Pegged Exchange Rate Systems in Macau and Hong Kong*

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Macau pegs its currency, the pataca, to the Hong Kong dollar, which in turn is pegged to the U.S. dollar. This type of pegging order is unique in the annals of international financial arrangements. This article analyzes the structure of the pegged exchange rate systems in Macau and Hong Kong and discusses the financial and economic implications of these systems for the two territories (JEL F33, G15).

Key words: currency board system, currency substitution, pegged exchange rates, seigniorage.

I. Introduction

Following the speculative attack on the Hong Kong dollar (HK dollar) in September of 1983, the Hong Kong government pegged the HK dollar to the U.S. dollar at 7.80/1.00, which has remained the same since then.[1] This peg is a currency-based peg in that the exchange of HK dollar currency for U.S. dollar currency takes place only between banks and the government's Exchange Fund. Because of processing costs, the banks charge a commission fee of 1 percent on each transaction initiated by non-bank customers. Therefore, the exchange rate for bank deposit

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1. Before the peg, there existed a government ordinance in Hong Kong called the *Prohibition of Circulation of Foreign Currency* to help strengthen the circulation of the HK dollar. The ordinance was abolished a few years after the establishment of the pegged system.

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money varies by 1 percent above and below the above pegged rate. The peg has made the HK dollar widely acceptable in foreign trade. However, the HK dollar has not been as widely acceptable in international trade as the U.S. dollar.

Macau pegs the pataca to the HK dollar at 1.03/1.00, with an effective 1 percent range above and below. In 1993, the government of Macau passed an ordinance requiring local businesses to list the prices of goods in patacas, probably because of fear that the HK dollar might displace the pataca in Macau. Nevertheless, the government does not discourage the circulation of HK dollars and other foreign currency in Macau. Bank automatic teller machines (ATMs) in Macau dispense bank notes in either of the two currencies.[2]

Having one currency pegged to another currency, which in turn is pegged to the U.S. dollar, is unique in the annals of international financial arrangements. Moreover, the fact that the HK dollar is widely used in local trade in Hong Kong raises a question of whether a currency with less intrinsic value (HK dollar) is driving out a currency with the higher intrinsic value (US dollar) that can easily be sent out of the country for deposit as "bullion" in foreign banks, as anticipated by Gresham's Law.

Gresham's Law, named after Sir Thomas Gresham, states that *bad money drives out good money*. A definition for Gresham's Law is found in *Webster's Ninth New Collegiate Dictionary* :" . . . when two coins are equal in debt-paying value but unequal in intrinsic value, the one having the lesser intrinsic value tends to remain in circulation and the other tends to be hoarded or exported as bullion." The reference pertains to a bimetallic currency system and the term *intrinsic value* clearly refers

2. Macau, established in 1557, is a Portuguese-administered territory across the Pearl River Estuary to the west of Hong Kong. It is expected to become a special administrative region of China on December 20, 1999. For nearly 300 years, its harbors kept Macau one of the richest cities in the world. However, when the British developed Hong Kong, with its deep water port, Macau's predominance faded. It is now a center for gambling. Each weekend, thousands of Hong Kong gamblers journey by ferry or helicopter across 60 kilometers of the Pearl River Estuary to gamble in Macau's casinos. Macau is one of the smallest modern economies in the world to maintain its own currency. Its population is about half a million and its land area is less than ten square miles. In contrast, Hong Kong's population is over 6 million and its land area is about 400 square miles. Both territories have large areas of steep rocky hillsides that are not suitable for cultivation or habitation. China maintains a special economic zone to the north of Hong Kong, called Shenzhen, and one to the north of Macau called Zhuhai. Both zones have grown rapidly during the past 15 years. There is no sales tax in Macau but, as in Hong Kong, there is a tax on business profits, gambling profits, and salaries above a certain level.

to the market value for metals set in international trade.

The purpose of this article is to analyze the structure of the pegged exchange rate systems in Macau and Hong Kong and discuss the financial and economic implications of these systems for the two territories. The article proceeds as follows: Section II presents a brief literature review on currency substitution and presents statistics for Hong Kong and Macau. Section III discusses the mechanism and types of seigniorage earned by the governments in Macau and Hong Kong. Section IV elaborates on the notion of intrinsic value of paper money. Section V explores the financial and economic implications of the pegged exchange rate systems in the two territories. Section VI presents a brief summary and concluding remarks.

