A WCU-Based Currency Board as a Sustainable Exchange Rate Regime*

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Abstract

This paper argues that avoidance of economic and financial crises requires that the values of national currencies maintain such real values as to be consistent with the underlying economic fundamentals. Thus in the absence of a change in such fundamentals the nominal values of the currencies should adjust spontaneously in response to changes in nominal values to preserve the underlying needed real values. When the fundamentals require a change in the real exchange rate, a mechanism for adjustment has to be in place. This paper

recommends adopting a monetary anchor in terms of stable purchasing power vis-à-vis world output, and to introduce a crawling peg mechanism vis-à-vis this anchor.

I. Introduction

It is not an exaggeration to say that currency crises have now become the single most serious threat to regional stability. The Asian Financial Crisis in 1997 through 1998 was simply devastating, as the contagion spread from country to country, to the extent that Indonesia, which was rated by PECC as a "star performer" in its 1996 Pacific Economic Outlook for its impressive growth and low inflation, got hit so badly shortly after the baht crisis that its currency lost some 80 per cent of its value in just months. In Latin America, the sharp depreciation of the Brazilian Real was the beginning of the nightmare for Argentina.

It is the thesis of this paper that neither the fixed exchange rate(in a currency board setting or otherwise) nor a floating exchange rate regime will be adequate to eliminate this source of regional instability. So some kind of "managed adjustment" is necessary. The challenge is to work out the nature and the mechanism of "managed adjustment" required(Williamson, 2000, 2002).

In the next Section I will discuss how and why currency crises occur and how and why currency crises cause serious instability in the regional economy. Section III will put forth the thesis that *an anchor for the world's currencies that is compatible with the changing fundamentals of our economies is necessary for regional stability* and is available in the form of a properly designed unit of account. Linking a currency to such an anchor, and allowing for marginal adjustments as needed, will pave the way for regional stability and indeed the stability of the world's financial markets. Section IV presents a proposal for an anchor called the World Currency Unit, which is a basket of output produced by five major economic regions of the world and discusses how the proposal can be implemented(Ho, 2000). Section V presents the results of a simulation exercise that appears to support the proposal.

Finally, Section VI provides the conclusions.

II. Currency Crises, Regional Instability, and Efficiency Loss

In general, markets run efficiently on the condition that inefficient firms get penalized and efficient firms get rewarded. What happens during currency crises is that efficient and aggressive firms may get penalized, while relatively inefficient and conservative firms may be rewarded.

During currency crises, firms that have borrowed to invest in production capacity almost invariably get burnt. If they have borrowed from abroad in a foreign currency, depreciation of the domestic currency will increase their debt servicing cost greatly. The problem of "sovereign risk" will haunt all borrowers from a region believed to be affected by the contagion, regardless of the quality of management. Even if the loans are in the domestic currency, these loans will be recalled as creditors want to get out of assets denominated in a depreciating currency. Inefficient firms, firms that sit on "a pile of cash" on the other hand may benefit by earning high interest income and capturing sizeable exchange gains if they had siphoned the money to offshore markets.

At the threat of an impending currency crisis, investors will try to get their money out as quickly as possible. This will depress the currency, thus validating the expectation. What must be noted is that sharp currency depreciation always hurt net debtor nations, whose foreign-currency-denominated liabilities will become more difficult to service[1]. Most countries in the developing world require capital inflow to

[1] An exception is a country whose currency is used for international settlement such as the U.S.

finance their investment and so are net debtors[2], and many countries in the same region are in a similar stage of development. Thus many countries in South America, in Eastern Europe, and in South East Asia belong to the category of "emerging markets." There is logic behind the regional contagion: foreign investors want to get out from perceived risky regions; their "evacuation" effort will depress exchange rates; and depreciation may hurt net debtor nations so badly that economic fundamentals that had been sound may become unsound, validating the evacuation.

