Financial Liberalization with Macro-Stability and Fiscal Revenue: Resolving Economic Dilemmas in China[*]

Mo Pak Hung[**]

Globalization has resulted in massive international flows of speculative capital. With its fragile social, economic and financial infrastructure, developing countries will be susceptible to the ills of the flows: periodic booms and busts with financial crises and loss of foreign reserves if they liberalize their financial market. In this paper, we formulate a system that can resolve some important economic dilemmas in Chinese economy. Under the system, China can liberalize its financial sector without suffering from the potential ills and generate stable fiscal revenue from capital flows. This system is applicable to all developing countries that face similar dilemmas as in the Chinese economy.

"Money has become a commodity rather than a means of exchange, trading at a volume of over US$ 1.9 trillion dollars per day.   This enormous amount moves around the world without restriction, seeking maximum short-term profit.   When currency speculators 'bet' against a currency and rapidly withdraw billions from a country, they wreck havoc on its economy and people's lives." <www.currencytax.org>, date accessed: 2008.

1. INTRODUCTION

When there is persistent inflation accompany with a high rate of unemployment in an economy, institutional problems normally exist which require supply-side improvements.   They include a better alignment of private and social interest so that resources can be directed to socially productive activities, reducing transaction costs, promoting domestic and international division of labor, reducing market and government failures, and finally, improvements in financial system that can better match saving and investment, raise the liquidity of assets, and reduce liquidity constraints and the needs for precautionary savings.

The successful story of the Chinese economic miracle is also a story of successful institutional reforms starting from the open door policy and privatization experiments since 1978.   A series of institutional reforms in rules and regulations that become more favorable to foreign direct investments, productivity improvement, private investments and efficient resource allocation underline the economic miracle.   However, as the international economic and technological environment changes, plus entering a higher stage of development, it seems that Chinese economy is again facing an institutional bottleneck in the currency system that exerts serious challenges to further advancement of the economy.   The bottleneck is revealed in the well-know economic dilemmas experiencing in China, namely, the dilemmas between internal balance and external balance, between financial stability and capital mobility, and between income

equality/social stability and globalization. Moreover, the international imbalance partly driven by domestic macroeconomic imbalance has resulted in growing international tensions. An important cause of the dilemmas comes from the intrinsic problems generated by the present currency system that is extensively discussed in recent literatures as surveyed in Lafrance (2008).

In this paper, we propose an 'asset dollar system' to solve the problems. The system attempts to institute a mechanism such that China can be benefited from the financial integration with the global economy while minimizing the associated risks and costs. It will enhance China to be an economy closely integrated with the rest of the world while gaining additional dynamics for further advancements. The next section reviews the dilemmas facing Chinese economy. It is followed by discussions on the existing proposals and how the government is trying to resolve the dilemmas. Section 4 introduces our proposal and discusses its potential benefits to the economy. The last section concludes. A formal model is reported in the Appendix to illustrate the interactions between major macro-variables after the asset dollar system is instituted into the economy.

2. THE ECONOMIC DILEMMAS

2.1. Exchange Rate Flexibility, Internal Balance and External Balance

Under the present currency system in China, the large and expanding trade surpluses with the rapid accumulation of international reserves have raised substantial tensions with its major trading partners. Since the open door policy adopted in 1978, China follows an export-led growth by attracting foreign direct investments, building up market infrastructures and accumulating public and private capital that drives the country towards a modern industrial market economy. A fixed exchange rate regime makes international transactions less risky that is favorable to foreign direct