II. Currency Substitution

A. Literature Review

The early literature on currency substitution revolves around the issue of the substitution of hard currencies for weak and volatile currencies of smaller countries. Aliber (1967) investigates the relation between changes in asset preferences and the demand for international reserves. He concludes that when prices of reserve assets are pegged, some mechanism to adjust their relative supply and demand is necessary to prevent hoarding of one asset or the other. McKinnon (1982) examines the implications of major currency substitution for the stability of money demand functions and recommends that the Federal Reserve should, in the interest of monetary stability, discontinue its policy of passively sterilizing the domestic monetary impact of foreign official interventions. Aiyagari (1989) explores the impact of asymmetric information on currency substitution. He concludes that higher quality assets are hoarded for future consumption, whereas lower quality assets are exchanged for current consumption. Thus, bad assets circulate faster than good assets.[3] Miles (1978) suggests that the elasticity of substitution between currencies should be the variable of focus in empirical studies of currency substitution rather than the interest elasticity of demand. Calvo and Rodriguez (1978), using a rational expectations model of exchange rate determination, find that an increase in the money supply in a small open economy leads to an instantaneous

3. See Aiyagari (1989), p. 692.

deterioration of the real exchange rate.

Craig (1997) provides a brief history of several dual currency regimes that existed in America from colonial to modern times. He suggests that perhaps smart-card money will spread to become the substitute currency in countries around the world.

Jao (1992) documents a significant amount of currency substitution as a result of the speculation against the HK dollar that occurred a month prior to the installation of the pegged exchange rate system in Hong Kong. He finds that in a pegged exchange rate system where adequate reserves are held, exchange rate volatility due to speculation has a minor effect on currency substitution. Currency substitution takes place because of concerns over the intrinsic value of the currency.

B. Currency Substitution in Hong Kong and Macau

To ensure clarity, it is important to define the terms *currency in circulation*, *money*, and *currency substitution*. *Currency in circulation* includes domestic and foreign coins and notes. *Money*, as measured by M_1, includes *currency in circulation* and demand deposits in domestic banks, whereas M_2 also includes time deposits. The deposits can be in domestic or foreign currency. The term *currency substitution* refers to the case where money in one country includes foreign coins, notes, and deposits. Thus, currency substitution refers to the use of another country's currency. In the discussion that follows, the term *currency* is used loosely to include coins, notes, and deposits.

Panel A of table 1 presents estimates of the composition of M_1 and M_2 money in Hong Kong during the period 1987–96. The results show that, on average, HK$ and Fx make up 90 percent and 10 percent of M_1, respectively. Except for the years 1990 and 1991, the proportions of HK$ and Fx to M_1 remain close to their average figures. The results for M_2 are, however, different. The last two columns of panel A, show that the HK$ and Fx make up about 45 and 55 percent of M_2, respectively. This is because Hong Kong is an international banking center, thus, a large percentage of foreign currency (Fx) is held in the form of time deposits. The figures for Fx indicate that there is a relative increase in currency substitution in Hong Kong during the period 1987–90 and a relative decrease in currency substitution thereafter.

Panel B of table 1 presents estimates of the composition of M_1 and M_2 money in Macau in terms of patacas (Ptc), HK$, and Fx for the period 1985–96.

TABLE 1. Composition of M_1 and M_2 in Hong Kong and Macau

A. Hong Kong

Year	HK$/$M_1$	Fx/M_1	HK$/$M_2$	Fx/M_2
1987	90.1	9.9	45.9	54.1
1988	89.2	10.8	43.1	56.9
1989	89.8	10.2	40.9	59.1
1990	85.4	14.6	39.0	61.0
1991	87.0	13.0	43.5	56.5
1992	89.7	10.3	44.0	56.0
1993	89.8	10.2	48.3	51.7
1994	90.6	9.4	49.7	50.3
1995	90.1	9.9	53.4	46.6
1996	91.2	8.8	58.4	41.6