The problems that arise during a currency crisis have their roots dating from the time when all appears to be well. During such times, large capital inflows drive up the local currency if it is floating. This will increase the country's imports, including imports of consumption goods, while depressing the ability of the country to export. As the current account deficit accumulates the risks of exchange loss increases. This will tend to boost domestic interest rates, which will further weaken the economy. When the currency eventually depreciates, debtors will face great difficulty and the economy may run into great difficulty.

If a currency is linked to a host currency like the US dollar, the fate of the country will depend on the behavior of the host currency. If the host currency is strong, similar problems as depicted in the last paragraph will occur. As a rule a risk premium will add to the local interest rates to reflect "sovereign risk." It will increase in the face of an expansion in the current account deficit or troubles among its neighbors. Once the floodgate opens the extent of devaluation can become quite drastic.

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[2] The corollary, that most countries in the industrialized world can provide capital and are therefore net creditors, is also true—with the notable exception of the United States.

III. The "World Currency Unit" as the Basis for an Anchor

Our earlier discussion suggests that neither a free float nor a tie to a host currency will address the fundamental problem of potential excessive strength of the currency in the beginning, followed by a prolonged period of high interest rates and then finally devaluations/depreciations. What is needed is an anchor that is "in sync" with the fundamentals of the country.

Two considerations argue strongly in favor of linking a currency (particularly the currency of countries that depend on the inflow of foreign capital to finance their investments) to an anchor that is compatible with full employment in the domestic economy and one that represents a stable unit of real purchasing power. The first consideration is that as long as the currency is at such a level, full employment in the economy becomes possible, and balancing the fiscal budget becomes possible[3]. The second consideration is that because the currency is linked to a stable unit of real purchasing power, issuing debt instruments in the domestic currency will sharply reduce worries about devaluation for creditors, and will also relieve debtors of worries about devaluation increasing the servicing cost of their debts. This will help reduce real interest rates. The question of how to reconcile these two considerations when there is a conflict will be taken up below.

Ho(2000) proposed a unit of account based on a basket of "world output." This unit of account, called the World Currency Unit, will serve the purpose. This unit emphatically is NOT a basket of currencies. This unit represents the purchasing

[3] Argentina's fiscal deficit at 3 per cent of the GDP prior to the currency crisis in 2001-2002 does not seem huge given that the economy was deeply depressed with unemployment rate locked in the range

power over a basket of goods and services that encompasses some 80 per cent of the world's output. In particular, the basket consists of the GDPs of the key economic zones in the base year. The five economic zones include the United States, the Euro zone, Japan, Canada, and Australia.[4]

Let Q_{i0} be the GDP of country/zone i in base year 0. Thus

$$1 \text{ WCU} = \lambda\{ Q_{10}, Q_{20}, Q_{30}, Q_{40}, Q_{50} \} \qquad [1]$$

This says that a WCU is some fraction λ of the basket of GDPs

Valuation in the base year is obtained by defining λ such that:

$$\lambda \sum Q_{i0} \,.\, e_{i0} = \text{US\$ } 100 \qquad [2]$$

where λ is a scaling factor that defines the size of the basket and thus the real value of the unit;

i is any of the five major economies;

e_{i0} is the exchange rate converting one unit of the currency of i into US$ in base year 0.

Valuation over time reflects the forces of exchange rate movements as well as domestic inflation/deflation. If Q_{i0} in current domestic prices increases because of inflation, and/or if currency i appreciates against the US dollar, other things being equal, the nominal value of the WCU basket in US dollars will increase, but still represents the same command over real goods. Valuation at time t can be written:

