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Currency Boards: Issues and Experiences

by

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Abstract

This paper discusses some of the issues that concern the operation of currency boards, by comparison to conventional exchange rate pegs, and looks at the experiences of three examples of this type of arrangement: Argentina (from 1991), Hong Kong (from 1983) and Estonia (from 1992). In all three cases, the implementation of currency boards or equivalent arrangements played a significant role in their successful stabilization programs. Currency boards derive their strength from the fact that they severely constrain the policy maker's room for manoeuvre, by comparison to conventional pegs. They generally require an even stricter and less forgiving attitude to bank failure, wage and price rigidities and other disturbances than do exchange rate pegs in general.

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Currency Boards: Issues and Experiences

In recent years there has been a growing interest in currency boards as a means of stabilizing the exchange rate and bringing order to economic conditions generally when more conventional systems threaten to be ineffective. Once a common arrangement of colonial territories during the first half of the twentieth century, currency boards fell into disuse as the colonial regimes were dismantled. Various currency arrangements around the world retained features of the currency boards they replaced, but otherwise came increasingly to resemble more conventional systems--with the setting up of a central bank and the operation of an active monetary policy.

Probably the most important development in encouraging a review of the usefulness of such arrangements was the re-introduction of a currency board in Hong Kong in October 1983. Prior to this time, discussions between Britain and China were causing considerable financial uncertainty and the exchange rate, in particular, was depreciating rapidly. Within weeks of the introduction of the new system, pressure on the exchange rate ended and despite dramatic changes in confidence--up and down--in the years since, the exchange rate was never under the same pressure again. Notwithstanding this success, the Hong Kong arrangements remained something of a curiosity until a similar arrangement was set up, under very different circumstances, in Argentina in March 1991. Finally, the dissolution of the USSR in the Fall of 1991 excited further debate about the usefulness of currency boards in bringing early financial stability to the newly emerging states, and in June 1992 Estonia, the first of the states of the Former Soviet Union (FSU) to introduce a separate currency, began operating a currency board. 1/

1/ Impressed by the success of the Estonian scheme, the Lithuanian authorities asked the Fund in November 1993 to help set up a similar system. On April 1, 1994 Lithuania became the second state of the FSU to operate a currency board. The Lithuanian scheme was modelled on that of Estonia.

This paper explains how a currency board works and what its practical merits and disadvantages are and reviews the experiences of Hong Kong, Argentina and Estonia since the introduction of their arrangements. 1/

I. Operating Principles

Under a currency board arrangement, the board agrees to supply or redeem local currency bank notes and, if applicable, reserve deposits of commercial banks held with the currency board for another currency--normally a widely traded currency--at an established exchange rate and without limit. Local currency may be supplied in exchange for domestic currency claims on other institutions only in strictly limited amounts and according to pre-determined criteria. The decision to set up a currency board involves five main issues (i) what liabilities to back, (ii) how much backing to provide, (iii) what to back with and what currency to peg to, (iv) what exchange rate to choose and (v) who should have access to the board.

1. What do you back?

The simplest arrangement is to back only bank notes, as in Hong Kong, where the currency board has no direct role in commercial bank clearing operations and therefore no other base money liabilities. Commercial bank clearing takes place instead through accounts held with the Hong Kong & Shanghai Bank (HKSB). Since July 1988, however, certain changes in accounting arrangements, which require the HKSB to hold balances with the Exchange Fund (the Hong Kong currency board) which clearing accounts held

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1/ See Osband and Villaneuva (1993) and Williamson (1994) for an analytical discussion of currency boards. See also Bennett (1993a) and (1993b) and Hansson (1993) for a discussion of the Estonian case and Greenwood (1984a) and (1984b) for the Hong Kong system. Hanke and Schuler (1993) provide a useful list of currency boards in the last hundred years.

with the HKSB by other banks cannot exceed, means that the Exchange Fund is now indirectly linked to the clearing accounts of commercial banks. Unlike the quantity of bank notes in circulation, which adjust to demand (in exchange for dollars), the (maximum) quantity of commercial bank clearing balances is under the control of the Exchange Fund.

In Argentina and Estonia, on the other hand, the central bank was already involved in commercial bank clearing arrangements by virtue of the fact that--in the absence of interbank credits--settlement would be undertaken using accounts held with the central bank. While commercial bank transactions in Argentina were highly efficient--banks could lend to each other or lend against Treasury bills or other secure collateral, this was not the case in Estonia at the time of the reform, where the only means of clearing was through accounts with the central bank. In neither case would it have made sense to undermine the security of accounts with the central bank by denying their convertibility. Thus the guarantee of exchange into foreign currency applies to both bank notes and deposits with the central bank. 1/

2. How much backing should be provided?

To instill confidence that it can honor the pledge of convertibility, the currency board should start with foreign exchange reserves sufficient to back a substantial proportion of the outstanding value of the relevant liabilities at the chosen exchange rate. Where confidence is lacking this

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1/ The two countries differ slightly, however, in their definition of legal tender. In Argentina, both the peso and the US dollar are legal tender, whereas in Estonia only the kroon is legal tender--transactions between residents cannot be settled within Estonia in any other currency.

proportion needs to be at least 100 percent. 1/ Ideally, the central bank that encompasses the currency board, if one exists, should have reserves surplus to those of the currency board, in order to deal with contingencies such as catastrophic bank failures. Figures for the Hong Kong Exchange Fund for 1983 have not been published, but details recently released of the Exchange Fund's assets show it now to have vastly in excess of what was required to merely honor its pledge of convertibility. 2/ The Convertibility Law in Argentina requires full backing for the monetary base. Argentine gross external reserves available to the central bank in March 1991 to guarantee convertibility were somewhat in excess of the outstanding amount of the relevant austral liabilities, but the net reserve position was initially negative. 3/ This reflected liabilities which it was known would be transferred out of the balance sheet following a debt and debt service reduction (DDSR) operation then under negotiation. The DDSR was completed in 1993 and the net reserve position is now positive. So long as reserve liabilities are sufficiently long term, or likely to be easily refinanceable, a sufficiency of gross reserves is an adequate measure of backing. Otherwise, a close eye will have to be maintained on the maturity structure of liabilities, in order to ensure that gross reserves remain

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1/ An alternative arrangement, in the absence of any reserves, would be to operate with only 100 percent *marginal* backing for the note issue. Such an arrangement could only work if there were no outstanding stock to guarantee, since it would not otherwise be proof against speculative attack. The accumulation of convertible notes would be a gradual process, and for a while there would have to be a dual system with both new and old notes.

2/ The Exchange Fund is also custodian of the reserves of the government, which has traditionally run a surplus, but these are in principle not available for the purposes of ensuring convertibility.

3/ The austral was subsequently replaced by the peso, at a conversion rate of one peso for 10,000 australs.

available as required. It is notable that the central bank is permitted by the Central Bank Law (1992) to count government dollar denominated bonds as backing for up to one third its liabilities should the need arise. 1/ In Estonia there was a strong case for full backing if possible, owing to the unpromising circumstances of the states of the FSU following their independence. Estonia was fortunate in the early restitution of gold by the Bank of England and in consequence the Estonian currency board was launched in June 1992 with 90 percent cover, quickly rising to over 100 percent as further gold and other monies were restituted subsequently by the Swedish government and the Bank for International Settlements. 2/

3. What should you back with and to which currency should you peg?

The choice of the currency to which to peg will depend, among other things, on the character of the currency (strong or weak) as well as on current or prospective trading relationships. For both Hong Kong and Argentina, the obvious choice was the US dollar, reflecting the fact that for trade and other financial transactions this was the dominant unit of account. In Estonia, consideration was initially given to the European currency unit (ECU). Such a link would not have been as transparent as a link with a single well-known currency, however, and would have greatly complicated the task of reserve management and conditions of exchange. While

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1/ The eligibility of government bonds as backing is also limited in *flow* terms to a maximum of 10 percent of the monetary base per annum. Bonds held as backing must be valued at secondary market prices.