investors and international transactions.   The policies of fixed exchange rate, capital control and encouragement of foreign direct investment have served well for China's quests for financial stability, sustaining economic growth along with poverty reduction and socio-political stability.   Furthermore, financial and economic stability can avoid imposing risk on the fragile banking system directly and also provide room for solving their problem of enormous nonperforming loans.   However, the costs associated with the fixed exchange rate become apparent in recent years.   As global integration increases and the control of capital flow becomes porous, it is necessary to have more flexibility in the exchange rate for allowing an independent monetary policy to achieve internal balance.[1]   Moreover, greater exchange rate flexibility in China can also facilitate banking reforms, foster social stability and justice by adopting more flexible monetary and fiscal policies for stabilizing the price level and rebalance the Chinese economy.   The exchange rate flexibility becomes increasingly important as the banks are commercialized and stakes are sold to foreign investors which rendering less effective of managing monetary conditions by issuing instructions to financial institutions. Moreover, increasing use of administrative controls on lending is inconsistent with the government's long-term policy of extending the level of marketization in financial sector.[2]

2.2. Financial Liberalization and Financial Stability

There is little dispute that financial liberalization can raise productivity and promote economic development (for instance, Bekaert, Harvey, and Lundblad, 2005; Rancière, Tornell, and Westermann, 2006).   However, the marked increase in financial fragility associated with the liberalization

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[1] Recent observations suggested that speculative inflows can seep in through both official and unofficial channels even under strict capital controls (for instance, Genberg, MaCauley, Park, and Persaud, 2005; Prasad and Wei, 2005).   According to the Impossible Trinity, an economy cannot have free capital flows, independent monetary policy, and a fixed exchange rate simultaneously.

[2] Goldstein and Lardy (2007), and Lafrance (2008) have an extensive review on the debates on China's currency policy.

experienced by developing countries in recent decades has offset the positive view of financial liberalization.   It is extensively documented that financial liberalization is generally associated with full-fledged financial crises.[3]

Capital account liberalization typically results in boom-bust cycles. During the expansionary cycle, speculative capital inflow raises liquidity and asset prices.   Bank credit expands as the collateral value of assets increases that generates further increases in liquidity and asset price.   This 'virtuous cycle' continues until the asset bubble bursts.   The drastic decline in asset price and associated liquidity contraction generates a vicious cycle of economic downturn.   The financial instability leads to high variability in real sector including employment level, trade balance and growth rate.   It is not uncommon that socio-political stability is also jeopardized.   They suggest that the benefits of financial liberalization have to be weighed against the cost of increased financial fragility.   China is also undergoing social and political liberalization processes.   The rapidly changing political, social and economic structures generate substantial risk to socio-political stability.   It is therefore understandable that the government places high priority to generating employment and maintaining economic stability.   The government also faces substantial fiscal pressure due to the expanding aspirations for public pension, health care and all other social services from the people.   The potential risks associated financial liberalization demonstrated by the Asian financial crisis and the fragile socio-political situation have made China very cautious in the related reform.   The potential benefits derived from financial liberalization and further integrating with the global economy cannot be realized under the present situation.   At the same time, the 'financial repressions' result in its acute internal and external imbalances when capital flow is increasingly difficult to control in the globalizing world.

2.3. Globalization, Income Disparity and Socio-political Stability

Globalization fosters economic prosperity and raises living standards

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[3] Among voluminous books and literatures, Pettis (2001), Tornell and Westermann (2005).

through specialization and exchanges of goods, knowledge and ideas (for instance, Mo, 2010). They reduce cost of production, facilitate technical progress and therefore expand consumption possibilities to all parties involved. However, the gains from globalization may not be distributed evenly in China. Those who are in the positions of capturing the benefits like locating close to trading and manufacturing centers, who have skills and assets that can contribute to the production of high value tradable goods and those who have power to capture the rents from the trading activities and technical progress can become very rich easily. The income disparity between the coastal and inland areas, between those have and have-not expands rapidly. It is well-documented that income inequality will jeopardize economic growth by lowering socio-political stability, investment, human capital accumulation and productivity growth (for instance, Mo, 2000). Moreover, the high growth also results in acute energy shortages and a deterioration of the environment that brings additional social conflicts and stresses among different economic classes. Solution to the problems has to be instituted for a harmonious society.

