

A Sustainable Currency Regime for Hong Kong and the Mainland

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This paper follows up with Joseph Stiglitz' idea about China's new role in the world economy and proposes a system of "real exchange rate targeting" for both the Mainland and for the Hong Kong SAR. It is based on the introduction of new reserve assets that are denominated in the "World Currency Unit." Such a system is found to be sustainable and is most suitable for economies without very deep financial markets. The mechanism is "rule-based" and it opens up the opportunity for the two currencies, the HK dollar and the RMB, as well as others, to integrate in a material manner without compromising their separate identities, thus paving the way for a much more integrated world economy.

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1. Introduction

The world is badly in need of a new reserve asset, so observed Joseph Stiglitz in a recent public lecture in Hong Kong¹. This paper follows up this idea and argues that China is in a unique role to contribute to the world by coming up with a new exchange rate arrangement involving such a new reserve asset.

China has been very pragmatic and very innovative on the exchange rate management front. China came up with the idea of “foreign exchange certificates” in 1980, shortly after Deng Xiao-ping declared an open door policy in 1978, and began to allow its citizens to set up foreign currency accounts from 1984. Foreigners visiting China would trade their foreign currencies for these certificates which were acceptable in specific stores where they could buy goods otherwise beyond the reach of most citizens. Foreign exchange certificates were much sought after by ordinary people who would pay a premium to get them. In 1985 China further set up its first Foreign Exchange Adjustment Centre in Shenzhen to allow eligible enterprises to trade surplus foreign exchange for RMB and vice versa. Soon after this, similar centres were set up in many major cities including Shanghai, Guangzhou, Dalian, Xiamen, and Zhuhai. The convertibility of a currency in practice is never a black or white matter: i.e., “either 0% or 100%.” Thus, the Renminbi had been moving toward convertibility over the years, in more timid and smaller steps at first then bolder and larger

¹ Joseph Stiglitz presented a public lecture on the China’s New Role in the World Economy on March 2005.

steps toward the late 80s and early 1990s.²

Shortly after China's even bolder measures to liberalize the RMB in 1994, the 1997-98 Asian Financial Crisis dealt a serious blow to many Asian economies from Indonesia and Malaysia to Thailand and Korea, and shook the confidence of those who had subscribed to foreign exchange liberalization. Malaysia brought back foreign exchange control. China, which was spared much of the damages of the AFC, was believed to have avoided the damages because it had maintained tight grip over capital flows in and out of the country. After the AFC, China has more reason to believe that liberalizing the RMB should not mean a free float.

As it happens, as will be demonstrated below, the problems faced by many Asian countries during the AFC as well as those faced by such Latin American countries as Brazil and Argentina in the late 1990s seem to have been related to the unprecedented and sustained strength of the US dollar over the 1995 – 2001 period, particularly during 1995-1998.

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 the “managed adjustment” required(Williamson, 2000, 2002).

² See Ho(1989) for a full story of these and other changes in the 1980s and Ho(1998) for developments through the late 1990s.

An important part of this exercise in finding an efficient managed adjustment mechanism lies in finding an instrument that can offer both stability and flexibility at the same time. It is argued that this requires a “real monetary anchor” so that a currency tied to it can maintain a real exchange rate level consistent with the fundamentals of the economy³. Since “real values” in practice involve the ratios of nominal variables, an integral part of a “real anchor” is the existence of an automatic adjustment in some nominal variables in response to some other nominal variables during times of stable fundamentals. Moreover, an escape mechanism should exist during times of substantial changes to fundamentals, to allow smooth, panic-free adjustment in the real link as called for by such changes in fundamentals.

There has been much discussion about a basket link in the literature(Kawai, 2001, Bird and Rajan 2002, Yano and Kosaka, 2003, Havanov, Kolari, and Sololov, 2004), and China has been reported to be actively considering a basket link as an option for the future of the RMB. Ho(1990) proposed re-pegging the Hong Kong dollar to the effective exchange rate index, which is a trade-weighted basket of 15 currencies and suggested using the US dollar -HK dollar exchange rate as the instrument to effect stability in the effective exchange rate index. While there is no question that a currency basket link will reduce the fluctuation of the home currency *vis-a-vis* any single currency it does not prevent the real effective

³ A nominal anchor such as a nominal link to a host currency would imply an unintended real exchange rate change when price levels or the exchange rates of the host currency change.

exchange rate from deviating from fundamentals. If we are concerned with both internal and external balance a currency basket link is still off the mark because an unintended swing of the real exchange rate in one direction or the other may result from fluctuations in nominal exchange rates. This can produce unexpected effects on aggregate demand as well as the external balance.

