}} \cdot \frac{1}{E_1} + \frac{Y^{CH}}{Y^{EA2} + Y^{CH} + Y^{EA1}} \cdot \frac{1}{E_2}$$
$$+ \frac{Y^{EA1}}{Y^{EA2} + Y^{CH} + Y^{EA1}} \cdot \frac{1}{E_4}$$

$$E_{7t} = E_{7t-1} \cdot (1+\varphi), \text{ if } \frac{CA^{EA2}_{t-i}}{Y^{EA2}_{t-i}} < -0.001, \forall i = 1,2,3,4,5 \text{ and only if}$$
$$E_{7t-1} = E_{7t-i}, \forall i = 2,3,4,5$$

(same equations for E_8 and E_9).

The ACU Regime without East Asia 2

In this regime one ASEAN country or Japan remains outside the ACU regime and floats against the Rest of the World. This regime is very similar to the previous one. The only difference is the determination of East Asia 2 currency/Rest of the World, which is now floating.

$$\frac{1}{E_{10}} = \frac{Y^{CH}}{Y^{CH} + Y^{EA1}} \cdot \frac{1}{E_2} + \frac{Y^{EA1}}{Y^{CH} + Y^{EA1}} \cdot \frac{1}{E_4}$$

$$E_{8t} = E_{8t-1} \cdot (1+\varphi), \text{ if } \frac{CA^{CH}_{t-i}}{Y^{CH}_{t-i}} < -0.001, \forall i = 1,2,3,4,5 \text{ and only if}$$
$$E_{7t-1} = E_{7t-i}, \forall i = 2,3,4,5$$

(same equation for E_9).

The ACU Regime without China

In this alternative ACU regime China remains outside the system to preserve its autonomy and the yuan floats alone against the Rest of the World.

This regime is similar to the previous ones. East Asia 2 currency is the new anchor of the ACU regime.

$$\frac{1}{E_{10}} = \frac{Y^{EA2}}{Y^{EA2} + Y^{EA1}} \cdot \frac{1}{E_1} + \frac{Y^{EA1}}{Y^{EA2} + Y^{EA1}} \cdot \frac{1}{E_4}$$

$$E_{7t} = E_{7t-1} \cdot (1 + \varphi), \text{ if } \frac{CA^{EA2}_{t-i}}{Y^{EA2}_{t-i}} < -0.001, \forall i = 1,2,3,4,5 \text{ and only if}$$
$$E_{7t-1} = E_{7t-i}, \forall i = 2,3,4,5$$

(same equation for E_9).

Table 5.1 shows the alternative closures for each exchange rate regime. The first three columns refer to variables that ensure the equilibrium with respect to each country's bond market. The last three columns indicate the variables that ensure the equilibrium of each central bank's balance sheet. We can recall, first, that the Rest of the World bonds market is always equilibrated by the domestic bonds held by the Rest of the World central bank, and second, that the equilibrium of the Rest of the World central bank balance sheet is not written, as it is the missing equation of the model.