2/ Although broadly equivalent in absolute amount, the larger size of the Lithuanian economy meant that relative to its proposed currency board liabilities, the Lithuanian gold, plus subsequent accretions of reserves, was sufficient backing only in gross terms. Net of foreign exchange liabilities, the Lithuanian currency board arrangement was significantly less than fully backed. In this sense, the Lithuanian scheme was closer to that of Argentina.

the Finnish mark or Swedish krona might have recommended themselves from the point of view of trade, the deutschemark was ultimately chosen because of its strength and respectability. 1/

The currency board should in principle be backed with *external* reserves, held--in interest bearing form--in the currency to which the domestic currency is pegged. In Argentina, a small proportion of the backing was in the form of foreign currency public sector debt. If claims on domestic institutions are employed it is important that the proportion held in this form is small enough for it to be most unlikely that any flight from cash could result in the external component being exhausted. For Argentina, therefore, the maximum allowable proportion that can be backed with claims on domestic obligors (BONEX) is one third--implying that the cash base would have to shrink by two thirds before such assets were called upon. 2/ The actual ratio is much lower than this. In Estonia, the bulk of the reserves at the outset was held in gold--the form in which it was restituted--but this was rapidly converted into deutschemark. The reserves of the Exchange Fund were already mostly in the form of US dollar interest bearing assets. The purpose is to ensure that no movement in asset prices can undermine the extent of the backing as well as to garner interest--either to add to the capital of the central bank/currency board or to provide income to the government.

1/ The vast majority of foreign exchange transactions and foreign currency deposits were US dollar denominated prior to the introduction of the currency board system. Accordingly the Lithuanians decided to peg to the US dollar.

2/ The early precursor to the Baltic currency boards--the system proposed by Keynes for the North Russian government in 1918, also allowed up to a third of liabilities to be backed by claims on the government, see Spring Rice (1919) and Hanke and Schuler (1991).

4. What considerations apply in choosing the exchange rate?

Three main considerations apply in choosing the exchange rate (a) the degree of under or overvaluation of the currency from the point of view of competitiveness (b) the implications for the level of reserve backing and (c) the extent to which it would represent a departure from the prevailing market rate. The usual situation surrounding the introduction of a currency board is where there has been a sharp depreciation of the exchange rate in the market for which the currency board is intended, in part, to stop. In these circumstances, the likelihood is that the overvaluation, if it existed, will probably have been eliminated by the speculative attack. At the market exchange rate prevailing just prior to the introduction of the Hong Kong and Argentine systems, there was not felt to be any particular problem regarding competitiveness. In the case of Estonia, on the other hand, the depreciation of the ruble that had occurred since independence had been so pronounced that the concern was rather that the exchange rate might be undervalued, rather than overvalued. On balance it was felt that the advantages of a kick-start to trade from an undervalued exchange rate would outweigh the disadvantages of comparatively high inflation.

Given the importance of backing for the domestic currency, the implication of the chosen exchange rate for the extent of backing and the availability, if any, of surplus resources, provided an important constraint on any decision to appreciate the rate. Depending on the resources available to the Exchange Fund at the time, there may have been some leeway for the Hong Kong authorities to appreciate the rate, but the scope for the Argentine or Estonian authorities was considerably more limited.

Whatever the considerations described above, there is good reason not to depart from the prevailing market rate, unless deemed necessary, since any prior knowledge of this in the market could lead to unwanted and destabilizing speculative inflows or outflows at the time of reform. In Hong Kong, Argentina and Estonia, the exchange rate chosen was very close to the market rate. In Hong Kong, the exchange rate had hit a low of 8.78 HK$ per US$ on October 5, 1983, having depreciated steadily in the preceding months from 6.5 HK$ per US$ at the beginning of the year. As it became increasingly clear to the market that something was about to be done the exchange rate began to recover, reaching 8.15 on the last working day prior to the launch of the new system. In the event, the exchange rate selected for the Exchange Fund was 7.8 on October 17, compared with a prevailing market rate of 8.0 on the day. The Hong Kong authorities therefore chose a slightly appreciated rate. In Argentina, by contrast, the authorities allowed the exchange rate to float--within bands--in the two months prior to the reform, and chose on April 1, 1991, an exchange rate at the lower end of this band. The rate selected was at a slightly depreciated level relative to the prevailing market rate. 1/ For the Estonian authorities, the ruble exchange rate had been fairly stable in the months preceding the reform at around rub 115 to the US dollar for cash rubles, with the rate in the auction market for account rubles steadily appreciating to a level somewhat above this. In the days immediately preceding the reform, both rates were

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1/ Although the bands were rather narrow, the rate fluctuated within them and it was felt that the bands probably covered a range that was close to the market equilibrium for the austral at the time. The convenience of a rate of exchange of precisely 10,000 australs (now one peso) to the dollar may have influenced the final choice of exchange rate.

close to rub 125 per US dollar. Since the conversion from rubles was to be in a factor of ten, this conveniently translated into cross rate of EEK 8 to the deutschemark, a round number that facilitated the comprehension of the new scheme. 1/

5. Who has access to the currency board?

In Hong Kong, only the banks with note issuing authority have the right to convert Hong Kong dollar cash into US dollars. Individuals and enterprises must rely on arbitrage and the competitiveness of the banking system to ensure that the rates offered them are equivalent. In Argentina all comers are in principle entitled to exchange pesos (originally australs) but in practice it is only banks which deal with the central bank. In Estonia it was felt appropriate to explicitly provide a window through which the general public could exchange their bank notes, in order to demonstrate that the guaranteed exchange was genuine. The Bank of Estonia found that it was a net seller of deutschemark through this window and that its customers tended to be banks. This reflected the fact that this was the only channel through which the Bank provided deutschemark bank notes. All other transactions were settled by account. After some months, the location of this window was shifted and lack of knowledge as to its whereabouts meant that de facto only banks had access to the Bank of Estonia from thereon.

1/ The exchange rate for the Litas in the months prior to the introduction of the currency board was stable at 3.90 to the US dollar. Immediately following the enactment of the Litas Stability Law the exchange rate began to weaken, reaching 4.07 as the market speculated about the rate. In the event, the Lithuanians chose 4.00--a round number which had the virtue of showing a commitment to a strong exchange rate, while not being so strong as to wipe out the surplus reserves of the Banking Department.

II. The Balance Sheet

The institutional arrangements for currency boards differ from country to country, largely reflecting whether or not central banks existed prior to the introduction of the new system. In Hong Kong, the Exchange Fund already existed by virtue of the previous currency board arrangement, discontinued in 1974, so the re-introduction did not involve any change in institutional structure. Until 1993, the Exchange Fund did not publish its accounts. The Exchange Fund's liabilities consist primarily of Certificates of Indebtedness--instruments which confer on its holder the right to issue HK$ bank notes of equivalent value. Although a substantial proportion of the Fund's assets are actually held on behalf of the government, the Fund is still substantially overcapitalized. In Argentina, since the currency board is being pursued in "shadow" form, there has been no change to the structure of the central bank in an accounting sense, and a balance sheet detailing the monetary base and the composition of assets is published in the normal way. For the Bank of Estonia, whose internal organization is still in the process of development, there has--for accounting purposes--been a formal division of the balance sheet into the Issue Department, responsible for the currency board, and the Banking Department, responsible for all other activities of the central bank. 1/ The Issue Department's balance sheet is endogenous to the economy at large--it is not controlled by the authorities.

1/ This follows the model of the Bank of England, likewise divided into Issue Department and Banking Department. Unlike the Bank of Estonia, however, the Issue Department of the Bank of England does not hold foreign exchange as backing for the note issue, but rather domestic securities. As with the Bank of Estonia, this division is purely an accounting device and does not reflect the organizational structure of the bank. The Bank of Lithuania now also prepares accounts in this way.