B. Macau

Year	Ptc/M_1	HK$/$M_1$	Fx/M_1	Ptc/M_2	HK$/$M_2$	Fx/M_2
1985	44.2	51.7	4.1	26.6	59.9	13.5
1986	44.3	50.0	5.6	25.7	54.2	20.2
1987	37.3	54.0	8.7	22.6	51.5	25.9
1998	38.9	48.5	12.6	19.1	56.3	24.6
1989	40.5	49.5	10.0	20.9	55.2	23.9
1990	35.8	47.3	16.9	22.7	49.0	28.3
1991	27.6	59.2	13.2	22.8	51.1	26.1
1992	28.8	57.3	13.9	23.9	50.8	25.3
1993	31.5	53.2	15.3	27.8	48.0	24.2
1994	35.8	53.1	11.1	27.1	55.5	17.4
1995	38.5	51.3	10.2	29.0	56.3	14.7
1996	42.5	47.6	9.9	30.5	54.9	14.5

Note: Figures are expressed as percentages. HK$ is for HK dollars, Ptc is for patacas, and Fx is for foreign currency. The M_1 definition of money includes currency in circulation and demand deposits. The M_2 definition includes M_1 and time deposits. Data were collected from *The Hong Kong Digest of Statistics and AMCM Annual Reports*.

The results show that, on average, the Ptc, HK$, and Fx make up 35, 54, and 11 percent of M_1, respectively. Thus, the HK$ is the dominant component of M_1 money in Macau. Moreover, the annual figures show that the composition of money in Macau is not stable over time. Specifically, during the last two years, 1995 and 1996, the share of HK$ and Fx dropped below their average values of 54 and 11 percent and the share of the Ptc increased above its average value of 34 percent. The latter suggest a recent decrease of currency substitution in Macau. The last three columns of panel B show that, on average, HK$ and Fx make up 25, 54, and 21 percent of M_2, respectively. As in the case of M_1 money, the HK$ is the dominant component of M_2 money. Interestingly,

the HK$ holds its share during the recent years. This is because people in Macau use more Ptc and less HK$ in everyday transactions, but they hold more HK$ and Fx in banks in the form of time deposits.

Currency substitution has important implications for earning seigniorage, which ranks as a principal inducement to governments to restrict the circulation of a foreign currency in their economies and stop the flow of seigniorage to other countries.

III. Seigniorage in Macau and Hong Kong

A. Types of Seigniorage

Seigniorage is a type of revenue governments earn because of their monopoly over the production of coins and notes. Many centuries ago, governments took over the minting of coins. Individuals with precious metal could take it to the government, and, for a fee called brassage, the government's mint would stamp a coin out of the metal so the individual could use the coin in commerce. Initially, the metal was stamped to verify its gold or silver content. But later governments mixed gold or silver with metal of lower value to create a "token" coin in contrast to full-bodied coin. This led to the creation of paper money.

One can distinguish between two types of returns to government from the issue of currency. One is seigniorage and the other is *inflation tax*. Although some analysts refer to both as seigniorage, there are important differences between the two.[4]

Barro and Stevenson (1997) report that the cost of printing paper notes in the U.S. is about four cents. Thus, the U.S. government makes a profit of 96 cents when it spends a newly printed dollar bill and a profit of $99.96 when it spends a newly printed $100 bill. This profit may be called seigniorage. By issuing its own currency and enforcing laws against counterfeiting, a government can literally make money to use for expenditures. Seigniorage also takes the form of the interest earned on the outstanding amount of domestic currency. This is the principal form of seigniorage for the governments of Macau and Hong Kong.

Inflation is usually the result of excess issue of money, mainly for the purpose of financing government expenditure. The government's purchases of goods and services leave fewer resources for the private

4. For a complete explanation of the origins of seigniorage and the way it is earned by governments and by banks that issue money, see Scott (1995), pp. 96–102.

sector. With more money and fewer resources, the result is higher prices and inflation. Essentially, inflation is a form of indirect income tax, since it causes a decline in the purchasing power of the public's income. Thus, by issuing excess money, the government profits at the expense of the consuming public. In addition, inflation often leads to increases in nominal income and government tax revenue.

Although both the inflation tax and seigniorage are significant forms of government revenue, this article focuses on the economic structure and measurement of seigniorage.