Table 5.1 Alternative closures of each exchange rate regime

	Variable determined in bond market			Variable determined by CB		
	B^{CH}	B^{EA1}	B^{EA2}	CB^{CH}	CB^{EA1}	CB^{EA2}
Regime XL Fixed E_2, Floating E_1 E_4	Bcb^{dCH}_{CH}	E_4	E_1	ΔBcb^{dRW}_{CH}	ΔBcb^{dEA1}_{EA1}	ΔBcb^{dEA2}_{EA2}
Regime XX Fixed E_1 E_2 E_4	Bcb^{dCH}_{CH}	Bcb^{dEA1}_{EA1}	Bcb^{dEA2}_{EA2}	ΔBcb^{dRW}_{CH}	ΔBcb^{dRW}_{EA1}	ΔBcb^{dRW}_{EA2}
Regime LL Floating E_1 E_2 E_4	E_2	E_4	E_1	ΔBcb^{dCH}_{CH}	ΔBcb^{dEA1}_{EA1}	ΔBcb^{dEA2}_{EA2}
Regime yuan area Floating E_2, Fixed E_3 E_5	E_2	Bcb^{dEA1}_{EA1}	Bcb^{dEA2}_{EA2}	ΔBcb^{dCH}_{CH}	ΔBcb^{dRW}_{EA1}	ΔBcb^{dRW}_{EA2}
ACU regime Floating E_2, fixed but adjustable E_3 E_5	E_2	Bcb^{dEA1}_{EA1}	Bcb^{dEA2}_{EA2}	ΔBcb^{dCH}_{CH}	ΔBcb^{dRW}_{EA1}	ΔBcb^{dRW}_{EA2}
ACU regime without EA2 Floating E_1 E_2, fixed but adjustable E_5	E_2	Bcb^{dEA1}_{EA1}	E_1	ΔBcb^{dCH}_{CH}	ΔBcb^{dRW}_{EA1}	ΔBcb^{dEA2}_{EA2}
ACU regime without yuan Floating E_1 E_2, fixed but adjustable E_6	E_2	Bcb^{dEA1}_{EA1}	E_1	ΔBcb^{dCH}_{CH}	ΔBcb^{dRW}_{EA1}	ΔBcb^{dEA2}_{EA2}

The Case of Intermediate Exchange Rate Regimes

Intermediate monetary regimes reflecting more managed floating exchange rate policies can be considered as they seem more realistic. These managed exchange rate regimes can be based on target used by the central bank concerning the level of current account or the level of foreign reserves. Four cases can be distinguished:

1. In the regime XA the yuan is still pegged to the Rest of the World but the East Asian currencies are now in a managed regime against the Rest of the World, instead of being purely floating like in the regime XL. It is still corresponding to the regime of the end of the 1990s and beginning of the 2000s. This regime can be constructed by modifying the exchange regime that determines E_1 and E_4 from the basic model. We can use two kinds of targeting. The former is based on the foreign reserves held by the East Asian central banks and uses the ratio of Rest of the World bonds held by central banks to GDP as a target, and the latter uses simply the ratio of the current account to GDP.
2. In the regime AL the Chinese monetary authorities follow a managed regime against the Rest of the World with a target for their foreign reserves or their current account surplus while East Asian currencies are floating against the Rest of the World. This regime is closer to the current monetary regime.
3. The regime AX is another version of the yuan area where the yuan follows a managed exchange regime against the Rest of the World and the East Asian currencies are in the fixed regime with the yuan. The Chinese financial liberalization is supposed to be less advanced and the Chinese authorities keep the yuan more under control.
4. The regime LA describes the situation where the East Asian monetary authorities manage their currencies to the yuan while the yuan is floating against the Rest of the World. This regime corresponds to a yuan block where the yuan is used as an anchor for the East Asian currencies, but in a more flexible manner.

Simulations

We focus on asymmetric supply shocks inside East Asia, which are the main challenge for East Asian monetary regime. We consider, first, a loss of competitiveness of East Asia 1 against East Asia 2, and second, a loss of competitiveness of the two ASEAN countries against China. Results will be given only for the basic exchange rate regimes.

A Loss of Competitiveness Intra-ASEAN

A loss of competitiveness of East Asia 1 induces a negative shock with a slowdown and current deficit. With fixed exchange rate regimes like the regime XX (all the East Asian currencies pegged on the Rest of the World) or the yuan area, there is no adjustment mechanism. The slowdown and the current deficit remain on the long term. On the contrary more flexible regimes like the regime LL (floating regime) or XL (yuan fixed, EA1 and EA2 floating) allow a progressive adjustment with a recovery and a

reduction of the current deficit thanks to a depreciation of EA1 currency. The same results can be obtained with an ACU regime or an ACU regime without EA2, thanks once again to exchange rate adjustments obtained by successive steps. More surprisingly an ACU without the yuan gives negative results with a more dramatic GDP decline and current deficit. This can be easily understood, since, in this regime, the EA2 currency is the new anchor of the ACU regime and appreciates strongly due to the gains of competitiveness. EA1 currency follows this appreciation, which increases the initial negative shock. An adjustment is observed only in the long term. Figure 5.2 presents the evolution of EA1 GDP after the initial shock depending on the exchange rate regime and figure 5.3 shows the evolution of EA1 currency/ Rest of the World exchange rate.