Section 2 argues for the need to have real exchange rates that are more stable to minimize macroeconomic volatility. Section 3 describes a mechanism, called a World Currency Unit Link, that can bring about more stable real exchange rates and recommends that the RMB adopt exactly such a “real link.” Section 4 describes the nature of the reserve asset in a world with real exchange rate anchors. Section 5 looks at the question of what constitutes the appropriate exchange rate and argues for the desirability for “real exchange rate targeting” for countries like China that do not have a very deep financial market. Section 6 looks at the subject of credibility, and argues that a monetary regime using the “real exchange rate target” as an instrument to achieve both internal and external balance is probably as credible as you can get. Section 7 then will discuss the implications for a globalized world when more and more countries adopt such real links and when the reserve asset as well as international settlement instrument switches to the World Currency Unit.

2. The Need for Macroeconomic Stability and for Stable Real Anchors

China has from time to time adopted measures of “macroeconomic control”(hongguan

tiaokong), and Premier Wen Jia-bao in his 2004 government work report once again referred to the need for effective macroeconomic control to steer the economy away from overheating⁴. By mid 2005, the Federal Reserve has raised the federal funds rate for the 9th time from a 46 year historical low of 1%. As the markets are closely watching and speculating over the continuation of the upswing phase of the “interest rate cycle,” the US dollar has appreciated against other major currencies and the stock market and economic activities have been under pressure.

Economists accept that business cycles will be with us forever. But as we gain more knowledge we should be able to continue to improve our ability in stabilizing the economy. We have learnt that money aggregate targeting is not as good as inflation targeting, for example. We have learnt that when unrealistic exchange rates cannot be sustained(Ho, 2001) and have seen how allowing an effective monetary loosening revived the United Kingdom economy in just months following its abandonment of the link to the European monetary mechanism in 1992. The fact is: when the host currency appreciates, the linked currencies are hushed along. Unintended nominal variable changes(the nominal exchange rate in this case) result in unsustainable real value changes. In the absence of real changes, the drifting of a nominal anchor may bring about exchange rates that are inconsistent with full employment(internal balance) and external balance. The Asian Financial Crisis of

⁴ See http://www.chinadaily.com.cn/english/doc/2004-03/05/content_312154.htm.

1997-8 is a graphic demonstration of this effect.

Linking currencies to a stable real anchor, therefore, will avoid many crisis-like situations. More precisely, if the real economy has been comfortable with a set of real monetary conditions, why should we let the real monetary conditions drift away from these comfortable values by the movement of the host currency?

I conclude that there is a need for anchoring the home currency to a “comfortable” real exchange rate level. In the absence of real changes that warrant a change, the real monetary conditions should stay intact. Failing to do this, we have seen how, during times of stress as caused by the appreciation of the host currency, central banks have found it necessary to make things worse by raising domestic interest rates, leading markets to question the sustainability of such measures.

3. The World Currency Unit Link

Ho(2000) proposed an indexed unit of account based on a basket of “world output” that he advocated as the basis for denominating financial instruments like bonds. In this paper we will see how the unit may also serve as the basis for anchoring currencies. This unit of account, called the World Currency Unit, is NOT a basket of currencies, so the proposed link with the WCU is not a currency basket link. We can say, however, that the WCU link is a “link with a basket of global output.” By design, the WCU basket consists of the

GDPs(outputs) of the key economic zones *in the base year 0*. The five economic zones include the United States, the Euro zone, Japan, Canada, and Australia.⁵ For exposition purposes, we will use WCU_0 to refer to the base year physical basket of output underlying each World Currency Unit, and use $V_{0US,t}$ to refer to the nominal value of WCU_0 at time t in US dollars.

Let Q_{i0} be the GDP of country/zone i in base year 0, measured in the domestic currency.

Thus

$$1 \quad WCU_0 = \lambda \{ Q_{10}, Q_{20}, Q_{30}, Q_{40}, Q_{50} \} \quad [1]$$

This says that a WCU_0 is some fraction λ of the basket of base year GDPs.

Valuation of this unit in the base year, $V_{0US,0}$, is obtained by defining λ such that:

$$\lambda \sum Q_{i0} \cdot e_{i0} = US\$ 100 \quad [2],$$

where: $\sum Q_{i0} \cdot e_{i0}$ is the nominal value of the GDPs in the base year in US dollars, and e_{i0}

is the exchange rate converting one unit of the currency of i into US\$ in year 0;

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.