B. Currency Board System and Seigniorage

Under the *Currency Board System*, the issue of coins and notes by a bank must be backed with the equivalent amount of foreign exchange or interest-earning (foreign) assets. These assets permit the government to earn interest (seigniorage) on the outstanding amount of currency in circulation. They also act as collateral to the amount of currency issued. If Hong Kong, for example, were to employ the U.S. dollar as its medium of exchange, the seigniorage would be lost to America. That is why it is important for the Hong Kong government to see that U.S. currency does not replace the HK dollar in everyday transactions. Similarly, if the Macau government wishes to raise seigniorage revenue from its issue of the pataca, then the pataca rather than the HK dollar should circulate more widely in Macau.

C. Economic Framework of Seigniorage

Traditionally, the Banco Nacional Ultramarino (BNU) has acted as the banker for the government of Macau and issued its currency.[5] In October 1996, however, the local branch of the Bank of China (BOC) also began issuing currency for Macau. The Authority for Money and Foreign Exchange of Macau (AMCM) is the government agency charged with the supervision of banks and the management of the monetary system and foreign exchange reserves in Macau.[6]

To issue new pataca notes, the BNU or BOC must obtain certificates of indebtedness (CI's) from the AMCM. For this purpose, the banks must deposit the equivalent amount of foreign exchange or interest earning assets—denominated in U.S. or HK dollars—with the AMCM. Neither the BNU nor BOC can earn interest on the CI's held. The

5. BNU is a bank based in Portugal but with offices in Macau.

6. The Portuguese name for AMCM is *Autoridade Monetaria e Cambial de Macau*.

foreign exchange deposits (henceforth called reserves) serve as backing for the amount of newly issued notes and they are used by AMCM to earn seigniorage for the government.

As the amount of pataca notes in the economy expands, the foreign exchange reserves held by the AMCM expand. Currently, the foreign exchange reserves exceed the amount outstanding of pataca notes, when evaluated at the pegged exchange rate of 1.03 Ptc/HK$. This is because the government is letting the earnings from seigniorage accumulate rather than spending them or cutting taxes. Thus, over the years the volume of reserves has been enlarged by the compounding of interest returns. Unfortunately, the AMCM chooses not to publish the volume of reserves it holds nor the yields earned on these reserves. However, the general policy of the AMCM is to invest in low-risk assets.[7]

The note-issuing banks in Hong Kong are the Hongkong Shanghai Banking Corporation, the Standard Chartered Bank, and the local branch of the BOC. As in the case of Macau, the issue of notes must be backed with assets deposited by the *Exchange Fund* (EF). The relationship between the EF and the local banks in Hong Kong, regarding the issue of new notes, is similar to that of AMCM and local banks in Macau.

The EF, established by the former British colonial government of Hong Kong, is charged with the management of foreign exchange reserves under the currency board system.[8] Currently, the EF manages between 70 and 80 billion U.S. dollars in foreign exchange reserves. These reserves also include government budget surpluses invested by the EF in foreign currency denominated assets. Note that the precise amount of reserves held by the EF is difficult to know because it fluctuates with global market conditions. Hong Kong's foreign exchange reserves are the fifth largest in the world.

In early 1997, the EF reported that the amount of HK notes in circulation was about 86 billion HK$, or 11 billion US$ when evaluated at the pegged exchange rate of 7.8 HK$/US$. Thus, the accumulated foreign exchange reserves held by the Hong Kong government are about seven times larger than the reserves needed to back the outstanding

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7. In a lecture presented at the University of Macau in 1997, a spokesman for the AMCM, who wished to remain anonymous, said that the AMCM had accumulated foreign exchange reserves of 2.3 billion U.S. dollars by mid-1997. On a per-capita basis, Macau might claim a rank of seventh in the world in terms of foreign exchange reserves.

8. Specifically, the *Exchange Fund* is managed by the Hong Kong Monetary Authority (HKMA), established in 1993. The HKMA is overseen by the Monetary Affairs branch of the government of Hong Kong.

amount of Hong Kong notes.

D. Seigniorage on Exported U.S. and HK Dollars

Seigniorage represents transfer of interest from those holding the currency (coins and notes) to the government issuing the currency. Therefore, in the case of currency substitution—where residents in the home country hold foreign currency—seigniorage flows from the home country to the country issuing the currency. Thus, currency exported from one country for use in another country earns foreign exchange (purchasing power) as well as seigniorage for the exporting country.