The impact on ASEAN integration can be examined through the evolution of the share of intra-ASEAN+3 trade in the total trade of each country. Figure 5.4 gives this share for country EA1. The loss of competitiveness induces a decrease of exports of East Asia 1 toward East Asia 2, which contributes to a decline of the rate of intraregional integration (around -2.5 percent). This decline is rather similar in the various exchange rate regimes with some deviations, which can be explained. Intra-Asian trade is larger in regimes XL and LL (where the relations between the yuan and EA currencies are more flexible) than in regimes XX and LX (where relations are more rigid) but the evolution of the ratio of intraregional trade is inversed, due to the large increase of exports toward the Rest of the World induced by the depreciation of EA currencies against the Rest of the World in the regimes XL and LLS. Similarly, the decline of the intraregional integration is more marked in the ACU regime without the yuan, as EA1 imports from China and EA2 decrease more, and less pronounced on the contrary in the ACU regime, as EA1 currency/EA2 currency depreciates.

A loss of competitiveness of ASEAN against China. As previously, a loss of competitiveness of ASEAN countries against China has first a negative impact in the EA1 country with a decline of GDP and an increasing current deficit. In fixed exchange rate regimes, this decline is enlarged like in the regime XX (all EA currencies pegged to the Rest of the World) or even more dramatically in the yuan area regime (the yuan appreciates with the improving Chinese competitiveness, inducing an appreciation of the East Asian currencies in spite of their loss of competitiveness). On the contrary more flexible exchange rate regimes like the XL regime (yuan/Rest of the World fixed, East Asian currencies floating), the regime LL (pure floating), or the ACU regime without the yuan allow a rather efficient adjustment with a GDP recovery and declining current deficit, thanks to the depreciation of the East Asian currencies against the Rest of the World. The ACU regime and even more the ACU regime without East Asia 2 are less attractive. The initial negative shock is amplified due to the appreciation of the EA1 currency induced by the appreciation of the yuan and of the ACU. It is only at medium-long term that exchange rate adjustments inside the ACU
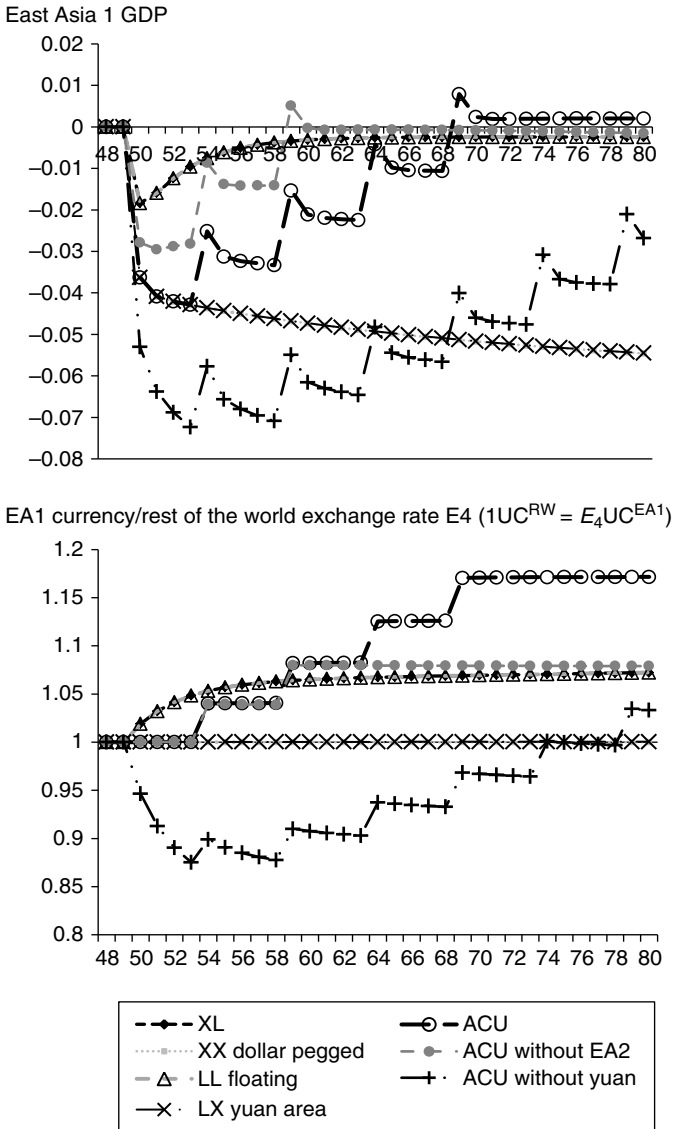
East Asia 1 GDP