3. EXISTING PROPOSAL AND PRACTICE

Facing the dilemma between stable exchange rate and inflation, the Chinese government has decided to appreciate the RMB. However, the porous capital control and the expected currency appreciation have attracted substantial capital inflow. To sterilize its effect, the government has to raise the required reserve ratio and restrict capital inflows for reducing the capital account surplus and the associated inflation pressure caused by excess liquidity.

Goldstein and Lardy (2007) suggest that China should undertake a 'three stage approach' currency reform moving towards liberalization of current and capital accounts. Similar to many proposals on the sequencing of international monetary and financial reforms, the process may take decades

while the risks of crises and instability associated with financial liberalization are still unresolved.

To resolve the negative effect of the excess capital inflow, Prasad and Rajan (2005) suggest securitizing capital inflow through closed-end mutual funds.   The funds would issue shares to domestic residents in local currency, use the proceeds to purchase foreign exchange from the central bank and then invest the proceeds abroad.   He argues that this would solve the sterilization problem and also give domestic residents broader investment possibilities and diversify their portfolios internationally.   In addition, it would help to alleviate some of the domestic risks typically associated with surges in capital inflow.   This direct intervention may solve the excess liquidity problem in the short-run but the goal of financial liberalization required more fundamental changes.

The Role of QDII and QFII

In order to avoid the potential instabilities and destructions caused by erratic and massive flows of international capital while moving towards the goal of financial liberalization, the government institutes the QDII-QFII system to allow regulated flows of capital account.   With restricted quotas, qualified domestic institutional investors (QDII) scheme allows pension funds, insurance companies and other large institutional investors to invest abroad while the qualified foreign institutional investors (QFII) are allowed to invest in China's asset market.   However, under the system, it is difficult for national authorities to control the timing of inflows and outflows. Moreover, the effectiveness of capital control is likely to be decreasing when the economy is more and more integrated with the world.   As a result, the system cannot smooth the erratic fluctuation inherent in the asset markets although in the short term, it may reduce the chance of full-scale financial crises since the maximum scale of capital outflow and inflow is limited. Another shortcoming of the system is that the potential rents generated from having the rights of capital inflow and outflow are likely to be captured by

the selected institutions and related bureaucrats.   It also provides additional corruption opportunities to insiders that further raise opportunity and income inequalities.

4. MISSING CAPITAL FLOW MARKET AND THE ASSET DOLLAR SYSTEM

It is generally accepted that the current internal and external imbalances are not sustainable in the long-run and an important key to resolve the imbalances is reforming the currency system.   In this section, we propose the 'asset dollar system' (ADS) to resolve the dilemmas. The design of the system is guided by four major purposes:

i) be able to have a stable but flexible exchange rate to attain the balance of trade automatically.

ii) be able to prevent erratic capital flows and the associated economic instability and financial crisis.

iii) be able to facilitate the development of deep and liquid financial and asset markets.

iv) be able to resolve or alleviate the internal and external imbalances mentioned in section 2.

The crux of the economic dilemmas in China arises from insufficient macroeconomic control tools.   Under the Mundell-Fleming model, interest rate affects the balance of internal sectors as well as determines the direction of capital flow.   However, the interest rate that is desirable for internal balance might not be desirable for its capital flow effects and vice versa. Our innovation is the introduction of a market-driven mechanism to balance the capital inflow and outflow which is similar to the money market.   As illustrated in figure 1A, when the return of the domestic asset (r) is higher than the international return (r_f) as at r_n^0, capital inflow is larger than outflow if