$$\lambda \sum Q_{i0} \,.\, P_t/P_0 .\, e_{it}$$

Figure 1 shows the changes in the nominal value of the WCU, computed using

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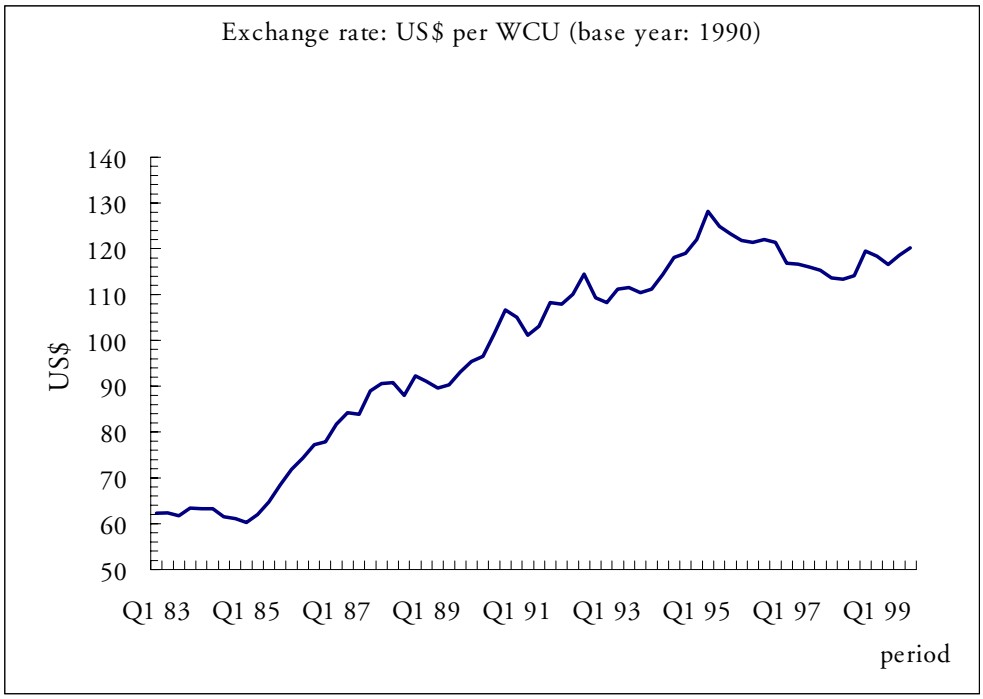
of 12 to 18 per cent for years.

[4] These economic zones are representative in that they comprise the world's major industrial zones as well as major producers of primary goods.

IMF and OECD statistics, from 1983 to 1999. A caveat must be added though. In revaluing the WCU basket, we use the consumer price indices of the different countries/zones, even though in principle GDP deflators would have been more appropriate. We do this because the GDP deflators are usually available only after a relatively long lag. Since the WCU is intended to be a unit of account ready to be used on a day-to-day basis, for practical reasons CPIs have to be used instead of GDP deflators in deriving the current values of the unit.

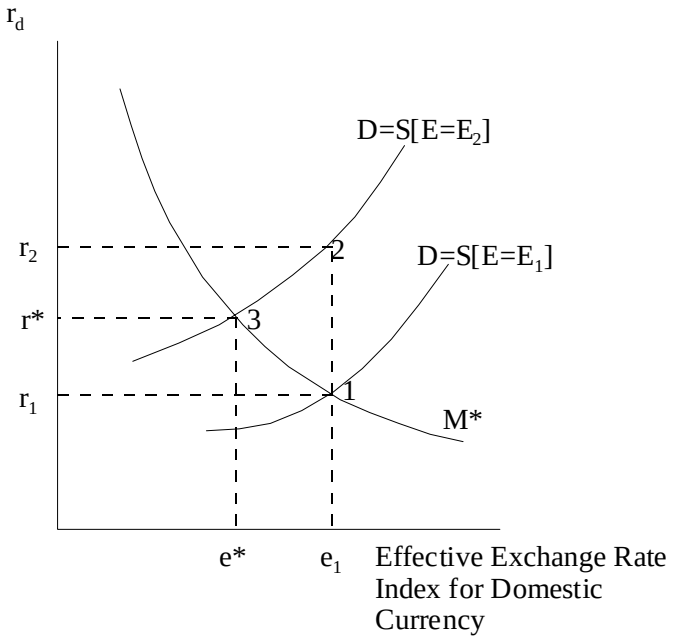
Figure 1: Value of the WCU in U.S $ 1983-1999



The nice thing about the WCU thus defined is that it represents the same command over real goods. It is a well-defined anchor with full transparency. It is up to each country to decide how its currency relates to the WCU on moving to a WCU link. This can be seen as adjusting α such that α.WCU = 1 unit of the domestic currency. For example, if the Argentine peso is to link to the WCU in year t, then

there exists some link rate α_p between the Argentine peso and the WCU such aggregate private sector investment is equal to private domestic savings plus the current account deficit at full employment. As we will demonstrate below, once this condition has been achieved, the fiscal authority can aim at budget balance at full employment. Both full employment and balanced budget will then be achieved.