$V_{0US,t}$ is the nominal value of one WCU_0 at t in US dollars. Changes in the valuation of

⁵ These economic zones are representative in that they comprise the world's major industrial zones as well as major producers of primary goods. All currencies are freely convertible.

the WCU output basket over time reflects the forces of exchange rate movements as well as domestic inflation/deflation in each of the represented economic zones. If Q_{i0} measured in current (let us represent the current moment with t) domestic prices increases because of inflation (P_{it}/P_{i0} rising) and/or if currency i appreciates against the US dollar (e_{it} rising), other things being equal, the nominal value of the WCU basket in US dollars will increase, but the underlying basket of real output remains the same. It is in this sense that we say $V_{0US,t}$ represents constant purchasing power.

$$V_{0US,t} = \lambda \sum Q_{i0} \cdot P_{it}/P_{i0} \cdot e_{it} \quad [3]$$

The nominal value of $V_{0US,t}$ can be updated easily according to [3] from moment to moment, even though P_{it}/P_{i0} is normally updated on a monthly basis. In principle P_{it}/P_{i0} should be based on the implicit GDP deflator, but for practical purposes considering that announcements of GDP deflators are subject to long lags and frequent revisions and that the CPI tracks GDP deflators fairly well we would recommend using the CPI in estimating the nominal values of the WCU.

With full transparency of the valuation formula [3], once the base year has been chosen and the WCU output basket has been defined, at any time τ the Monetary Authority may link the domestic currency to WCU_0 so that $\alpha_\tau V_{0US,\tau} = 1$ unit of the domestic currency. *By adjusting the magnitude of α the Monetary Authority can achieve any level of effective real exchange rate desired. As a result, transition to a WCU-based regime can be*

completely smooth in the sense that the exchange rate vis-à-vis the US dollar stays the same momentarily. The exchange rate *vis-à-vis* the US dollar will rise or fall from then on depending on whether the nominal value of the WCU rises or falls.

In practice, a country that ties its currency to the WCU can be considered a currency board that effectively issues bank notes against their equivalents in real purchasing power and guarantees reverse convertibility for the reserve assets submitted in real terms. The Hong Kong currency board system is a good starting point to explain how this works. In Hong Kong, note-issuing commercial banks currently have to deposit US\$1 for every HK\$7.8 that they issue in the form of banknotes, and the Hong Kong Monetary Authority undertakes to convert these Hong Kong dollar notes back to US dollars at the same rate.⁶ Under a WCU-based link, on the other hand, convertibility is guaranteed not at a fixed rate against the US dollar, but at a fixed rate in terms of real purchasing power (“real money,” not “nominal money”) though redeemable in US dollars or other currencies. This way the convertibility undertaking allows varying nominal exchange rates, even though it guarantees conversion at constant real exchange rates.

Moreover, to avoid panics in the event that the economic fundamentals have changed

⁶ Two minor changes were made respectively on date 1 and date 2. Starting on date 1 the “convertibility undertaking” was guaranteed for HK dollars at HK\$7.75 to the US\$ on the strong side (i.e., the HKMA pledges to buy US dollars at that rate from the market whenever the HK dollar tests such strength), and on date 2 the convertibility undertaking was guaranteed for HK\$7.85 to the US\$ on the weak side, meaning that the HKMA commits to buy Hong Kong dollars back when it tests weaker rates than HK\$7.85 to the US\$.

calling for a change in the real exchange rate, the monetary authority of some country Z that decides to adopt a WCU-based currency board will designate the money issued from time τ till further notice as money of vintage τ . Each unit of the local currency (called peso for convenience) is issued with α_τ^* times $V_{0US\$t}$ worth of US dollars (or any other acceptable currency) being deposited with the monetary authority for each unit of the local currency issued. The monetary authority undertakes that these pesos issued are fully convertible into α_τ^* times $V_{0US\$t}$ at any time t , redeemable in any acceptable currency according to prevailing exchange rates. Provided that such guarantees extend to bank deposits, we can avoid depositors becoming panicky when a devaluation is deemed imminent.

4. The New Reserve Asset and International Settlement Vehicle

Today the US dollar is the predominant reserve asset among the world's central banks and the universally accepted international settlement vehicle. Many commodities, including petroleum, are quoted in US dollars. One result of this is that the United States benefits from seigniorage, which is "a financial reward accruing to the reserve currency as a result of its being used as a world money." (Husted and Melvin, 2003) As a result the United States can issue debt to the world (often taken up by much less well off countries like China and Korea) in US dollars and repay years later in much depreciated US dollars. Indeed, as the world's largest net debtor nation holding foreign assets in foreign currencies and with its own

debt issued in US dollars there is a built-in incentive for the US to depreciate its currency. Depreciation will actually reduce America's net indebtedness to the world.

Thus, as urged by Joseph Stiglitz(2005) the world needs a new international reserve asset. Debt issuers need to be held responsible to repay the amount owed in real terms. The proposed indexed unit of account called World Currency Unit serves this purpose well. Because the WCU is a unit of global real purchasing power, debt denominated in the WCU requires the debt issuer to repay, in dollars, yen, Euros, or any other currency, in an amount commensurate with the latest valuation of the debt issued. The debt issuer will not be asked to repay more, and indeed will be protected from having to repay more—such as what happens when the linked currency appreciates unexpectedly. At the same time, the debt issuer also will not be allowed to repay less, than what was borrowed in the first place.