Figure 1A   Capital Flow Market Asset Premium: Excess Inflow
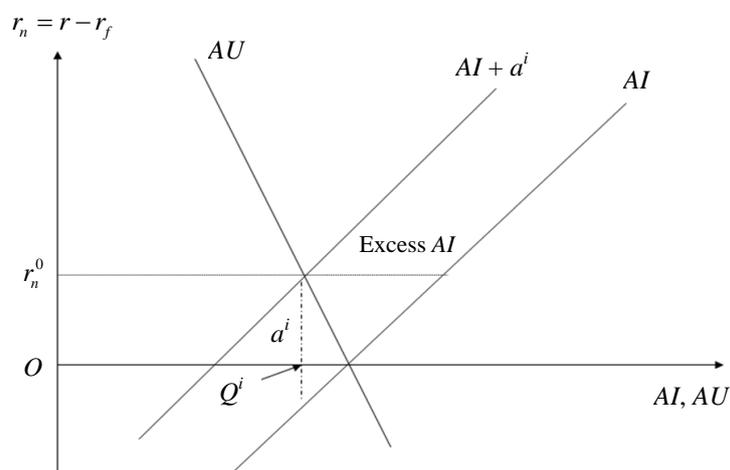
Notes: *AI/AU*: amount of capital inflow/outflow, Q^i: inflow quota, a^i: inflow premium, r/r_f: return rate of the domestic/foreign assets.

unregulated.   Under the situation, the government sets the quota for capital inflow that equals to the amount of uncontrolled outflow Q^i. The inflow quota amounting to Q^i is than auctioned to qualified institutions that serve as market-makers and retailers of the quota (asset dollar).   The price-taking market clearing price of the quota will be equal to a^i that is the difference between the actual return r_n^0 and the acceptable return of inflow capital at Q^i. The price of the quota is called asset premium which is denoted by '*a*'. The lower the '*a*', the higher will be the net inflow and vice versa.   '*a*' can be positive or negative.   Negative '*a*' represents charging a price on outflow of capital when the outflow is larger than inflow as illustrated in figure 1B. Under the situation, government imposes a quota on capital outflow and the quota price will be equal to a^u in a competitive quota market that is the difference between the international return and the domestic return of assets at Q^u. The introduction of asset dollar can therefore guarantee stability to the balance of capital flows.   In the Appendix, an extended Mundell-Fleming model is constructed to illustrate the role and interactions of the asset dollar with other major macro-variables in the economy.

Figure 1B   Capital Flow Market Asset Premium: Excess Outflow

$r_n = r - r_f$
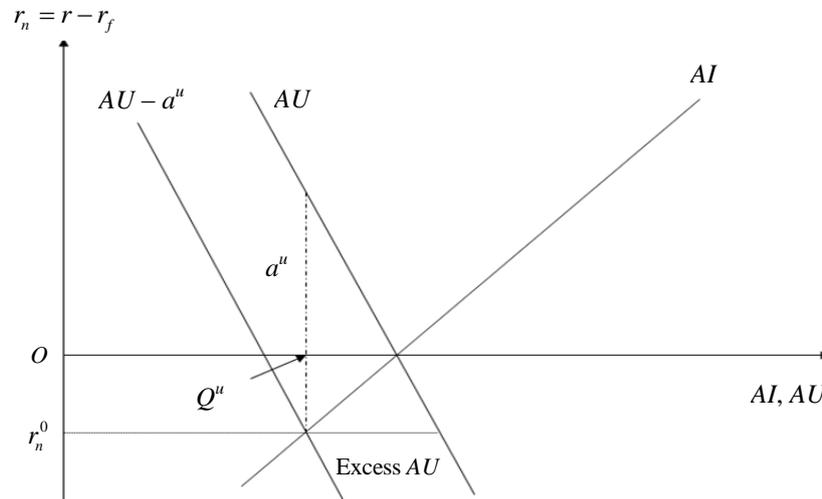
Notes: Q^u: inflow quota; a^u: outflow premium.

Once the balance of capital account is guaranteed, we can allow a free float of exchange rate to balance the trade account automatically. Being isolated from the flows of speculative funds by ADS, exchange rate adjusts according to the international demand and supply conditions in the trade market that is much more stable than the capital flow market.   The economy can therefore enjoy the benefits of a stable, convertible and flexible exchange rate after the ADS is instituted.   The flexible exchange rate regime and current account balance reduce the disputes with its major trading partners. The first and second dilemmas are resolved.