The Banking Department, on the other hand, represents the exogenous or policy side of the central bank. In particular, the Banking Department holds the reserves surplus to the requirements of the Issue Department, and which are available, should the need arise, to provide emergency lending to commercial banks. In this instance, the Banking Department would purchase the domestic currency--to lend to the commercial bank--from the Issue Department in exchange for deutschemark. This accounting framework is intended to prevent the Issue Department from being involved in discretionary lending activities itself and to ensure that its liabilities are always fully backed. 1/

III. Policy Implications

The robustness of the exchange rate that a currency board confers, by comparison to conventional pegs, does not come without a price. The operation of such a system entails a number of restrictions--beyond those that apply to a peg--for the conduct of fiscal and monetary policy.

1. Government finances

One of the most important conditions applying to a currency board is that there should be no lending by the currency board to the government. Modest compromises to this principle are nonetheless sometimes made--as in Argentina where a portion of the backing for base money can be in the form of dollar denominated government debt. 2/ The credibility of the link depends on the asset used to back them being external. Furthermore, the

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1/ For further information regarding the evolution of the balance sheet of the Bank of Estonia see Bennett (1993a).

2/ The central bank is nonetheless prohibited from extending any new credits to the public sector.

denomination of these assets must not be in terms of local currency, since this undermines the ability of the central bank to honor its guarantee.

Since the government cannot obtain financing from the central bank, domestic financing, if needed, must be obtained instead from the commercial banks. If the commercial banks are to have any resources left to lend to the private sector, such domestic government financing must be fairly limited in scale. Thus the domestic borrowing requirement should ideally be zero, or at least very small. It is notable that until recently the government of Hong Kong has--since the introduction of the currency board--always run a surplus, and the deficit planned for 1994/95 is easily financeable from the huge accumulation of external fiscal reserves by the government. In Argentina, the government deficit, which had in the past always been very large was brought under control prior to the introduction of the currency board and now stands in surplus. In Estonia, a key part of the successful introduction of the new currency was the introduction, on the day of the reform, of measures to bring the ex ante government deficit for 1992 down from around 4 percent of GDP to zero. The domestic borrowing requirement has remained zero since. This requirement for a balanced or small domestic borrowing requirement has important implications for the governments of other states of the FSU which have proved less able to reduce their borrowing to manageable proportions.

2. Open Market Operations

Under a currency board, both the level of interest rates and the yield curve are genuinely market determined. In this sense, a pure currency board deprives the authorities of a degree of freedom that is retained, by sterilizing foreign exchange intervention, under an exchange rate peg. A

currency board can, in essence, be viewed as a pegged exchange rate system under which open market operations, and thereby sterilization, are prohibited. This implies the complete loss of control over interest rates. By forgoing the ability to control interest rates, however, the authorities gain a much more robust exchange rate. This is because attempts to controls interest rates through open market operations typically leak quickly into changes in reserves--and this process may continue indefinitely if these reserve changes are sterilized.

While this is the ideal under a pure currency board, departures from this principle may sometimes be warranted. In Hong Kong, occasional intervention to smooth undue fluctuations in interest rates has been known to occur. Originally this was done indirectly, mainly by means of intervening in the foreign exchange market 1/, but since 1990 the Exchange Fund began issuing bills to enable it to conduct more conventional open market operations. More recently, with the introduction in 1993 of the Liquidity Adjustment Facility--a discount window--the Exchange Fund has taken another step away from the principle of a pure currency board and towards that of a conventional central bank. This facility is intended to stabilize overnight interest rates, traditionally volatile in Hong Kong, and upper and lower bands for overnight rates are now set. The scope for the authorities to sustain rates significantly at odds with the market is limited, however, even though the Exchange Fund is overcapitalized, owing to

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1/ Other methods of influencing liquidity included short term borrowing in the interbank market and the shifting of treasury deposits from the banking system into sterilized Exchange Fund deposits. See Yam (1992) for a discussion of the implications of the recent reforms.

the high degree of capital mobility in Hong Kong. When surplus reserves are scarce such a policy is extremely dangerous.

In Argentina open market operations are also conducted, but here the intention is purely to smooth out intra-monthly fluctuations in the demand for cash. Such operations are intended to net out to zero on a month by month basis. Typically the outstanding swap operations do not exceed 1 percent of the monetary base. In Estonia, on the other hand, there are no open market operations or discount window facilities. Given the unpromising economic circumstances of its introduction it was essential that the new system be as watertight as possible. In time, as central banking experience is gained, occasional intervention might be feasible, but at the moment this is not on the agenda. The introduction of Bank of Estonia bills in February 1993, which could ultimately be used for open market operations, was intended in the first instance to enhance the ability of banks to undertake collateralized lending to each other and thereby alleviate severe interbank clearing problems and remove prohibitive risk premia from the interbank loans market.

While smoothing operations by means of open market operations need not necessarily compromise the operation of a currency board, control over interest rates through administrative action is definitely inadvisable. Any attempt to control the level of interest rates administratively would lead to the early collapse of the system, since it interferes with the mechanism through which banks bring equilibrium to the distribution of monetary assets and liabilities. If interest rates are set too low, for example, banks would be subject to excess withdrawals--leading ultimately to their

collapse. Such controls are therefore entirely absent from all three countries considered here. 1/

3. Lender of Last Resort

The limitations on the ability to influence interest rates also constrains the scope of the monetary authorities operating a currency board to act as guarantor of the banking system. The scale of assistance that may be offered to a weak bank should be confined to the foreign exchange reserves surplus to the requirements of the currency board--those of the Banking Department in the framework of the Estonian system. This is why it is important to ensure, if at all possible, that there are such reserves available, for which the choice of exchange rate can be crucial (see above). Such resources should only be used in circumstances where the stability of the banking system as a whole is at risk.

In Hong Kong, the surplus of foreign exchange means that the banking system has implicitly very strong backing. A bank collapse which genuinely threatened the whole banking system has yet to occur, and the recent treatment of BCCHK shows that lesser cases can expect little succor. In Argentina, following the implementation of the Convertibility Law, banks were put on notice that central bank assistance would cease. Steps were

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1/ This is not to say that there is a free for all in the setting of interest rates. In Hong Kong the banks operate a cartel, setting interest rates on deposits following regular meetings between banks. Banks are also to expected to "consult" the Monetary Affairs Committee about their decision. An earlier legal maximum of 60 percent per annum was removed from the Money Lenders Ordinance in 1988 when it was realized that this could be an impediment to operation of market forces in defending the exchange rate. This complemented the move in 1987 to allow banks to impose negative interest rates on deposits, to deal with situations when the exchange rate was undue upward pressure. Ironically, these measures appear to have *dampened* the variance of interest rates since their introduction (Chart 2).

taken to strengthen capital adequacy requirements in order to preempt the need for support. In Estonia, likewise, lending to commercial banks is only undertaken when the stability of the banking system as a whole is threatened.

4. Reserve requirements

Under the simplest currency board arrangement, where convertibility is guaranteed only for bank notes, there is no role for reserve requirements (apart from prudential liquidity requirements) since there is usually no central bank, as in Hong Kong. In Argentina and Estonia, on the other hand, central banks, complete with the institution of reserve requirements, already existed, and these were retained following the introduction of the currency boards. In situations where clearing arrangements are poorly developed, a high reserve requirement ratio may be prudent, in order to ensure that payments can be honored--even if this means censure of the bank. High reserve requirements, as in any system, have a cost in terms of driving a wedge between borrowing and lending interest rates of banks, and over time more moderate ratios should be pursued. Nonetheless, in the absence of other tools of monetary policy, adjustments to reserve requirements can provide some flexibility to policy makers--if this is done appropriately.

5. Scope for Devaluation or Revaluation

Although, in principle, an exchange rate fixed through a currency board could be adjusted--upwards or downwards--this rarely occurs under stricter currency board regimes. In all three countries, there has been a tendency since the introduction of the currency board for the real exchange rate vis-a-vis the peg currency to rise and in some instances this has led to discussion as to the merits of a re-alignment. In Hong Kong, for example,

there has been periodic debate over the possibility of realigning the Hong Kong dollar, both upwards and downwards depending on the prevailing pressure on the exchange rate, but always the proposal has been rejected. The view taken is that once the certainty of the exchange rate is removed, the resilience of the exchange system would be compromised. In addition, market interest rates would become more variable, reflecting speculation about the prospects for a future realignment. The enhanced credibility that currency boards enjoy--by comparison to conventional pegs--probably depends, in part, on the assumption that realignments have been all but ruled out.