When a sufficient number of debt issuers do issue bonds denominated in WCUs, such “global indexed bonds” will serve as an excellent reserve asset for the world's central banks. Before this occurs, however, it may be feared that central banks will have difficulty matching their liabilities with the right kind of assets. Without dismissing these concerns, however, it must be pointed out that the central banks' real liabilities are preserved, so that they are protected from the risk of seeing their real liabilities explode as a result of exchange rate fluctuations. Their challenge is simply to invest their assets in a way that can preserve real values. There is no presumption that this is inherently more difficult than upholding a

currency board based on a single host currency. To the extent that the real exchange rate is gauged at a level consistent with economic fundamentals, the challenge is likely to be easier. The Argentine peso crisis and the Asian Financial Crisis demonstrate clearly that when the exchange rate has become unrealistic, then defending it will be extremely difficult even if we need a single currency link.

5. What Constitutes the Right Exchange Rate

In the literature there is much discussion about what constitutes the appropriate exchange rate. Williamson(1985, 1994) coined the term “Fundamental Equilibrium Exchange Rate”(FEER), referring it to the level that is consistent with both external and internal balance. By nature this is a desirable rate because it will contribute to both external balance and internal balance. In practice, however, what is desirable need not be what actually occurs. Thus the observed exchange rates are always a result of prevailing market conditions, including expectations of the moment, and a host of random events that affect currency demand and supply. Some economists have then come up with the concept of “Behavioral Equilibrium Exchange Rate”(BEER, Clark and MacDonald, 1998) From the policy point of view, however, with FEER being desirable, keeping the real exchange rate at such a level makes eminent sense. The assumption is that in the absence of real factor changes that have changed the FEER deviations of the actual rate from the FEER would be

disruptive. So working out the FEER and then bringing the actual exchange rate in line with the FEER become imperative.

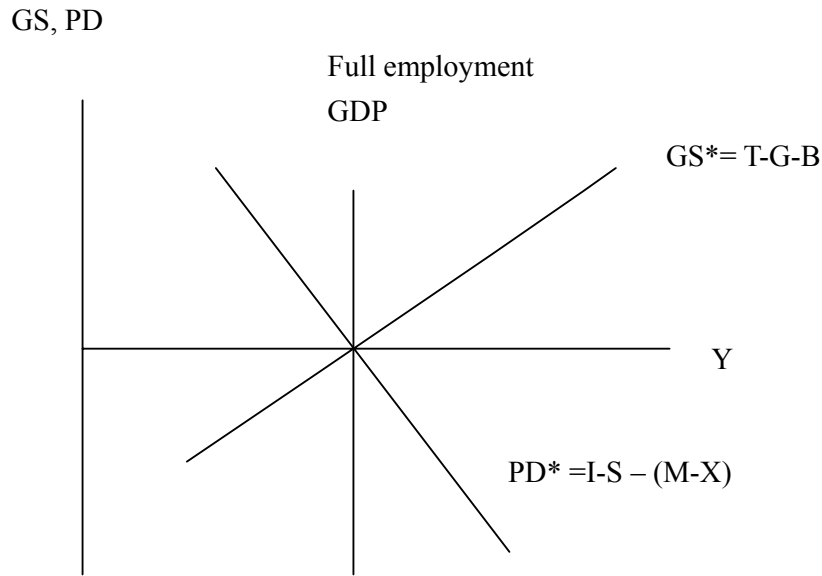


Figure 1: Achieving Full Employment Equilibrium and Budget Balance

From the equilibrium condition $GDP = C + I + G + X - M$, we can write $Y_d + T - B$ (disposable income plus net taxes minus government interest payment) $= C + I + G + X - M$. This transposes to $T - G - B = I - S - (M - X)$. Thus the intersection of $GS (\equiv T - G - B, \text{public sector savings})$ with $PD (\equiv I - S - (M - X), \text{private sector savings deficiency})$ at full employment shows how full employment aggregate demand can be achieved and how fiscal budget balance can obtain at the same time. (See Figure 1)