After the capital and trade accounts are liberalized, the government is free to adopt monetary and fiscal policies to solve the internal problems.   The booming financial sector due to the full-scale liberalizations will create enormous high quality employment opportunities.   The additional source of fiscal revenue from the quota auction empowers the government to foster a harmony society by reducing counter-productive taxes and by expanding the scale and quality of infrastructures and socially productive services.

Growth driven by productivity improvement can reduce the stress on global raw materials, energy demand and the environment.   They strengthen the capacity of the government to build a more harmonious society.   They can alleviate the third dilemma.

Effectively, the ADS is implemented by auctioning out the capital flow quota to financial institutions periodically.   If the net inflow of capital is positive when the asset premium is zero, than inflowing capital has to purchase the capital inflow quota with its price determined by the current market condition while capital outflow is free.   If the net inflow of capital is negative when the premium is zero, than outflow capital has to pay a premium equals to the market price of outflow quota while inflow is free. Under this mechanism, both the size and time of capital flow are regulated but at the same time market-driven.   Even the capital account is liberalized, undesirable financial and economic fluctuations due to erratic asset price driven by speculative flows can be avoided. The management cost of capital flow is also much lowered in comparing with the QDII-QFII system. Moreover, the mechanism is transparent and the inflow or outflow quota can be allocated to the highest-valued users under the market mechanism.   The economy can be benefitted from the efficient, liberalized market-driven current and capital accounts.   At the same time, government has full autonomy in choosing monetary and fiscal tools for achieving the internal balances of the economy and enjoys an additional stable source of fiscal revenue from the quota auction.

The Merits of ADS

At present, there are enough evidences that all developing and emerging economies are susceptible to the ills caused by the erratic and massive international capital flows.   The ADS allows a rapid and full-scale market-driven financial liberalization with limited risk and cost.   The major benefits brought by instituting the system include the followings:

ADS requires no sequencing of the monetary and financial reforms.   The

whole system will adapt towards the equilibriums over time without large disruptions.   After proper financial infrastructures are constructed, opening up of the current and capital accounts can proceed simultaneously, orderly and rapidly.   The fully convertible current and capital accounts raise the attractiveness of RMB denominated assets to long-term investors when the operation costs and risks of their international transactions are reduced while the liquidity of their portfolio is increased.

i) An internationally open and competitive financial market with a highly liquid asset market will substantially reduce the liquidity constraints to entrepreneurs, particularly the small and medium enterprises.   More foreign banks are interested and allowed to establish in China which can readily access the global capital markets.   With a stable financial environment, they will be more aggressive in their lending.   Local borrowers can go beyond domestic banks and raise funds overseas. Domestic and international savings can also be channeled effectively to productive ventures.   The free flow of outward investment provides more diverse investment opportunities to domestic savers and raises the return of their savings.

ii) The system can shield the domestic economy from external shocks. ADS eliminates the incentive and possibility of international investors to make speculative attacks by lining up to take the same position that will create self-fulfilling booms and busts.   With the reduced financial risk, the optimal level of reserves for precautionary purpose against unexpected outflow of capital is lowered.   This can reduce the risk of potential capital loss and the management costs for the huge reserves. The quota revenue can be used to solve the nonperforming policy loans in the banking system and to improve the financial infrastructure for reducing information and transaction costs in the sector.

iii) The stable asset price will foster collateral-based private lending. This further raises the liquidity and hence the function and value of assets.   The increase in asset liquidity further lowers the risk and cost

of debt financing. With lower liquidity constraints, the associated opportunity inequality and hence income inequality will be alleviated. The stable asset price and increased liquidity facilitate long-term investment and therefore enhance the function of stock market to amass long-term capital for profitable investment.

iv) Historically, consumers' inability to borrow against assets and future income has been an important factor contributing to a high rate of household saving in China. The increase in liquidity country-wide reduces the people's needs to high precautionary saving. Furthermore, the quota revenue received by the government can also be used in areas such as poverty relief, health care, infrastructure, education, rural development and reducing counter-productive taxes. They raise happiness and consumption of the general public. Equality of well-being, social stability and opportunities can be enhanced.