EA1 currency/rest of the world exchange rate E4 (1UC^{RW} = E_4UC^{EA1})

- - ◆ - - XL	- ◯ - ACU
⋯⋯■⋯⋯ XX dollar pegged	- ● - ACU without EA2
- △ - LL floating	+ ACU without yuan
✕ LX yuan area	

Figure 5.2 Loss of competitiveness of East Asia 1 against East Asia 2 (relative deviation compared with the base line) East Asia 1 GDP.

Source: Authors' calculations.

system allow a progressive recovery and reduction of the imbalances. Of course, in case of an ACU regime without EA2, the results are more favorable for this last country whose currency can depreciate. Figures 5.5 and 5.6 give the main results for EA1 GDP and EA1 currency/Rest of the World exchange rate.
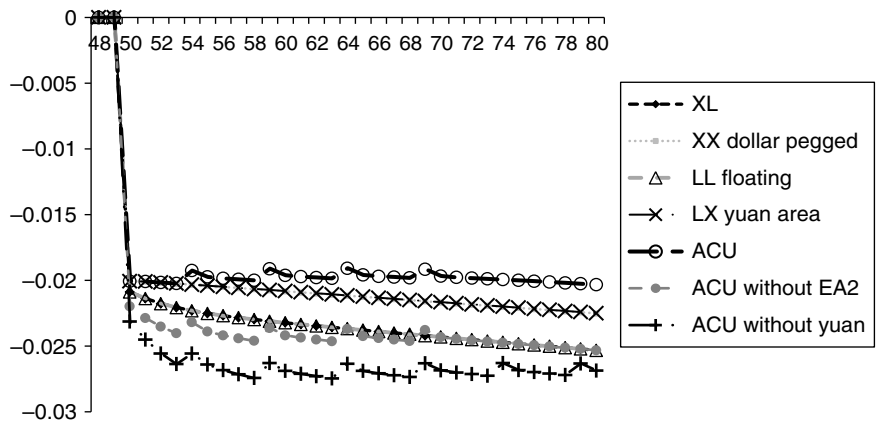
Figure 5.3   Loss of competitiveness of East Asia 1 against East Asia 2 (relative deviation compared with the base line) EA1 currency/Rest of the World exchange rate E4 ($1UC^{RW} = E_4 UC^{EA1}$).

Source: Authors' calculations.

Last, the impact on ASEAN integration can be examined (figure 5.7). The loss of competitiveness induces a decrease of exports of East Asia toward China, which contributes to a decline of the rate of intraregional integration. But the differences between the various exchange rate regimes are more marked than previously (between -2 percent and -6 percent). With the ACU regime the appreciation of the EA and Chinese currencies/Rest of the World exchange rates induces an increase of EA and Chinese imports from the Rest of the World, which is larger than the exports decrease and leads to a large decline of the rate of intraregional integration. This decline is even more important in case of a yuan area, as with fixed exchange rates there is no possible rebalance thanks to EA1 export to China.

Conclusion

This analysis based on an East Asian SFC four-country model has given a first description of East Asian monetary regimes, as they have been observed in the past or could evolve in the future.