Figure 2: Alternative (e,r) combinations compatible with full employment



In Figure 2 M* traces the combination of the real effective exchange rates e (defined in relation to the WCU) and real interest rates such that equilibrium aggregate private sector demand is compatible with full employment. Mathematically, along M*,

$$e = e\,(r \mid I = (Y^d - C) + (M\text{-}X) \text{ at full employment})$$

It should be noted that moving down M* towards the right foreign demand would replace domestic demand, so the composition of private sector demand changes without affecting the aggregate level. The two upward sloping curves D=S[E = E_i] represent equilibrium in the foreign exchange market, where E is a shift parameter

depicting short term capital movement intentions. If capital outflow intentions are high D=S will be at a higher level, higher domestic interest rate will be needed. The real exchange rate has then to be lower to maintain full employment. Increased external demand will then come in to replace the domestic demand that has been suppressed by the higher interest rates.

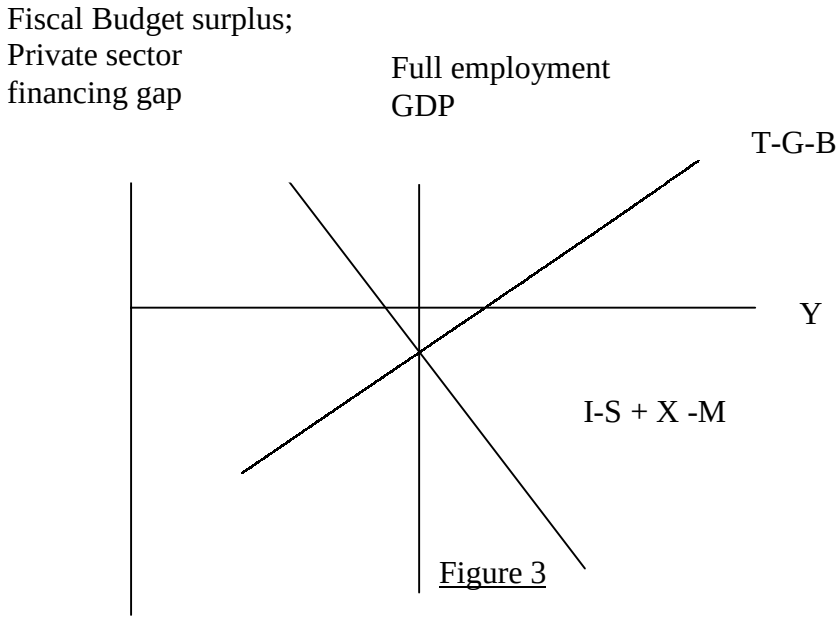


Figure 3

Referring to Figure 3, the M* in the earlier diagram defines the position of I-S+X-M as indicated by the downward sloping line. As long as full employment budget balance is achieved, i.e., net taxes minus government expenditures on goods and services minus government interest payments(T – G – B) = 0 while I = [Disposable Income – C] + (M-X)] at full employment, we will have T-G-B = I – (Yd – C) + X – M = 0. This condition is depicted in Figure 3, and implies GDP ≡ Yd +T-B = C + I + G + X-M at full employment.

IV: A WCU Based Currency Board with Possibility for Real Adjustment

The proposed system works like the currency board in Hong Kong, where note issuing commercial banks deposit a stipulated amount of US dollars for the Hong Kong dollar notes that they issue, presently at the rate of US$1 for every HK$7.8.