v) The flexibility in the ADS allows the government to direct industrial policy to constrained sectors. The government can simply lower the price of asset dollar for investments in particular sector and industries instead of direct subsidy. Without bearing direct financial burden, this can raise the capital formation in desirable areas that generate substantial external benefits.

vi) Under the system, the financial sector is fully liberalized. The role of government is left with maintaining financial stability and the desired balances of current and capital accounts. The market allocates the scarce capital flow quota efficiently in the sense that the quota is allocated to the highest value users. All financial institutions, local or foreign, will have a level playing ground. The allocation and terms of international borrowing and lending are totally decided by the market. When the current and capital accounts adjust towards their equilibrium levels, the trade disputes and protectionist pressure from the trading partners will be eliminated.

vii) The widening and deepening of the financial markets will generate a booming financial sector. The increase in productivity will further

generate new business opportunities and employment. The current capital-intensive pattern of growth driven by the low interest environment will be diluted by the booming financial sector that are much more labor intensive with high quality employment opportunities. Moreover, the may be higher unemployment rate caused by the reduced net export under a free-float exchange rate can be alleviated or over-compensated by the direct and indirect effects of the vibrant financial and asset markets.

viii) Comparing to other policies adopted in some Latin American countries for regulating the composition and volatility of short-term capital inflows which include reserve requirements, a stamp tax on foreign credit and a minimum-stay requirement for foreign direct investment, the ADS is more precise, market-driven, transparent, less distorting and comprehensive in solving the problems.[4]

5. CONCLUSION

In view of the growing internal and external imbalances, it becomes obvious that the huge trade and capital account surpluses are increasingly undesirable to China as well as to the world. This is revealed in the economic dilemmas being experienced in China.   However, with the current state of art, the dilemmas will never be fully resolved.   In the present system, currency appreciation for resolving trade disputes might reduce net export, lowering aggregate demand and growth that will raise unemployment rate and non-performing loans in the banking system.   Socio-political stability is therefore jeopardized.   Stimulating consumption to reduce trade surplus without being able to reduce investment will result in inflation that raises real exchange rate, lower net export and further worsen the income inequality

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[4] In order to maintain international currency stability, Tobin (1978) suggests imposing a tax on all currency exchanges disregard the purpose of transactions.   This will raise the cost of trade and therefore reduce the gains from mutual beneficial international exchanges.   ADS does not reduce trade and affect mostly on disruptive speculative capital flows.

problems.   Raising interest rate for cooling down the economy will invite speculative fund inflow that drives up asset prices and inflation. Maintaining the status quo has resulted in tremendous internal and external imbalances while full-scale financial liberalization in current and capital accounts will almost certainly end up in economic instability and financial crisis.

The crux of the deadlock arises from insufficient macroeconomic control tools.   Under the standard Mundell-Fleming model, the interest rate determines domestic equilibrium and the flow of international funds at the same time.   The interest rate that is desirable for maintaining domestic balance might not be desirable for capital flows and vice versa.   We therefore introduce a price for capital flow to balance the flow of international investment funds.   The function of asset premium is similar to the exchange rate in the trade market and the interest rate in the money market.   They balance the respective market but do not affect the relative price of domestic goods directly.   The asset dollar equates capital inflow and outflow without distorting domestic credit market and asset price.   We have constructed an extended Mundell-Fleming model to illustrate the mechanism under the ADS which is reported in the Appendix.[5]   The system will permit China to solve most of its economic dilemmas.   Without the system, even China desires to further integrate with the global economy including the adoption of full capital account convertibility, it will be a very long road in view of the potential risks and damages exemplified by the extensively documented financial crises experienced in the emerging economies.