The major exporter of foreign currency in the world is the U.S. About $240 billion (60 percent) of the $400 billion outstanding U.S. notes circulates in foreign countries. Every dollar of this non-interest-bearing debt represents a dollar less that the U.S. government must borrow from the securities markets. The U.S. Treasury pays roughly 5 percent interest to borrow funds. Thus, the total savings for the U.S. government from the exports of U.S. dollars is about $12 billion each year. Hanke (1995) points out that this indirect export of dollars is the most profitable export the U.S. has.[9]

Hong Kong exports its currency into Macau and the adjacent Guangdong Province of China. Greenwood (1990) and Ogus (1992) estimate the proportion of Hong Kong currency circulating in Guangdong Province and find that the percentage was about 18 percent during 1990 and 30 percent during 1995.[10] The latter figure amounts to about HK$21.9 billion of the HK$73 billion in circulation during 1995. The relevant estimate for Macau during 1991 was HK$2 billion.[11] Thus, a 5 percent interest would produce HK$1.095 billion seigniorage for the Hong Kong government, coming directly from the persons living in Guangdong Province, and HK$100 million coming from Macau. The latter figure amounts to about 200 patacas per year for each person living in Macau.

E. Seigniorage on Bank Deposits

In countries where there are binding legal reserve requirements, banks must maintain non-interest-earning reserves. But, banks in Hong Kong

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9. See Hanke (1995), p. 126.

10. See Greenwood (1990) pp. 37–44. Revisions of the original estimates by Greenwood are also presented in Ogus (1992), pp. 34–35.

11. This estimate was based on a simple ratio of HK dollar demand deposits to pataca demand deposits, which was about 2.3 at the time.

follow the UK system which only requires banks to hold liquidity reserves, usually held in interest-earning securities. In Macau there is a 3 percent legal reserve requirement on demand deposits, which must be held with the AMCM. Banks in Hong Kong and Macau generate part of the money supply in the form of demand deposits through the money multiplier mechanism. Banks making loans in the local currency realize interest earnings equal to the difference between the interest received from the loans and the interest paid on checking accounts and other deposits.

Macau banks make more loans in HK dollars than they do in patacas, although their deposit base in patacas is quite large. To help the banks utilize their pataca surpluses, the AMCM began issuing monetary bills that banks can buy and earn interest on. By buying or selling monetary bills, the AMCM is in a position to affect the supply of patacas in Macau.

Liquidity for the banking sector is maintained through the monetary bills market and not through direct injections of liquidity. Since there are no financial markets in Macau, the monetary bills are usually sold among banks. The AMCM is charged with the responsibility of acting as a buyer of last resort for the bills. The bills are considered to be risk-free instruments in Macau. Thus they provide a benchmark interest rate for the economy. Note that the monetary bills operations provide the foundation for the development of markets for other money market instruments in Macau.

IV. Intrinsic Value of Paper Money

The distinction between "bad" and "good" for paper money is not as clear as that of precious metal coins. In the case of coins, the international markets for gold and silver bullion determine the intrinsic value of money, relative to that of another country.

Every commercial transaction of goods and services involves a buyer and a seller. The buyer pays money to the seller in exchange for the goods and services received. People in Macau consider the HK dollar to be of higher intrinsic value than the pataca. However, because the pataca is Macau's tender currency, the sellers must accept it as the payment, regardless of its intrinsic value. The buyers, on the other hand, will tender their "bad" patacas to the seller and hold on to their "good" HK dollars usually in the form of time deposits.

The HK dollar has certain intrinsic qualities that the pataca does not have. It is used not only in Hong Kong, but also in Guangdong Province of China, and it is accepted nearly everywhere in the Asian Pacific region. As economic development in Macau progresses, the pataca may also become more acceptable to people in China and other neighboring countries. Nevertheless, the government of Macau can make the pataca more acceptable to people in Macau by permitting the casinos and exporters to pay taxes in patacas, rather than requiring them to pay their taxes in HK dollars or other foreign currency.[12] Moreover, pegging the pataca to the Hong Kong dollar at a rate of one—i.e., to have the same face value as the HK dollar—will make the pataca a closer substitute for the HK dollar.