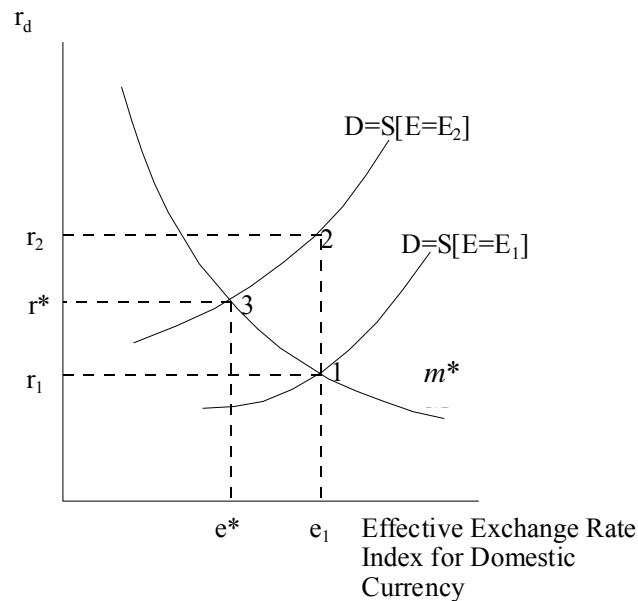


Figure 2: Alternative (e,r) combinations compatible with full employment

We can represent the full employment fiscal budget balance condition by writing $T(y_f) - G - B = 0$. This line is represented by GS^* in Figure 1. This will be described as the “full employment budget balance fiscal position line.” Figure 1 further shows that there is a unique position of the I-S-(M-X) line that will bring about a level of aggregate demand consistent with full employment. The monetary conditions underlying this PD^* will be referred to as the “full employment compatible monetary conditions.” These conditions can be alternatively depicted as m^* in Figure 2.

Moreover, in Figure 2 m^* traces the combination of the real exchange rates and real interest rates such that equilibrium aggregate private sector demand is compatible with full employment. To derive m^* we can express $I - S - (M-X)$ as a function f of real exchange

rate e , real interest rate r , and real GDP y . Thus we can write:

$$I - S - (M-X) = f(e, r, y) \quad [4]$$

By setting f at zero, we can write y as a function m of e and r . *The function $m(e, r)$ will be called a Monetary Conditions Index.* When m equals full employment GDP, the monetary conditions are consistent with full employment. m^* is one of many similarly shaped curves drawn in the (e, r) space but meets the additional condition that $m^* = y_f$.

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 lowered to maintain full employment (Point 3 rather than Point 2). Increased external demand will then come in to replace the domestic demand that has been suppressed by the higher interest rates.

The intersection of the $D=S$ line with m^* determines e^* . Given e^* , the rate at which the domestic currency should link to the WCU will be set at α_τ^* . By definition, α_τ^* is consistent with e^* . Provided that fiscal policy maintains budget balance at full employment, setting α_τ at α_τ^* will bring about full employment, rendering the fiscal budget

balanced. When price levels or nominal exchange rates for currencies comprising the WCU change, maintaining α_{τ}^* implies that the nominal exchange rate of the domestic currency will change spontaneously to preserve full employment.

As the underlying economic fundamentals change (for example, when there is a shift in the I-S+X-M line, or when the relative productivities of different countries have changed), it may be necessary to adjust α upwards or downwards at some future time. If the economy requires a depreciation of the currency to re-establish full employment it should adjust α downward, and if the economy requires an appreciation to prevent overheating it should adjust α upwards. 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 $\tau+k$ α is adjusted downwards, so the peso depreciates. Any new pesos issued as of $\tau+k$ will be designated as *vintage $\tau+k$* . *Pesos of vintage τ are worth more than pesos of vintage $\tau+k$ and will be converted to the new pesos accordingly.* The same guarantee extends to all bank deposits prior to the time a devaluation is to take effect. With depositors' and cash holders' interests protected, it is clear that this arrangement will inspire confidence and will avoid bank runs as well as any need for holders of pesos to rush to sell them.

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, by allowing α to change as needed, is compatible with full employment and is therefore sustainable and credible.

6. Credibility

One may still 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, however, we find that the financial markets at first actually cheered the initial devaluation of the Thai baht. The Thai stock market jumped noticeably. 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 further 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 except in so far as maintaining monetary conditions m^* . 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 real convertibility at the original rate is guaranteed. 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.

Over time there may be a need to add the GDPs of other countries to the basket. For example, in time the RMB will become fully convertible and, provided that markets in RMB-denominated financial assets are deep enough it may then be appropriate to include China's GDP in the WCU basket. However, by design any country represented in the WCU basket should have a freely floating exchange rate. The key points are that the currencies of the countries represented in the basket must be fully convertible, freely floating, and that the

countries are predominantly free market economies, so that the prices of these countries are true market prices. The need for “deepness” in financial markets is to ensure that short term capital flows will not cause undue fluctuations in exchange rates.

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.

Credibility of the proposed system requires that the WCU be defined and that its nominal values be computed and updated round the clock by an authoritative international organization such as the IMF.