Our innovation in this paper is instituting a market for capital inflow and outflow so that the capital flow, money and trade markets have their own price.   With the ADS, the government is empowered with additional tool that can regulate the capital account independently while the exchange rate is left solely for balancing the current account.   The ADS destroys the cycle of credit expansion and asset market bubbles pumped up by huge foreign capital

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[5] For more detail elaborations, please refer to Mo (2009).

inflows.   Without the bubbles, exchange rate volatility and financial crises are unlikely and the drastic outflow of capital along with its destructions to the real sectors can be avoided.

To summarize, the ADS can achieve the following outcomes within years:

i) a liberalized, stable and balanced capital account.

ii) a market-driven flexible exchange rate system, fully convertible domestic currency and a balanced current account.

iii) independent monetary and fiscal policies targeting at the internal economic problems.

iv) a persistent and substantial stream of fiscal revenue generated from the auction of capital flow quota that incentivizes the government to rasie the efficiency of the capital and asset markets.

v) a liquid domestic capital and asset markets expand opportunity set and source of credit to the public.   The benefits of having an efficient, internationalized financial and asset sectors are open to the economy.

The ADS is therefore not only an effective financial device for macroeconomic and financial stability, it is also a critical institutional innovation that will generate substantial improvements in economic structure and long-term performance to the economy.

APPENDIX

A1. The Role and Mechanism of Asset Dollar in the Macroeconomy

We have four markets in the economy under the system: the domestic money and goods markets, the international trade and the international capital flow markets.   The model follows the tradition of the IS-LM and later the Mundell-Fleming constructions to illustrate the interactions among the markets, the factors driving the key macro-variables and the transmission

mechanisms of the monetary and fiscal policies for regulating the markets.

A1.1. The Balance of Current Account

$$\text{Net Export}(NX) = \text{Export} - \text{Import} = NX_0 - \varepsilon_1 e - \varepsilon_2 Y + \varepsilon_3 Y_f,$$

where NX_0 is the autonomous net export; $e(\$_f / \$_d)$ is the relative price of domestic dollar $(\$_d)$ in terms of foreign dollar $(\$_f)$; the higher the e, the higher the price of $\$_d$; Y and Y_f are the domestic and foreign real income respectively; ε_1, ε_2, and ε_3 are constants with values greater than zero.

Imposing a balanced current account, $NX = 0$, we have:

$$\varepsilon_1 e + \varepsilon_2 Y = NX_0 + \varepsilon_3 Y_f = NX_n. \tag{A1}$$

A1.2. The Balance of Capital Account

$$\text{Net Capital Inflow}(NA) = \text{Inflow} - \text{Outflow} = NA_0 - \eta_1 a + \eta_2 r - \phi e,$$

where NA_0 is the exogenous net capital inflow that can be affected by foreign interest rate, expected change in exchange rate and political, socio-economic factors; r is the domestic interest rate; 'a' is the market-driven price of capital inflow or outflow as above-mentioned, with $-\infty < a < \infty$; the parameters are greater than zero.[6]

The lower the price of capital inflow 'a', the higher will be the net capital inflow; the higher the price of domestic currency 'e' will cause higher/lower capital outflow/inflow and therefore lowers the net capital inflow; higher

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[6] Having extreme values of 'a' is highly unlikely when the market-driven capital inflow or outflow premium is expected by the agents. In contrary to the situation when the price of capital flow is absent, international asset traders will smooth their inflow or outflow to a country in order to pay lower premiums for their transactions. Moreover, the system raises the costs of frequent asset trading. Speculative capital flows are reduced while long-term investments are encouraged. Please refer to footnote 2 also.

domestic interest attracts/reduces capital inflow/outflow.