V. Economic Consequences of Pegged Exchange Rates

In September of 1983, a speculative attack drove the exchange rate between the HK dollar and the U.S. dollar from five to nine. The government of Hong Kong had no tools to control the money supply and stabilize the value of its currency. It could have asked the Hongkong Shanghai Banking Corporation to act as a central bank, but chose not to do so. Instead, in October of 1983, the Hong Kong government pegged the HK dollar to the U.S. dollar at the rate of 7.8; the fundamentals were suggesting a rate close to six.

At the time of the peg, the U.S. dollar was very strong in the foreign exchange markets because of the high interest rates in the U.S. and the anti-inflation measures taken by the Federal Reserve. Soon after the peg, the inflation and interest rates in the U.S. started to decline. To support the pegged rate of 7.8, the authorities in Hong Kong were forced to hold local interest rates close to U.S. interest rates. The combined forces of the undervalued HK dollar and falling interest rates resulted in a booming inflationary economy in Hong Kong.

Hong Kong has a legal banking cartel, the Hong Kong Association of Banks, which exercises considerable influence on domestic deposit and lending rates. Initially, the cartel did not support the pegged exchange rate system. But, soon after, it gave strong support to the

12. The government of Macau collects taxes from the casinos in HK dollars, partly because tourists coming from Hong Kong use HK dollars in gambling. Also, when Macau exporters earn foreign exchange they are required to pay their taxes in foreign exchange.

pegged system because it provided a key to large profit positions for the banks. Specifically, banks in the cartel could set deposit rates in the range of 2–4 percent and lending rates in the range of 10–12 percent. With inflation ranging between 8–10 percent, the banks could earn positive real returns continuously at the expense of the public, which suffered negative real returns.

Economists repeatedly warned the government that the pegged exchange rate system left no weapon to use against inflation. The high inflation rates and low interest rates on deposits provided a strong incentive to the public to invest in real estate property. As inflation continued, real estate prices rose rapidly. The pegged fixed exchange rate guaranteed that real estate could always sell for more U.S. dollars, thus creating conditions of continuous inflation.

Because the peg kept the HK dollar undervalued, on several occasions speculators sold U.S. dollars and bought HK dollars. Many times these HK dollars were placed into bank deposits in Hong Kong, earning close to zero interest. The EF was frightened by these speculative moves and obtained discretionary authority from the HK government to impose a tax on large deposits, in case it needed this power to make their effective yield negative. The EF did not find it necessary to use its authority to impose tax, but provisions for taxing deposits is still in place.

Hong Kong authorities held back market pressures for a rise in the value of HK dollars. Exports remained inexpensive to foreigners, but imports — especially those from the U.S. — remained expensive. Thus, local exporters received less for their products and consumers paid more for imported products than they would have if the HK dollar had been permitted to rise in value.

Fischer (1982) states that the inflation rate in a country that ties its currency to the currency of a major trading partner will converge to the inflation rate in the partner country. In the case of Hong Kong, the convergence was very slow. One reason for this may be that Hong Kong businesses shifted production to China to take advantage of low wage rates there to maintain exports even as local inflation was leading slowly to an overvalued HK dollar. Another reason for the slow convergence could be that productivity increased.

Inflation in Hong Kong had finally made the HK dollar overvalued. As a result, on October 23–24, 1997, the Hong Kong stock market plunged by more than 25 percent. The latter triggered negative waves to the New York and other major international stock markets. These

markets, however, recovered quickly, because there was no reason for large stock markets to be affected by a relatively small local market such as Hong Kong's.

Hong Kong's market and economy have finally responded to Fischer's forces of adjustment that promise to bring on significantly lower rates of inflation. To sustain the peg and keep the HK dollar from being overvalued, inflation in Hong Kong must eventually drop to about 2 percent from its current rate of 7 percent. Such a drop will require difficult adjustments in the real economy, especially in the highly overvalued real estate sector.