7. Conclusions and Implications for the World

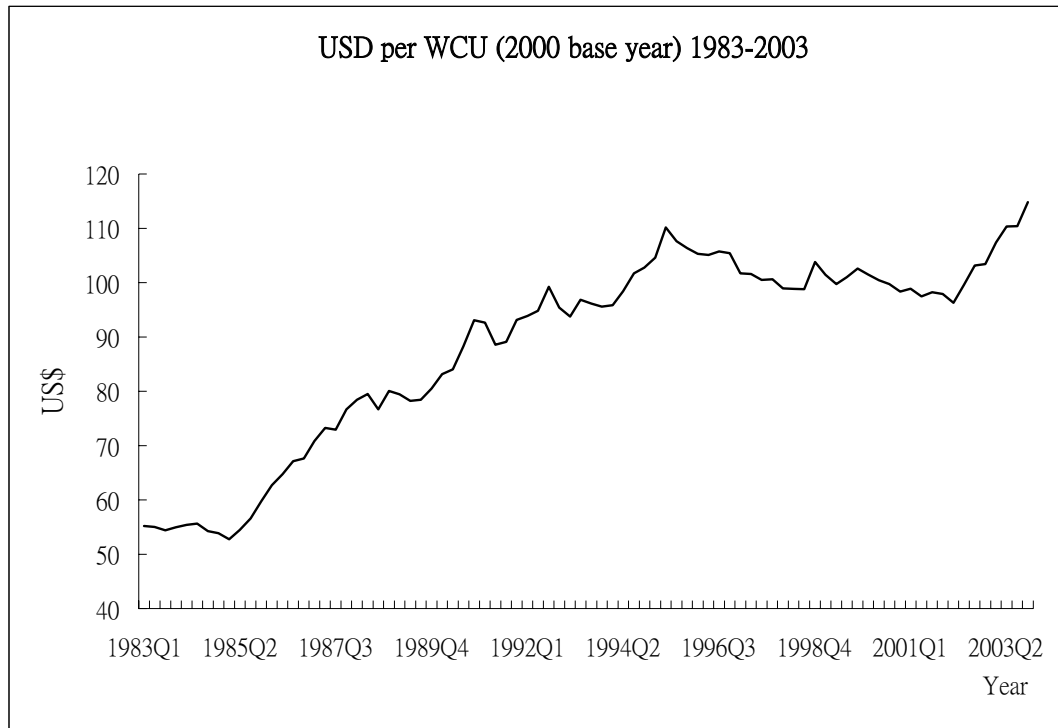
The idea of the WCU is, first and foremost, promote accountability, transparency, and efficiency. Issuers of bonds denominated in the WCU, whether official or private, will be held responsible for repaying debt in constant purchasing power plus the pledged real interest payments. Governments will not be able to inflate away or depreciate away their debts as they can now. There will be greater transparency about the real cost of borrowing, and if the entire world issues debt in the WCU, the world’s capital market will become much more

integrated. The world will have an alternative reserve asset to gold or the US dollar, and no country will collect seigniorage at the expense of others.

Each central bank that decides to tie its currency to the WCU will fix an appropriate exchange ratio to the WCU, namely 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” for as long as their α s remain constant.

Figure 3 shows the changes in the nominal value of one $WCU_{1990US\$t}$, computed using IMF and OECD statistics, from 1983 to 2003. 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 3: Value of the WCU with base year 1990 in U.S \$ 1983-2003



We may note that just before the Asian Financial Crisis, the US dollar has had its unprecedented appreciation against the WCU in the second quarter of 1997. This no doubt caused serious strains to most of the countries whose currencies were tied to the US dollar, including both Asian and Latin American countries. Figure 4 shows the “2-year real exchange rate appreciation” of the US dollar against the WCU (i.e., the percentage increase of the real value of US dollar over two years to time t). At the risk of oversimplification, the financial market turmoil of countries with currencies tied to the US dollar during the period 1995-2002 appears to make sense.