6. Exchange Controls

One of the advantages of a currency board is that its robustness usually permits a very liberal structure of exchange arrangements. In fact, it works most effectively under liberal conditions--particularly when markets are well developed. The Hong Kong exchange arrangements are probably amongst the most liberal in the world, and the financial markets are deep and well developed. In Argentina, the last vestiges of capital controls were removed in 1992 and capital can freely flow into and out of well developed money markets. In Estonia, on the other hand, there were concerns at the time of the introduction of the new currency that the banking system was in very poor shape--although there was little information available--and that the rigors of the currency board arrangement would quickly reveal illiquidity and insolvency, leading to potential bank runs. For this reason, the Estonian currency board was set up with a system of capital controls. This system required the repatriation and conversion of foreign exchange earnings with authorized commercial banks and precluded the sale of kroon for anything other than current transactions. This was

designed to prevent the transfer of funds abroad, in the event of a bank run, thereby protecting the liquidity of the banking system as a whole, except to the extent that the public withdrew cash from banks. The expected bank crisis duly occurred at the end of 1992, when three large banks were closed and restructured. After the bank crisis conditions settled down and the continued growth in the demand for base money, with the concomitant increase in Issue Department reserves, the authorities abolished all exchange controls in December 1993.

IV. The Role of the Markets

1. The foreign exchange market

While the currency board may fix the rate of exchange between cash and foreign currency, there may still be an active foreign exchange market--although rate movements will rarely be of any magnitude. Under a Hong Kong-type arrangement, where the exchange rate is for notes only, the principal role for the market is to allow banks to trade each other's deposits for foreign exchange. In the same way as the gold standard allowed for small deviations in exchange rates--the so called "gold points"--beyond which it became profitable to ship gold and arbitrage the deviations, so under a currency board small deviations from the currency board rate can occur in the foreign exchange market (for bank deposits). If pressure exists on the currency the deviation from the currency board rate is unlikely to be large because the incipient arbitrage (drawing down bank deposits in exchange for notes, which can be exchanged at a favorable rate for foreign currency) would induce banks to rises interest rates to the level required to abort the arbitrage. Where the currency board backs base money rather than just bank notes, these deviations would tend to be even smaller, since interbank

transactions can be settled by cheques drawn on the banks' accounts with the central bank where the equivalence with foreign exchange is guaranteed. 1/ The large differences between the three economies under consideration, however, make this proposition difficult to illustrate.

As can be seen from Chart 1, the variance of the market exchange rate relative to the official rate in Hong Kong has typically been quite pronounced, with deviations sometimes as much as one percent. In recent years, relatively rapid economic growth has resulted in an increase in the demand for money, pushing up the market rate so that it has been consistently above the official rate. 2/ In Argentina, by contrast, where the convertibility applies to bankers' deposits with the central bank, as well as bank notes, the variance of the market rate relative to the official rate has been much smaller. The effect of the November 1992 "Peso run" is barely noticeable. The large jump in the exchange rate at the beginning of 1993 was the result of a change in the dealing practice of the Central Bank of Argentina, whereby the buying rate was brought to a much narrower margin viz-a-via the official selling rate of parity to the US dollar. This had the effect of bringing market rates--on average--much closer to the official rate. The lower variance of the Argentine market exchange rate relative to

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1/ It might be felt that the lower variance of the exchange rate that results under a monetary base, as opposed to currency, definition of the currency board would recommend the former versus the latter. With less variance available in the exchange rate, however, it is possible that more of the burden of adjustment to changes in money demand will fall on domestic interest rates. In consequence it may be that interest rates are more variable under a monetary base currency board than under a currency system.

2/ That the rate has been consistently appreciated since 1991 suggests that the authorities, through open market operations, have been actively tightening monetary conditions. Left to itself, the market would draw in sufficient liquidity to remove the premium.

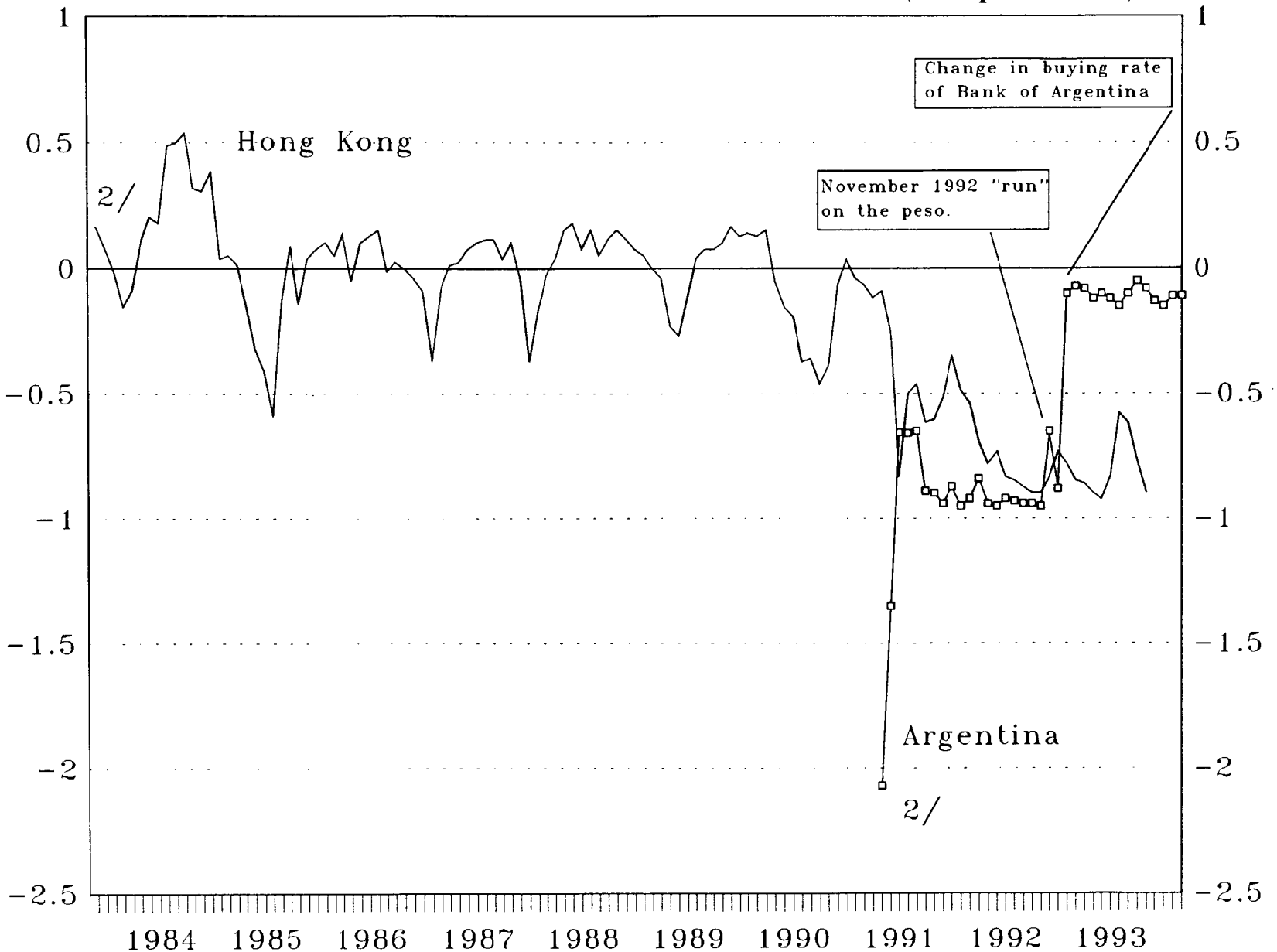
the official rate by comparison to Hong Kong, however, may also reflect occasional smoothing by the authorities. Since such intervention is unsterilized, the effect is to bring forward the liquidity squeeze or loosening that would have occurred anyway under the currency board.