Under a WCU-based link, the monetary authority would announce at time t that α_t times one WCU's worth of US dollars(or any other acceptable fully convertible currency) be deposited for every unit of the currency issued(called *peso* here for illustrative purposes), until further notice. These pesos are called *pesos of vintage t*. The monetary authority undertakes that these pesos issued are fully convertible into α_t times WCU any time. Because the nominal value of a WCU changes all the time, the amount of US dollars behind these pesos will change, and full convertibility does not guarantee that the same amount of US dollars will be exchanged in submitting pesos of vintage t.

As the underlying economic fundamentals change, it may be necessary to adjust α upwards or downwards from time to time. The general understanding is that if the economy requires a depreciation of the currency to re-establish full employment it should depreciate, and if the economy requires an appreciation to prevent overheating it should appreciate. Since the adjustment of α is in relation to the WCU, and since the real value of the WCU is constant, we can be sure that every marginal adjustment is an effective right step in the right direction. Suppose at time t+k α is adjusted downwards, so the peso depreciates. Any new pesos issued as of t+k will be designated as *vintage t+k*. Pesos of vintage t are worth more than pesos of vintage t+k and will be converted to the new pesos accordingly. It is clear that this arrangement inspires confidence and avoids any need for holders of pesos to rush to sell them. The arrangement will therefore inspire confidence. As well, because α can be adjusted it is sustainable.

A further word about sustainability should be added. It is that a currency regime, in order to be sustainable and thus credible, needs to be adaptable and compatible

with full employment. If the currency regime produces an exchange rate that is not compatible with full employment and has no effective mechanism to adapt towards such a rate it cannot be sustainable and thus cannot be credible. In contrast, the system herein proposed allows adaptation towards what is necessary to bring about full employment.

One may well ask if this system is sustainable in the face of shattered confidence. Given the Argentine experience in 2001-2002 and the Asian experience in 1997-98, it does appear that if people firmly believe that the currency will collapse, nothing can be done. If we look at the Thai and the Indonesian experience carefully, however, we can only conclude that the collapse of confidence was a result of ineffective and misguided policies in the first place. Even in the case of Argentina, the collapse of confidence was the result of a string of misguided actions, and a lack of the necessary institutions to protect the interest of people who have legitimate claims to be protected.

If we look at the Thai experience, we find first that the financial markets actually cheered the initial devaluation of the Thai baht The Thai stock market jumped noticeably at first. But when interest rates were raised sharply higher around the region (The Philippine central bank raises the overnight lending rate to 24 percent from 15 percent on July 3, 1997) and the austerity measures announced on August 5 impressed upon investors that the region is headed for a dramatic economic slowdown confidence began to crumble.

Under the proposal of a WCU link, full employment and economic stability are the explicit objectives of the central bank, and no attempt is made to defend an unrealistically high exchange rate. Interest rates will not be raised to defend the

currency and will only be raised to cool the economy when it is overheated. Holders of the domestic currency as well as bank deposits know that while the currency may devalue, their interests will be protected as the vintage of their monetary assets are specified and fully recognized. The valuation of the currency will not be allowed to take on unrealistic values in the first place, unlike what may happen under a nominal tie to the US dollar. For all these reasons, and for the reason that the WCU itself represents purchasing power over a diversified portfolio of multiple-currency-denominated output, risks for holding the local currency and assets of the local currency are reduced considerably. Because perceived risks are smaller, a collapse of confidence is less likely.

The WCU should be a globally used unit of account in order to serve its purpose. In order that the unit be accepted as a standard, it will be necessary for an authoritative international organization, such as the IMF, to take the lead and to define the standard.

Over time there may be a need to add the GDPs of other countries to the basket. For example, after the RMB has become fully convertible China's GDP may have to be included. The key points are that the currencies of the countries represented in the basket must be fully convertible and that the countries are predominantly free market economies, so that the prices of these countries are true market prices. When it becomes necessary to update the composition of the WCU basket continuity of the series can be maintained by reconciling the valuation in the last period under the old basket and the valuation in the first period under the new basket. This procedure is routinely done with regard to the consumer price index and should be both transparent and automatic.