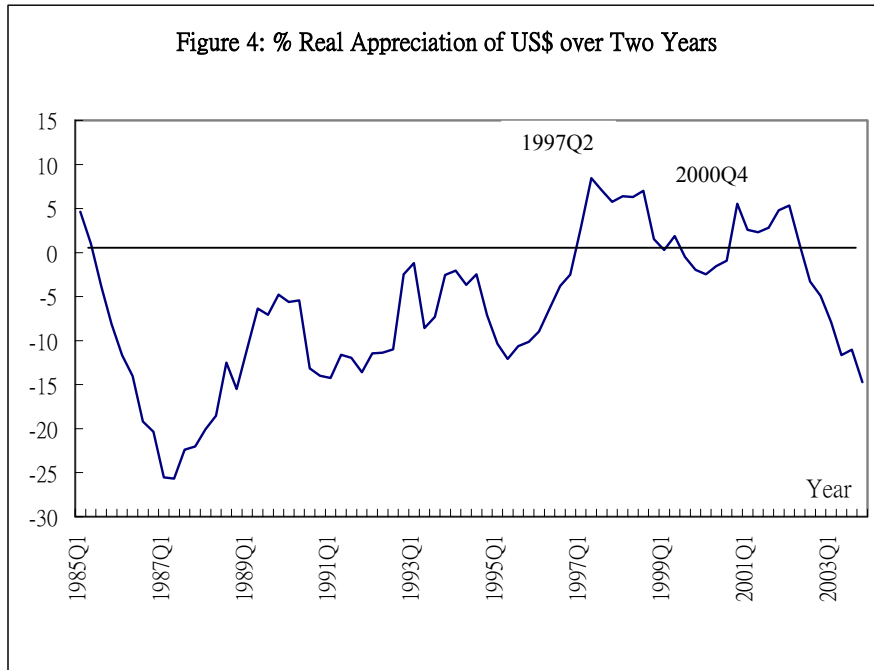


Figure 4 shows that the US dollar by the second quarter of 1997 had appreciated almost by 8% vis-à-vis the WCU over the preceding two years, and this strength greatly surpassed that of the first quarter in 1985, which was also a year of solid strength of the US dollar. This unprecedented strength of the US dollar no doubt had produced much pressure on those economies whose currencies were tied to the dollar, and have probably played an important role in the Asian Financial Crisis.

To explore the possible advantages of a WCU-link a simulation exercise was conducted. First, we estimated the relation between Hong Kong's total exports (HKTXI) on the one hand, and the real exchange rate (WCU/HKD) represented by HKRE and the GDP of OECD countries (represented by OGDP) on the other hand. We use the Johansen cointegration method. All variables are in natural logarithm form.

First, the Augmented Dickey-Fuller Test indicates that the stationary properties of the three variables are I(1) variables (See Table 1). Therefore, the Johansen procedure is then used to detect the existence of long run relation, if any, between them. The results of cointegration test (see Table 2) for the period from 1984 to 2004 showed that they are found to be cointegrated with $r = 1$. Table 3 reports the normalized cointegrating coefficients that can be interpreted as long run coefficients. As can be seen, all coefficients carry the right signs and are statistically significant. According to the coefficients a 10 per cent appreciation in the real exchange rate will reduce real exports by 17 percent. The error correction model is shown in Table 4. The ECM term is negative and significant which also re-confirms that the series are cointegrated. 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-link, and comparing with results from the benchmark of actual values. To do this, I re-estimate the cointegrating relation⁷ from 1984 to 2000 only and then forecast the exports value from 2001 to 2004 assuming HK dollar pegged with WCU starting from year 2001 (i.e. the HKRE (WCU/HKD) is a constant value for the forecasted period). The predicted exports are as shown in Figure 4. As can be seen, the predicted export values are more stable compared with the actual value. The standard deviation for the predicted exports and the actual exports are 0.1255 and 0.1451 respectively.

⁷ The variables are found to be cointegrated and the normalized coefficients also carry with significant and correct signs. The details of results are not reported here to save space but available upon request.

Table 1. Augmented Dickey-Fuller Test of Unit Root 1984Q1 to 2004Q4

Variable name	Test on	No Trend	Trend	Conclusion
HKEX	Level	-1.7619	-1.4363	I(1)
	1 st diff	-3.5693***	-4.3374***	
HKRE	Level	-1.5957	-1.8588	I(1)
	1 st diff	-4.1429***	-4.1857***	
OGDP	Level	-1.0411	-2.4409	I(1)
	1 st diff	-5.2889***	-5.3258***	

1. The optimal lag period in ADF test is determined by the Akaike Information Criterion.
2. *** indicates 1% significant level.
3. 95% C.V. for the ADF tests that include constant and constant plus trend = -2.899 and -3.468 respectively

Table 2 Testing Cointegration between HKEXI, HKRE and OGDP

Null Hypothesis	Alternative Hypothesis	Test Statistics	5% Critical Value
Trace tests:		Trace Value	
$r = 0$	$r > 0$	30.86**	29.80
$r \leq 1$	$r > 1$	6.74	15.49
λ max tests:		λ max Value	
$r = 0$	$r = 1$	24.11**	21.13
$r = 1$	$r = 2$	5.80	14.26

1. Lag length of the VAR is determined by Akaike's Information Criterion
2. ** denotes significance at 5% level and r indicates the number of cointegrating vectors.