Data on market exchange rates for Estonia have been available since October 1993. Chart 2 shows that the variance of the market rate for settlement by account (primarily wholesale)--on a week by week basis--is much greater than that for cash transactions. Account transactions tend to be at an appreciated rate for the kroon, unlike cash transactions which are at a depreciated rate. This suggests that banks are net sellers of kroon on account (conversion of export proceeds and capital inflows) and net buyers of kroon banknotes (possibly reflecting the acquisition of foreign exchange for travel and other purposes). The equivalent data for Hong Kong weekly deviations (for wholesale transactions) show the variance to be similar to that of Estonian cash transactions, but much lower than for Estonian account transactions. While the Hong Kong system in principle backs only bank notes, as opposed to the monetary base as in Estonia, the increasing influence of the authorities--through the introduction of overnight discount windows, open market operations and outright foreign exchange intervention--may well have reversed the implications for exchange rate variability between the two systems--at a possible cost in terms of robustness.

2. <u>The role of interest rates</u>

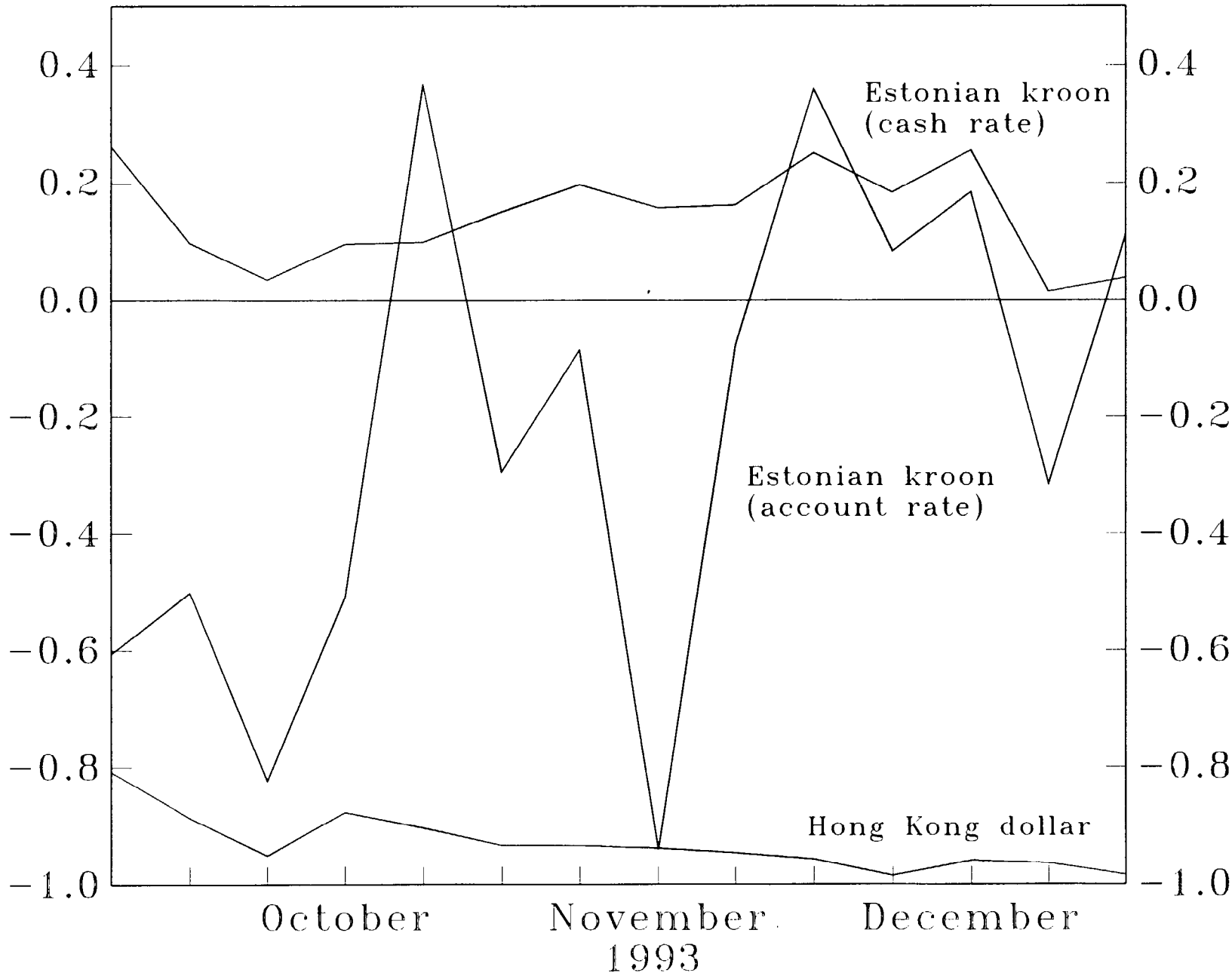
In principle, under a currency board, interest rates are set at the discretion of the commercial banks. Because of the arbitrage possibilities, interest rates are unlikely to deviate by large amounts for very long from those applicable to the peg currency, except insofar as there is a risk

Chart 1. Hong Kong and Argentina: Exchange Rate 1/
Deviations of market from official rate (in percent)



1/ Average monthly exchange rate (to the US dollar)
2/ First full month after introduction of currency board

Chart 2. Hong Kong and Estonia: Exchange Rate 1/
Deviations of market from official rate (in percent)



1/ Average weekly exchange rate (appreciation −)

premium reflecting either the probability of default or of a realignment. Nonetheless, changes in the demand for local currency will tend to result in significant deviations in the short run, until capital flows can bring cash balances to their new equilibria. Chart 3 shows the behavior of interest rates in Hong Kong and compares this with US dollar interest rates. It can be seen that interest rates in Hong Kong have frequently deviated, both up and downwards, from US rates, sometimes by significant amounts, but that there is a tendency for Hong Kong rates to follow US dollar rates over the long run. 1/ In Argentina, local rates of interest tended to remain above equivalent US dollar rates during 1991-92, partly on account of strong demand for money--resulting from the growth of the economy--but also possibly reflecting residual concerns about the viability of the arrangement (Chart 4). These concerns came to a head in November 1992, when there was a speculative attack against the peso. In three days, the Central Bank of Argentina was forced to redeem US$300 million, or 3 percent, of the monetary base. The squeeze on the money supply that this generated forced market interest rates up to the equivalent of 85 percent per annum. It is testimony to the resilience of the currency board arrangement that this speculative attack petered out after only a few days, and the US$300 million--and more--was rapidly restored. Following the failure of this attack, market interest rates returned to normal. In fact, the premium over US dollar rates was substantially reduced--suggesting greatly enhanced confidence in the peg.