The regime XX (fixed yuan and East Asian currencies against the Rest of the World) represents roughly what was prevailing during the middle of the 1990s. It reflects a weak form of de facto coordination between East Asian countries by anchoring on the dollar to avoid divergent evolutions. Gains of Chinese competitiveness against East Asia lead to a boom in China at the expense of ASEAN countries with large current imbalances, as there is no exchange rate adjustment mechanisms. The Asian crisis of 1997–1998 could be interpreted in this context with an East Asian speculative boom and declining competitiveness leading to large current deficits with no adjustment mechanisms.
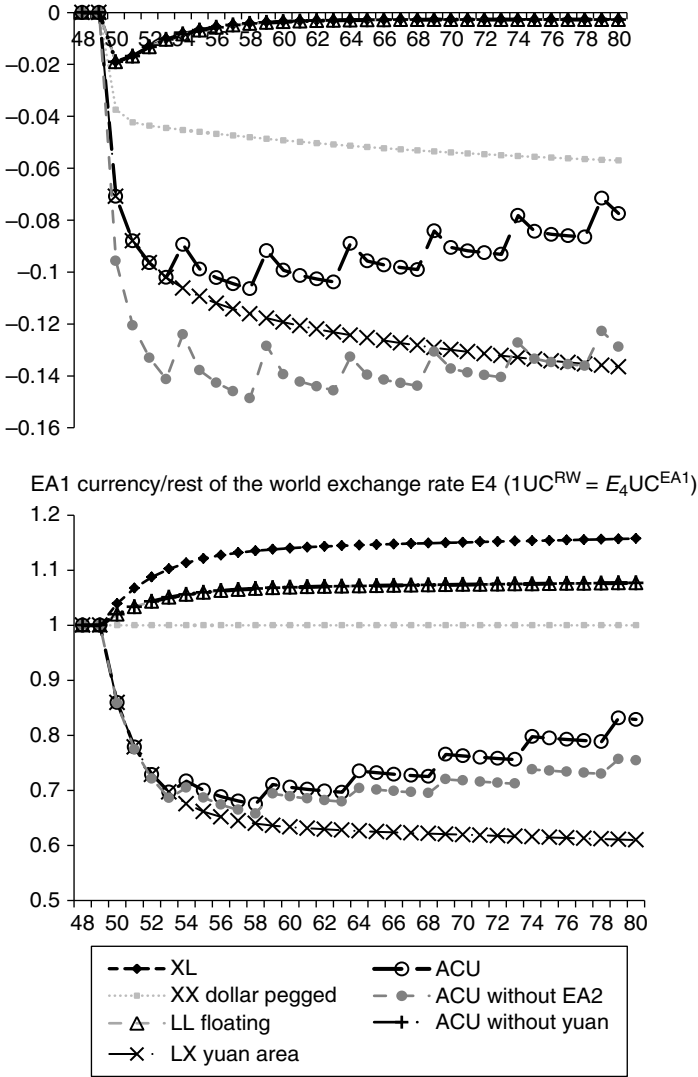
EA1 currency/rest of the world exchange rate E4 ($1UC^{RW} = E_4 UC^{EA1}$)

Figure 5.4   Loss of competitiveness of East Asia 1 against East Asia 2. Impact on the share of intra-ASEAN trade in the total trade of country EA1 $\left\{\left(X_{EA2}^{EA1} + X_{CH}^{EA1}\right) + \left(IM_{EA2}^{EA1} + IM_{CH}^{EA1}\right)\right\} / (X^{EA1} + IM^{EA1})$, in difference with the base line.

Source: Authors' calculations.

The regime XL (fixed yuan/Rest of the World and floating East Asian currencies) and the intermediate regime XA (fixed yuan and managed East Asian currencies) correspond to the main lines of the end of the 1990s and beginning of the 2000s. Gains of competitiveness of China against East Asia can be balanced thanks to East Asian depreciation against the Rest of the World. Similarly, asymmetric supply shocks inside East Asia
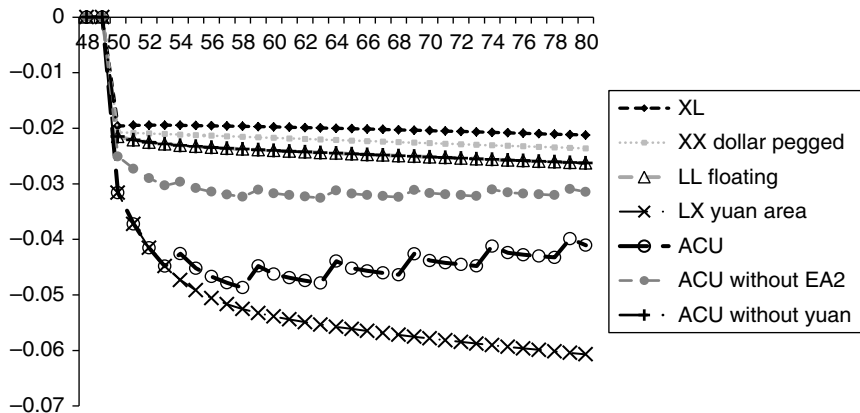
Figure 5.5 Loss of competitiveness of ASEAN countries against China (relative deviation compared with the base line).