Geoffrey Tootell (1992), using cointegration analysis, finds that inflation rates do not converge even in major metropolitan areas within the U.S. This finding raises a serious question of whether inflation rates can converge between Hong Kong and the U.S. in light of the fact that the banking cartel in Hong Kong finds high inflation profitable. Nevertheless, in the long run, either inflation rates must converge or the exchange rate peg must adjust.

Similarly, in Macau, people have invested their holding of patacas into real estate in the form of flats in high-rise buildings. In Macau there are currently 60,000 new apartments in about 300 to 400 empty buildings. The amount of housing available is sufficient to provide living space for a 50-percent increase in its population. Unfortunately, if the apartments were to fill up, there would not be sufficient road space, schools, water, and so forth, to provide for the occupants. This misallocation of investment resources is the result of the pegged exchange rate system.

Whenever concerns were expressed about the pegged exchange rate system and the problem of inflation, officials in Hong Kong argued that the pegged system was necessary for "stability" because of the upcoming turnover of Hong Kong to China in July of 1997. After the turnover, many people claimed that the pegged exchange rate system was successful in providing stability.

The pegged exchange rate system in Hong Kong stabilized the trade with the U.S., which accounts for about 30 percent of the total trade, and, perhaps, relative stability in the trade with other countries. However, the pegged system has produced higher inflation and misallocation of resources, especially in the real estate sector. Hong Kong's overheated real estate sector recently triggered government intervention in the mortgage market.

The three principal macroeconomic variables that act as cushions for

an economy subjected to intermittent shocks are exchange rates, interest rates, and the rate of inflation. When exchange rates are pegged, interest rates must be kept in line with the host country's interest rates to avoid arbitrage. With no adjustment possible in the exchange rates and interest rates, adjustments toward longer-run equilibrium can only come about through swings in the rate of inflation. It might have been better to have the cushion provided by modest instability in flexible exchange rates, interest rates that would fluctuate in response to changes in the climate for investment, and minor variation in price levels, so that each of the three macroeconomic variables could do its work of partially cushioning the adverse effects of shocks to the system. All prices in a free market economy need to adjust to market forces if the economy is to enjoy true stability. Rigid exchange rates simply do not provide stability, as the case of Hong Kong today so aptly illustrates.

VI. Summary and Conclusions

This article began with a description of the unique currency system in Macau. The HK dollar is pegged to the U.S. dollar at 7.8 and the pataca is pegged to the HK dollar at a 1.03. The pataca is viewed as having less intrinsic value than the HK dollar because it is less acceptable in regional trade just as the HK dollar is less acceptable than the U.S. dollar in international trade. Thus, buyers of goods in Macau offer patacas and hold onto or export their HK dollars, and buyers of goods in Hong Kong offer HK dollars and hold onto or export U.S. dollars, as "dictated" by Gresham's Law.

Despite the pataca being less valuable than the Hong Kong dollar, a large portion of the circulating currency in Macau consists of Hong Kong dollars. The government can make the pataca more acceptable to people in Macau by permitting the casinos and exporters to pay taxes in patacas, rather than requiring them to pay their taxes in HK dollars or other foreign currency. Moreover, pegging the pataca to the Hong Kong dollar at a rate of one will make the pataca more acceptable in trade. Wider circulation of pataca will result in additional seigniorage for the government of Macau.

The pegged exchange rate system had left the HK dollar undervalued and, as a result, the economy had boomed. Interest rates had to be kept close to U.S. interest rates to avoid arbitrage. The absence of monetary tools to control inflation in conjunction with the booming economy led

to steady inflation. The high inflation rates and low interest rates on deposits provided a strong incentive to the public to invest in real estate. As inflation continued, real estate prices rose rapidly.

Finally, by November 1997, Hong Kong prices had risen high enough to make its currency overvalued. The Hong Kong monetary authorities ware forced to intervene in the interbank market and purchase large volumes of HK dollars in defense against speculative attacks on its pegged rate system.

Macau's economy has suffered similar problems. Builders have built an excess number of apartments in tiny Macau and they are still building more apartments at a greater rate.

Government interference in the setting of prices tends to weaken the efficient operation of an exchange economy. This is especially true in the case of foreign exchange markets. Political reality indicates that governments will always be under pressure to interfere with the price of foreign exchange. But pegged exchange rates do not guarantee long-term domestic economic stability even when the peg itself is rigidly maintained.

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