While the definition of the WCU needs to be done with authority by an international organization and the revaluation automatically updated continuously as data becomes available, the monetary policy of countries opting for a WCU link should be entirely independent. Each central bank should fix an appropriate α and make appropriate adjustments as necessary, in addition to fixing an appropriate benchmark interest rate for its own currency. It is noteworthy that countries whose currencies are independently tied to the WCU are "currency-integrated" as long as their α s remain constant.

V. A Simulation Exercise

In this Section I would try to do a preliminary simulation exercise to investigate into the advantages of a WCU-link. Specifically, I shall assess if Hong Kong had tied to the WCU instead of the US dollar what might have happened to its exports and economic growth. To do this I first regress Hong Kong's exports excluding exports to China against the real exchange rate, represented by HKRER, defined using Hong Kong's domestic price versus the price of the WCU, i.e., $\frac{\text{CPI in Country A x Price of A's Currency in US dollars}}{\text{Price of WCU in US dollars}}$, and the growth rate of the GDO of OECD countries, represented by OCGDPVRY. The results are presented in Table 1.

Table 1. Dependent Variable: Hong Kong's Total Exports less Exports to China, year-on-year change -- 1985 Q1to 1999 Q3

Variable	Coefficient	t-ratio
Constant term	3.9564	0.73159
HKRER	-0.14478	-2.7759***
HKRER(-1)	-0.23693	-3.2125***
HKRER(-2)	-0.27646	-3.9580***
HKRER(-3)	-0.26337	-4.0306***
HKRER(-4)	-0.19766	-1.7105*
OCGDPVRY(-1)	2.5257	2.0338**

R-bar squared = 0.79876 DW-statistic = 2.3203

Notes: 1) Sum of the "Almon lag" coefficients for: HKRER

Coefficient : -1.119
t-ratio : -4.320***

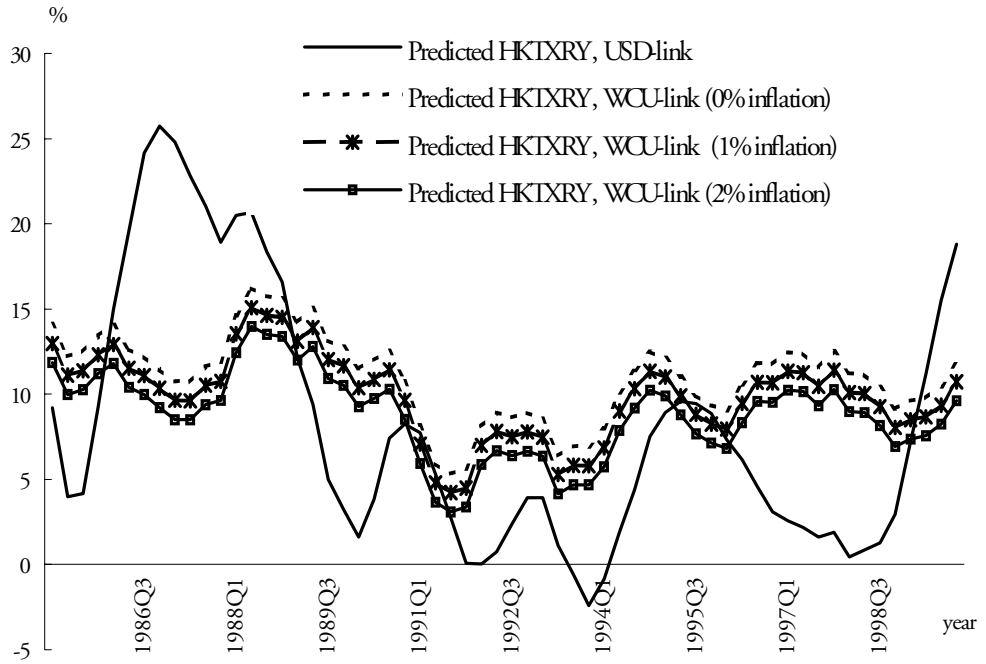
2) AR(1) procedure was used to adjust for serial correlation.