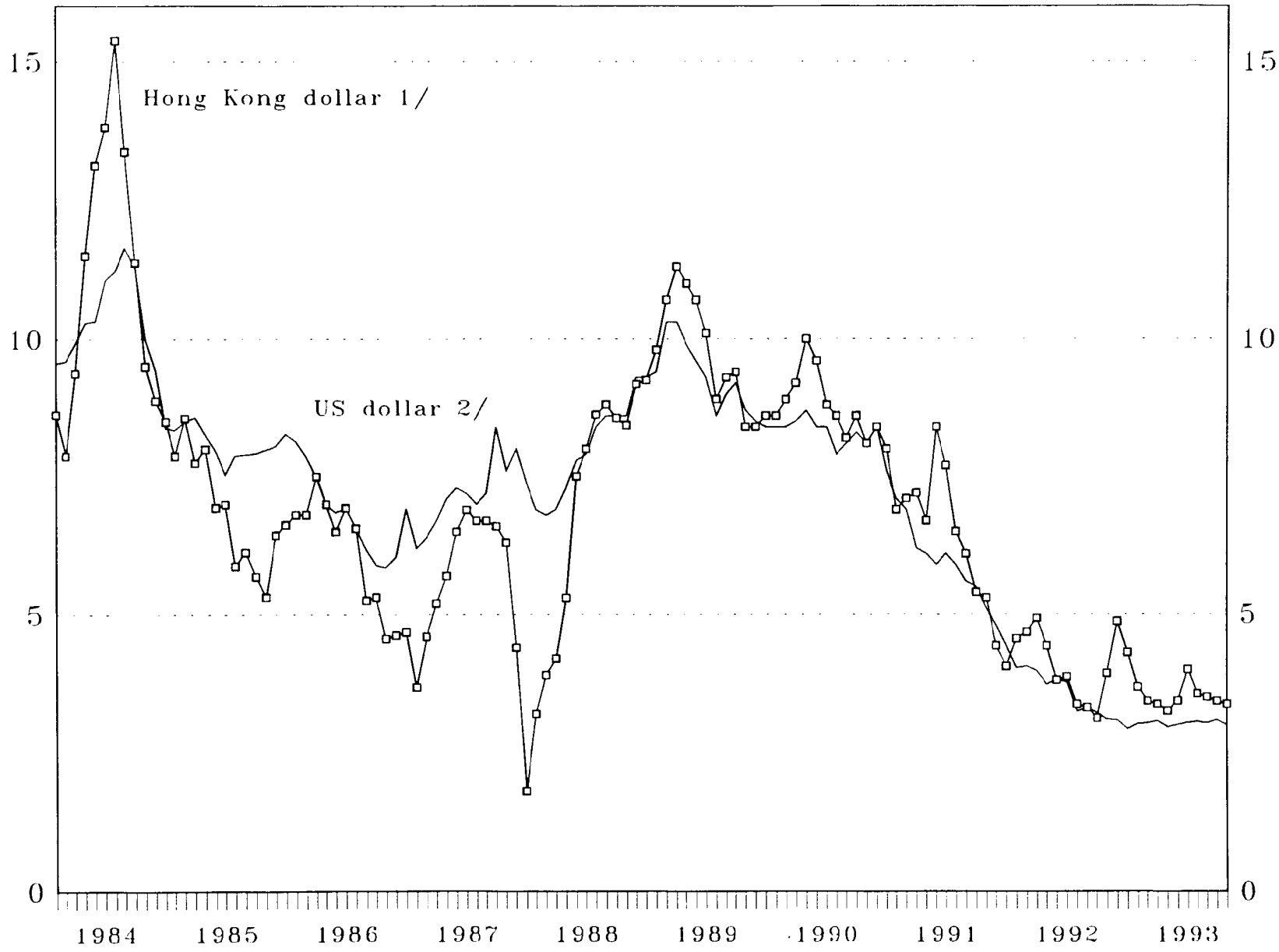
1/ Since 1989 there has been a tendency for Hong Kong interest rates to be slightly above equivalent US rates, suggesting that the authorities may have been systematically tightening liquidity--as the behavior of the exchange rate would also indicate.

In Estonia, interest rates for deposits and loans in the banking system have tended to be very high since the currency reform, but this reflected primarily the risk of default. This default risk applied as much to bank deposits as to loans, and explains why both rates have tended to be above equivalent deutschemark rates. In December 1992, three large banks were closed by the Bank of Estonia on account of their being both illiquid and insolvent. Following their restructuring, involving an EEK300 million government bond issue and a capital contribution of EEK100 million from the Banking Department of the Bank of Estonia, liquidity was restored to the market and fear of default, although still present, was somewhat assuaged. In consequence, interest rates declined. Concerns about the possibility of a realignment, however, would appear to be absent. Since May 1993, the Bank of Estonia has been auctioning CDs, initially with a view to providing banks with an asset against which they could lend to each other without risk. Chart 5 shows that the rates of interest that have emerged from these auctions are generally very close to equivalent deutschemark rates. Thus, for assets with near zero credit risk, the absence of a remaining premium is suggestive of confidence in the peg.

V. Inflation and competitiveness

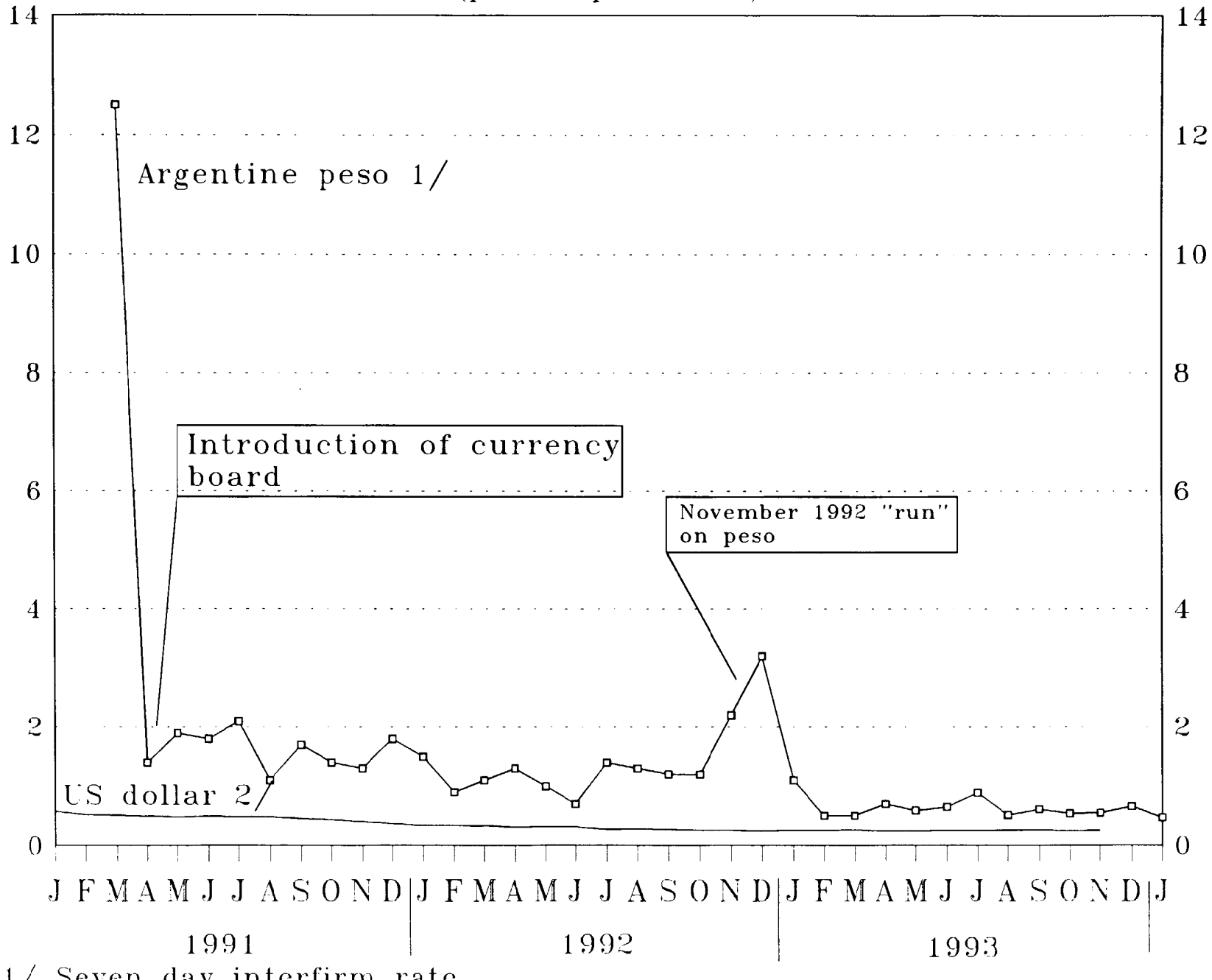
While interest rates will tend to follow those of the peg currency over the medium term, the inflation rate may not. The currency chosen for the peg is usually that of a mature industrialized economy, where the rate of productivity--and thereby income--growth will tend to be slower than in the less developed economies of typical currency board countries. With non-traded goods (property and domestic services) in inelastic supply, the relative price of nontraded goods may rise faster than in developed

Chart 3. Hong Kong and US dollar Interest Rates



1/ Three month interbank rate
2/ Three month Eurodollar rate

Chart 4. Argentine peso and US dollar Interest Rates
(percent per month)