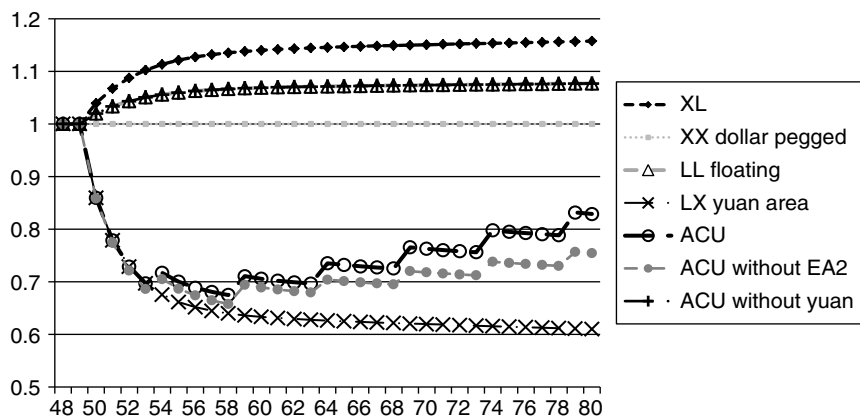*Source*: Authors' calculations.

Figure 5.6 Loss of competitiveness of ASEAN countries against China (relative deviation compared with the base line), EA1 currency/Rest of the World exchange rate E4 (1UC^{RW} = E_4UC^{EA1}).

Source: Authors' calculations.

can be easily managed. In spite of a modest yuan revaluation before the burst of the financial crisis in 2007–2008, intra–East Asian imbalances and exchange rate misalignments have been reduced thanks to more flexible exchange rate policies.

The regime LL (pure floating) illustrates once again that floating exchange rates are a powerful tool to reduce international imbalances. But the large instability is the intrinsic drawback of this exchange rate system. The economic policy instruments to preserve the stability should be implemented. Even though the adjustments are realized more gradually and the
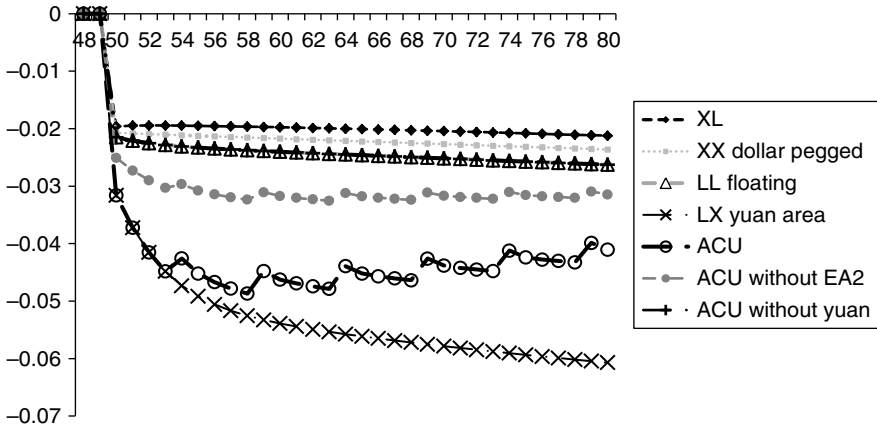
Figure 5.7 Loss of competitiveness of East Asia against China. Impact on the share of intra-ASEAN trade in the total trade of country EA1 $\left\{\left(X_{EA2}^{EA1} + X_{CH}^{EA1}\right) + \left(IM_{EA2}^{EA1} + IM_{CH}^{EA1}\right)\right\}/(X^{EA1} + IM^{EA1})$, in difference with the base line.