*** indicates statistical significance at 1 % level
** indicates statistical significance at 5 % level
* indicates statistical significance at 10% level

It can be seen that all coefficients carry the right sign and are statistically significant. According to the equation a 10 per cent appreciation in the real exchange rate will reduce real exports to countries other than China by up to 11 per cent after 4 quarters. The impact of linking with the WCU on exports are simulated by assuming that the Hong Kong dollar's value in US dollars follows those as implied by a WCU, as compared with the benchmark of actual values. The predicted exports are as shown in Figure 4. In this exercise exports to China are taken out because the RMB is not fully convertible and exports to China are affected by factors different from those that affect other exports.

Table 2. Dependent Variable: HKPRDOMDR (Hong Kong Private Sector

Figure 4: HK's Total Exports less Exports to China (HKTXRY):
Linking to WCU(under alternative inflation rates) vs Linking to the US$
(per cent change year-on-year)



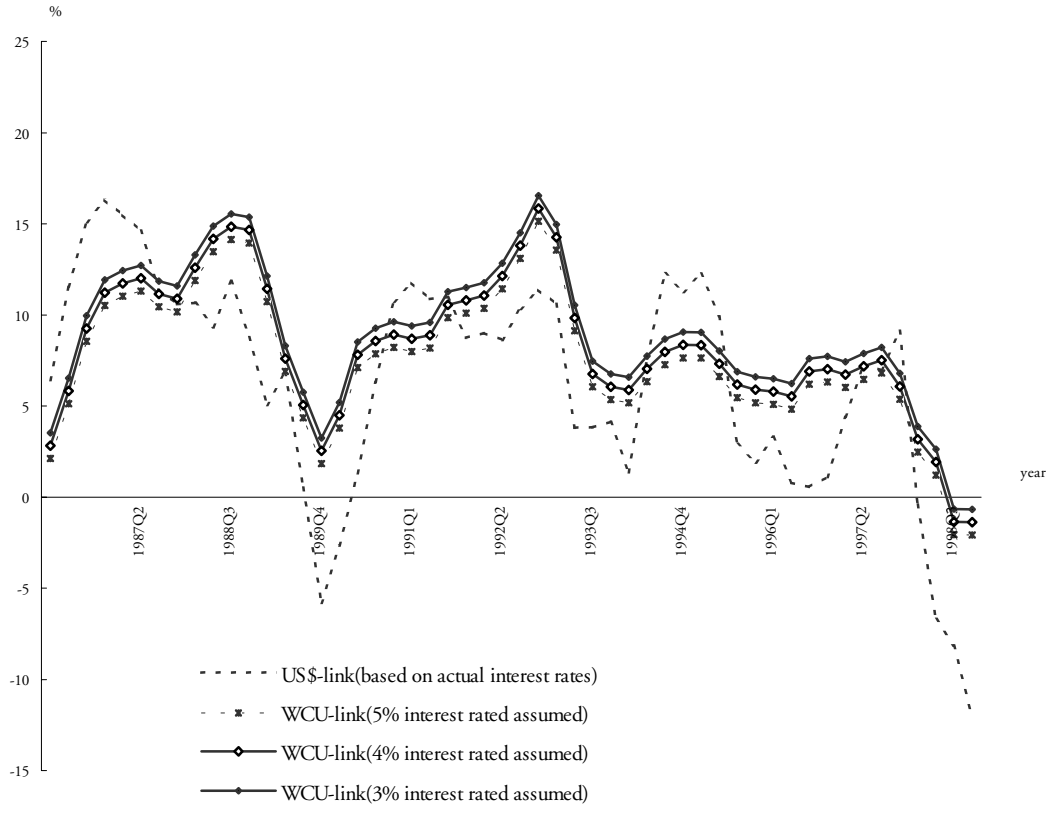
Domestic Demand, year-on-year change) -- 1984 Q1to 1998 Q4