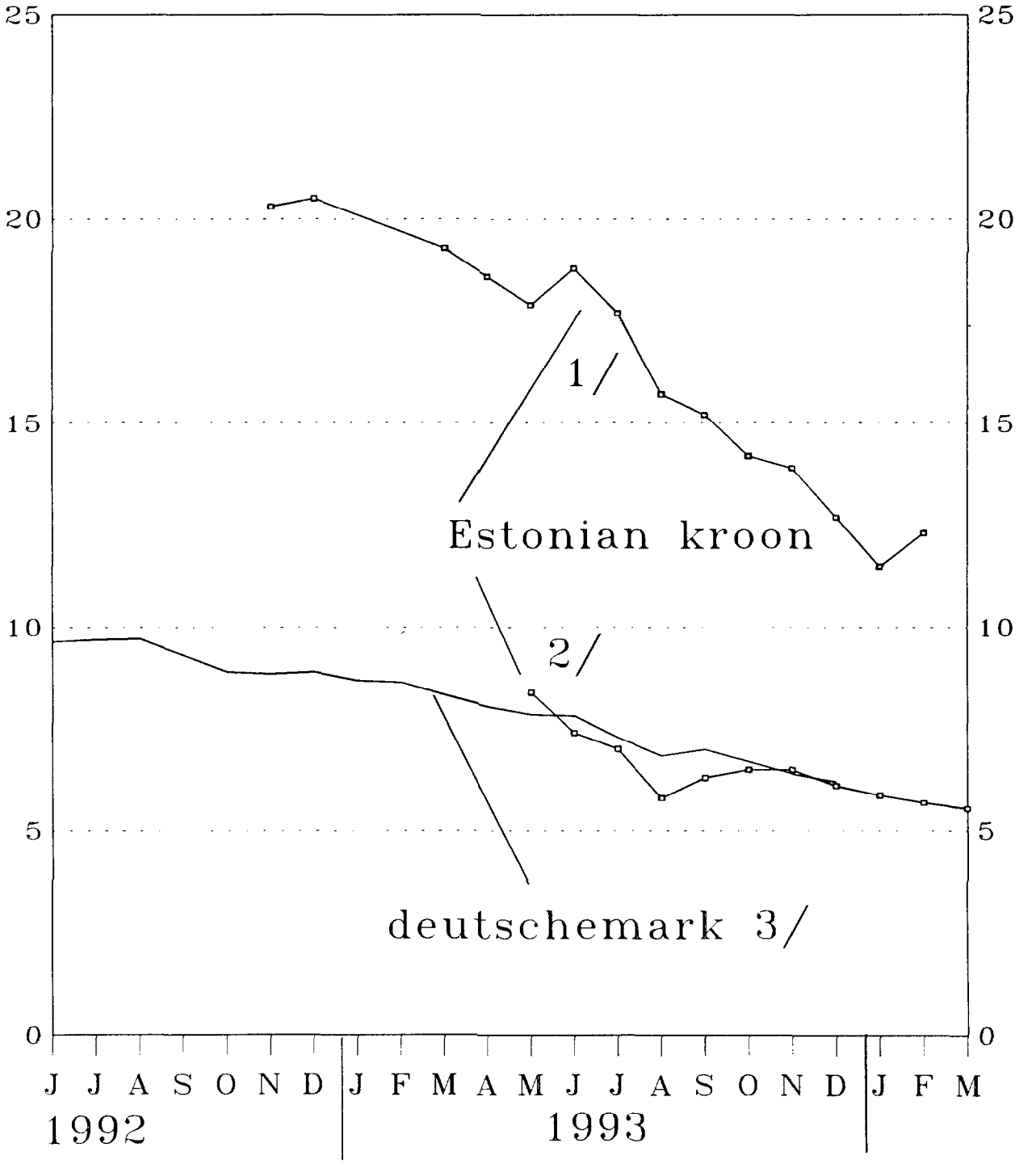


1/ Seven day interfirm rate
2/ US interbank (Federal Funds) rate

Chart 5

Estonian kroon and deutschemark Interest Rates

(percent per annum)



1/ Weighted average bank deposit rate
2/ One month Eesti Pank bill rate
3/ Euro-deutschemark rate

economies. This process helps explain why inflation in Hong Kong has remained almost consistently above that of the United States since 1983, despite the peg to the US dollar (Chart 6). Whether this process explains the more rapid growth of consumer prices in Argentina is less clear. This may have more to do with the improvement in confidence, and thereby in consumer spending relative to income, that the successful Argentine arrangement has brought about. The rate of inflation in Argentina, however, has fallen steadily and by early 1994, although still slightly above that of the USA, was below that of Hong Kong.

In Estonia, the inflationary process is likely to be as much a factor of the initial undervaluation of the exchange rate as of underlying productivity growth. At this stage, the inflation comparison is probably more relevant versus the other Baltic states than with Germany. As can be seen from Chart 7, the fixed exchange rate regime chosen by Estonia has resulted in much lower inflation by comparison to Lithuania, but not by comparison to Latvia, where inflation, after an initial spurt, has been broadly similar. This reflects the fact that Latvia has, despite a floating exchange rate, achieved an exchange rate at least as strong as that of Estonia (Chart 8).

Rising real exchange rates usually excite concern about competitiveness and the balance of payments. Since the cause in Hong Kong is likely to be related primarily to productivity growth, this concern is probably not well founded. In Argentina and Estonia, on the other hand, the jury is still out. Insofar as excessive spending is driving up prices, there may come a moment when capital inflows, having previously supplied the growth of cash to service this demand, go into reverse. The result will be rising interest

rates and a dampening of demand. The process should therefore be self correcting. Fortunately, it looks like Argentina may achieve a soft landing--inflation is slowing and demand abating without the need for high interest rates. In Estonia there is concern that wage growth may outstrip productivity growth, but trade with the West has yet to be adversely affected and dollar wages are still only about $100 per month (Chart 9).

Nevertheless, the credibility of currency boards depends, in part, upon the assumed relinquishment of the devaluation (or revaluation) option. A mis-aligned real exchange rate, where this occurs with currency boards, will therefore require that even more attention will have to be paid to unravelling wage and price rigidities than under a conventional exchange rate peg. For while the currency board itself may be proof against their influences, the real economy will not be. 1/

VI. Conclusions

There is little doubt that the currency board arrangements introduced by Hong Kong, Argentina and Estonia, all of them in very difficult but otherwise entirely different circumstances, have served them well. The contrast between Argentina's pre and post 1991 economic performance is no less striking than the contrast between Estonia's experiences and those of most other states of the FSU since 1992. But the steady sequence of reforms being introduced by the authorities in Hong Kong are testimony to the constraining nature of such an arrangement. Currency boards trim a significant number of degrees of freedom from the policy maker's range of options. They also require a stricter and less forgiving attitude towards