Table 3 Normalized Cointegrating Coefficients

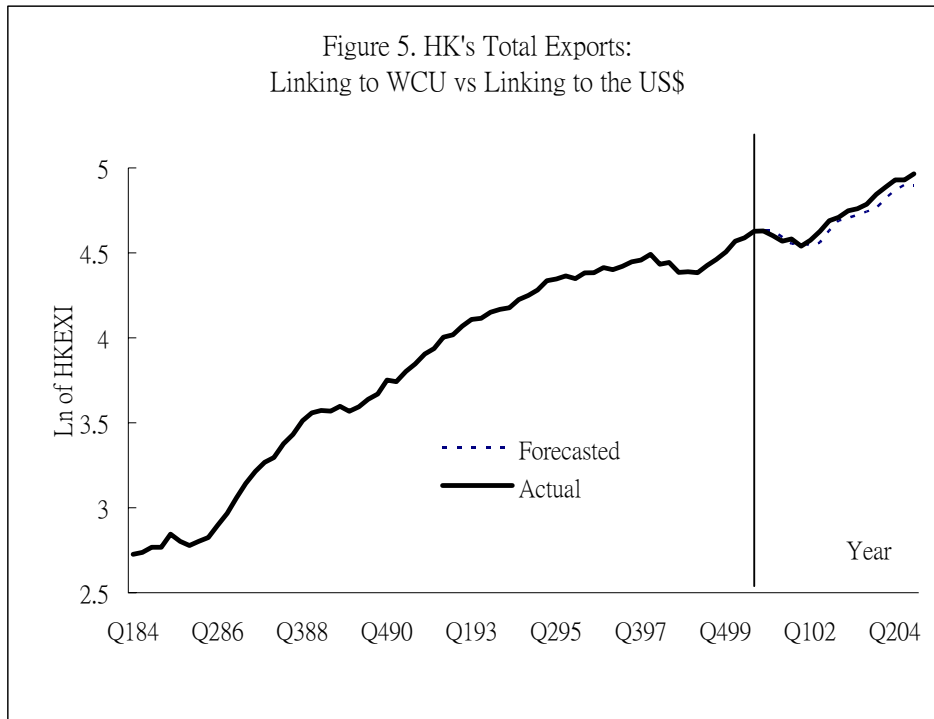
	HKRE	OGDP	Constant
Coefficients	-1.7306	1.8135	15.3521
(t-statistics)	(11.6816)***	(9.2648)***	

*** denotes significance at 1% level

Table 4 Error Correction Estimates. Dependent Variable: D(HKEXI) (-1)

	ECM (-1)	D(HKEXI) (-1)	D(HKRE) (-1)	D(OGDP) (-1)	Constant
Coefficient	-0.2078	0.1190	0.1078	1.3664	0.0157
(t-statistics)	(-4.9984)***	(1.2399)	(0.7568)	(1.5402)	(2.2242)**

1. D denotes first differences
2. ECM denotes error correction term
3. ** and *** denote significance at 5% and 1% level respectively
4. Adj. R² = 0.3433



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

First, currencies on an adaptive WCU, or “real monetary unit standard” as they are

called, are flexible yet are truly anchored and stable. In the absence of a recognized permanent change in economic fundamentals, α will be kept stable. But adjustment in nominal exchange rate vis-à-vis the US dollar will take place continuously and automatically as the US dollar appreciates or depreciates in the foreign exchange market. When the economic fundamentals have changed permanently, each adjustment of α is a real adjustment in the direction desired. In contrast, because the real value of the host currency under a traditional currency board is fluctuating all the time, changing the nominal peg need not imply a real adjustment in the right direction. 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, any two currencies on a WCU-based currency board are indirectly linked as long as their α 's are unchanged. The RMB and the HK dollar will be integrated as will any other currency similarly tied to the WCU. Integration of currencies is achieved without each currency losing its own identity. Regardless of the α 's chosen, countries linked to the WCU will find that their currencies are linked to one another until such times as one or more countries re-adjust their α 's. The increased stability of exchange rates will foster trade and promote efficiency enhancing capital movements.

Third, a WCU-based currency board is completely 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 pressures⁸. Because the central bank's earlier liabilities are guaranteed in real terms⁹, panic over changes in α will be minimized.

Fourth, 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

⁸ This approach may prove superior to stabilizing a Monetary Conditions Index as discussed in <http://www.bankofcanada.ca/en/mci2.htm>, which is based on nominal exchange rates and nominal interest rates.

⁹ This does raise the question whether central banks can take the risks inherent in making such guarantees. The objection will be reduced when borrowers, particularly governments, issue debt denominated in the WCU. When WCU-based assets are available central banks can hold them for reserve purposes.

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.

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List of Variables and their Descriptions

e	: real effective exchange rate index
$e_{\text{US\$}}$: Price of the local currency in US dollars, or US\$ exchange rate
HKEXI	: Hong Kong Total Exports Volume Index 2000=100
HKRE	: WCU / HKD (The price of HKD in WCU)
HKWC _t	: Price of WCU in Hong Kong dollars at time t.
OGDP	: OECD GDP Volume Index 2000=100
P	: Domestic price level, measured as consumer price index
R	: Local nominal prime rate
r	: Real interest rate defined in WCU ₀
RE _t	: Real exchange rate defined relative to the WCU ₀ , = $P * e_{\text{US\$}} / V_{0\text{US\$}t}$
WCU ₀	: World currency unit basket of GDPs in base year 0.
V _{0US\\$t}	: Valuation of WCU ₀ in US dollars at time t.