Source: Authors' calculations.

scale of the fluctuation is larger compared to the case of the pure floating system, the managed exchange rate system (regime AL) could be a feasible political alternative as an intermediate stage. Compared with the present situation, two points must be underlined. First, it is clear that the yuan is not floating and the managed exchange rate of the yuan is under control of the Chinese central bank. Second, East Asian currencies are not also freely floating. However since the end of the 2000s the East Asian current surpluses have been reduced significantly.

The regimes LX and AX can be called yuan area with the ASEAN currencies anchored to the yuan, which is floating or managed against the Rest of the World. It is a long-term scenario, which could be achieved after a difficult process of economic and politic integration in East Asia. Although rather unlikely, it is worth being examined. A stimulation of Chinese growth diffuses to East Asia while the Rest of the World suffers losses due to the yuan depreciation. But in case of Chinese gains of competitiveness against the Rest of the World or East Asia, the induced growth leads to an appreciation of the yuan and of the East Asia currency, which penalizes its growth and deteriorates its current account. Asymmetric shocks in a fixed exchange rates regime induce divergent evolutions that are difficult to manage in the absence of exchange rate adjustments. This is a well-known result, often forgotten however as the euro area crisis illustrates it. Even if a yuan area is a long-term perspective, it does not play in its favor, more especially as this yuan area is characterized by strong structural heterogeneities between participant countries.

Last, the ACU regime is also a long-term scenario. It allows progressive adjustments facing asymmetric shocks inside East Asia and appears close to

floating or flexible exchange rate regimes. It can also be associated with the intermediate regime LA (yuan/Rest of the World floating, East Asia/yuan managed), a yuan block, where the yuan is used as an anchor and which is less rigid than a yuan zone with a single currency. These regimes seem rather appropriate for East Asia facing asymmetric shocks of competitiveness from China or inside ASEAN. However it must be underlined that the ACU regimes are very sensitive to the currencies participating to the ACU. For example, an ACU without the yuan is well suited for shocks originating from China, but more problematic for intra-ASEAN shocks.

These various exchange rate regimes don't change radically the impact of structural shocks on ASEAN intraregional integration. However significant differences can be observed in some cases of intra-ASEAN shocks.

General Conclusion

This chapter has analyzed East Asian monetary cooperation since the 1990s. First, using a FEER approach, exchange rate misalignments have been estimated and linked to the external performances and growth of East Asian countries. Exchange rate misalignments are more limited in the 2000s and 2010s than in the 1990s, the main exception being Indonesia whose currency seems overvalued. Even the yuan undervaluation in real effective terms has been reduced. This configuration contrasts with what is observed between European countries where undervaluation of the euro for the German block is opposed to the overvaluation of the euro for Southern countries. These results can be linked to the nature of the exchange rate regimes, which have been adopted successively.

Second, an analysis based on an East Asian SFC four-country model has given a description of East Asian monetary regimes, as they have been observed in the past or could evolve in the future. It is of course a highly simplified representation, but it describes the interdependency between real and financial spheres in stocks and flows in a consistent way at the world level, which is not always done in other approaches. In particular, in this SFC approach there is no opposition between a determination of the exchange rates by the capital flows and by the trade sector. Both are taken into account simultaneously. A clear cut opposition has appeared between fixed exchange rate regimes, like the peg on the dollar (Rest of the World in the model) or the yuan area, which don't seem suitable for a highly heterogeneous region, and more flexible or managed regimes (floating or ACU regimes), which can better face asymmetric evolutions. However it must be underlined that ACU regimes give rather contrasted results according to the countries participating to the ACU. Beyond these ACU regimes, other East Asian monetary regimes could be explored, such as a system combining national currencies and a global ACU, floating at the world level and not reduced to a simple unit of account, with the possibility for the yuan to be inside or outside. Following Keynes proposals, an ACU bancor could also

be explored with a new institution acting as a Clearing Union at the East Asian level.

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