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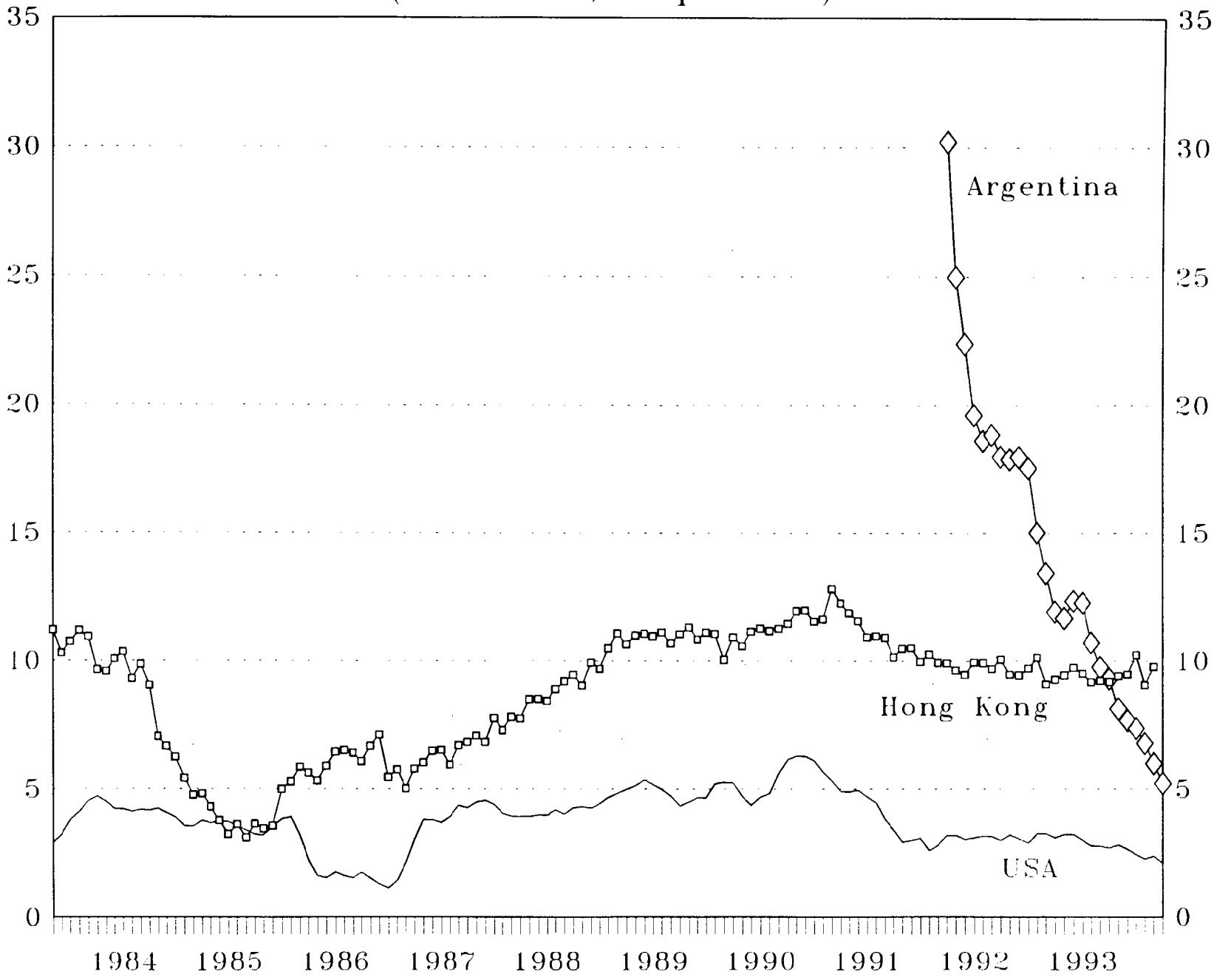
1/ It is notable that the Convertibility Law in Argentina involved the prohibition of all indexation arrangements, including those for wages.

Chart 6.
Hong Kong, Argentina and USA: Consumer Price Inflation
(12 month, in percent)



The Baltic States

Prices, Exchange Rates and Wages

(June 1992 – December 1993)

Chart 7

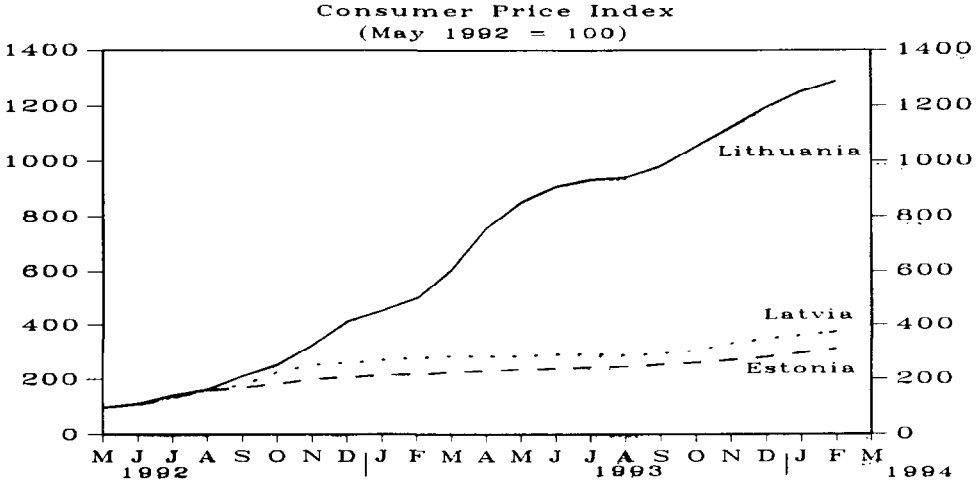


Chart 8

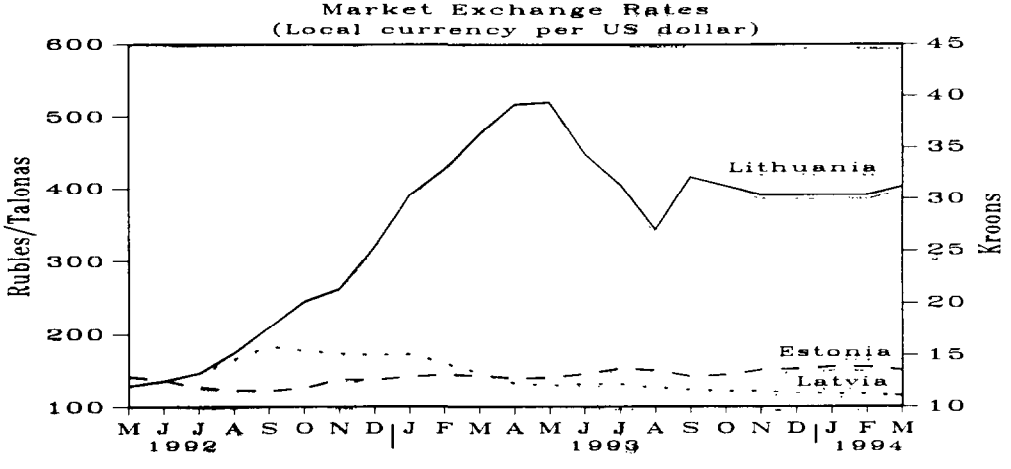
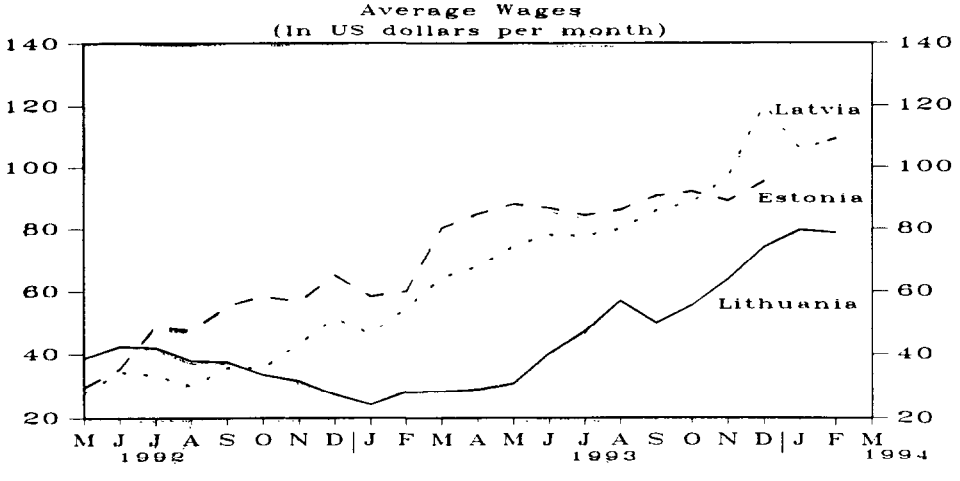


Chart 9



Source: Estonian, Latvian, Lithuanian authorities and staff estimates

bank failure, wage and price rigidities and other disturbances in the economy. Since it is these constraints that give currency boards their robustness, it is important that those who have chosen this route to avert crisis do not succumb prematurely to the temptation to relax them when crises fade.

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