Variable	Coefficient	t-ratio
Constant term	2.7434	0.72081
GOVERY(-1)	0.21470	1.2948
GOVERY(-2)	0.24071	1.4776
EXPORTRY	0.27211	2.3065**
EXPORTRY(+1)	0.28825	2.5094**
HKWCURY(-2)	-0.70396	-1.8736*

R-bar squared = 0.70610
DW-statistic = 1.7376
Notes : AR(1) process was used to adjust for serial correlation.
** indicates 5 % significant level
* indicates 10% significant level

The simulation about what would happen to economic growth under a WCU link is done by plugging the predicted values of exports(after adding back exports to China) into the equation that explains private sector domestic demand in Hong Kong. Private sector domestic demand is the dependent variable in Table 2 and is explained by the growth rate of government real expenditures, the growth rate of real exports, and the real interest rate. The results of the simulated private sector demand under the WCU link is shown in Figure 5.

Figure 5. HK's Predicted Private Sector Domestic Demand under US-Dollar Link versus under WCU-link (year on year change)



VI. Conclusions

There are important benefits from the proposed WCU-based currency boards.

First, they are flexible yet they are anchored. As has been explained, each adjustment of α is a real adjustment because WCU is anchored. The crawling pegs as discussed in the literature, on the other hand, need not imply a real adjustment in the right direction every time, because the real value of the host currency itself is fluctuating all the time. Under a crawling peg that is not defined relative to a real anchor, a depreciation against the benchmark currency may be more than offset by changes in other key nominal variables.

Second, WCU-based currency boards are anchored yet they are flexible. The currency boards as we know suffer from the crucial drawback of inflexibility. Under a WCU-based currency board, even if α is not adjusted the nominal value of the currency vis-à-vis the US dollar or any other currency will change, as the WCU itself is re-valued all the time. Adding to this is the fact that α may be adjusted.

Third, WCU-based currency boards are transparent and rule-based. The monetary authority running the WCU-based currency board undertakes to guarantee full convertibility of WCU-based liabilities issued. While it does have the discretion to change α when the currency appears to be overvalued or undervalued relative to what is necessary to bring about full employment, adjustments in α are expected to be marginal and dictated by clear signs of inadequate aggregate demand or inflationary pressures.

Fourth, WCU-based currency boards promote integration and minimize currency exchange risks. Regardless of the αs chosen, countries linked to the WCU will find that their currencies are linked to one another until such times as one or more countries adjust their αs. The increased stability of exchange rates will foster trade

and promote efficiency enhancing capital movements.

Fifth, WCU-based debt instruments and WCU-based currencies benefit savers and promote efficiency. Savers in the past have great difficulty finding a reliable instrument to harbor their savings. They have been haunted by inflation and exchange risks. Consider the predicament of the Japanese in the late 1980s. They had plenty of savings. But whether they invest overseas or at home they are doomed—they would suffer huge exchange loss if they invested overseas and would suffer huge capital losses if they bought domestic assets whose prices had already been much inflated. Debt instrument denominated in the WCU offer a unique shelter against inflation and exchange losses. Households who keep their savings in a bank account also enjoy the same benefit, if their currencies are tied to the WCU. On the other hand, investors who need to borrow will know the real cost of borrowing if the debt instrument is denominated in the WCU. This is quite unlike the case when WCU-based debt instruments do not exist. Under the latter case, they have to worry about whether the currency in which they borrow will appreciate significantly. When all investors know and read the cost of borrowing in like manner the capital market becomes more efficient. Projects that fail to bring in a high rate of return will not be funded.

Most important, the WCU-based currency board arrangement as proposed is sustainable because compatibility with full employment is an explicit objective in its operation. The parameter α will be adjusted so as to ensure that aggregate private demand is at a level compatible with full employment. This is certainly much more credible than currency boards that ignore the pain of surging unemployment.

Finally, the anchor as proposed is transparent and well defined. The mechanism is essentially rule-based but incorporates an automatic adjustment mechanism that makes it credible. While we allow changes in α if the economic fundamentals have

changed, the central bank's earlier liabilities are guaranteed in real terms, so that objections or panic over changes in α will be minimized.

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