With $NA = 0,$ we have:

$$-\eta_2 r + \eta_1 a + \phi e = NA_0. \tag{A2}$$

In equation (A2), the price of capital inflow/outflow, 'a', adjusts to maintain a balanced capital account while e and r respectively serve to balance the current account and to attain desirable internal balance.[7]

A1.3. The Money Market Equilibrium

Demand for money $= M_d = -\beta_1 r + \beta_2 Y,$ with $\beta_1, \beta_2 > 0.$

Money supply $= M_s = MS_0,$ is exogenous and controlled by government. In equilibrium, $M_s = M_d$ implies:

$$-\beta_1 r + \beta_2 Y = MS_0. \tag{A3}$$

A1.4. The Goods Market Equilibrium

Consumption function: $C = C_0 + \rho Y,\ 0 < \rho < 1$ is the marginal propensity to consume.

Investment Function: $I = I_d + I_f = I_0 - \delta_1 r - \delta_2 a,$

Net Export: $NX = NX_0 - \varepsilon_1 e - \varepsilon_2 Y + \varepsilon_3 Y_f,$

Aggregate Expenditure: $AE = C + I + G + NX,$

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[7] Imposing a balanced capital account is for simplicity. Sometimes a country might want to have capital account surplus or deficit. It is equivalent to impose *NA* equal to a constant instead of zero and solve for the solutions in the system. Moreover, under the system, governments are free to introduce desirable industrial policy such as treating foreign direct investment with more favorable terms than those pure asset trading.

where AE is the aggregate expenditure on domestic goods, C, I, and G are consumption, investment and government purchase; I_d and I_f are the domestic and foreign investment respectively; the parameters are greater than zero.

In equilibrium, $Y = AE$, we have:

$$\varepsilon_n Y + \delta_1 r + \delta_2 a + \varepsilon_1 e = AE_0, \text{ with } \varepsilon_n = (1 - \rho + \varepsilon_2), \tag{A4}$$

where $AE_0 = C_0 + I_0 + G + NX_0 + \varepsilon_3 Y_f$.

Solving equation (A1) to equation (A4), we have:

$$Y^* = \frac{-\beta_1 \delta_2 \varepsilon_1 NA_0 + \varepsilon_1 (\delta_1 \eta_1 + \delta_2 \eta_2) MS_0}{|A|}$$
$$+ \frac{\beta_1 (\varphi \delta_2 - \varepsilon_1 \eta_1) NX_n + \varepsilon_1 \beta_1 \eta_1 AE_0}{|A|}, \tag{A5}$$

$$r^* = \frac{-\beta_2 \delta_2 \varepsilon_1 NA_0 - [\varepsilon_1 \eta_1 (1 - \rho) + \varphi \delta_2 \varepsilon_2] MS_0}{|A|}$$
$$+ \frac{\beta_2 (\varphi \delta_2 - \varepsilon_1 \eta_1) NX_n + \beta_2 \varepsilon_1 \eta_1 AE_0}{|A|}, \tag{A6}$$

$$e^* = \frac{\beta_1 \delta_2 \varepsilon_2 NA_0 - (\delta_1 \varepsilon_2 \eta_1 + \delta_2 \varepsilon_2 \eta_2) MS_0}{|A|}$$
$$+ \frac{(\beta_2 \delta_1 \eta_1 + \beta_2 \delta_2 \eta_2 + \beta_1 \eta_1 \varepsilon_n) NX_n - \beta_1 \varepsilon_2 \eta_1 AE_0}{|A|}, \tag{A7}$$

$$a^* = \frac{[\beta_2 \delta_1 \varepsilon_1 + \beta_1 \varepsilon_1 (\varepsilon_n - \varepsilon_2)] NA_0 + [\delta_1 \varphi \varepsilon_2 + \varepsilon_1 \eta_2 (-1 + \rho)] MS_0}{|A|}$$
$$- \frac{(\beta_2 \delta_1 \varphi + \beta_2 \varepsilon_1 \eta_2 + \beta_1 \varphi \varepsilon_n) NX_n + (\beta_1 \varphi \varepsilon_2 + \beta_2 \varepsilon_1 \eta_2) AE_0}{|A|}, \tag{A8}$$

where, $|A| = \beta_1 \varphi \delta_2 \varepsilon_2 + \beta_2 \delta_1 \varepsilon_1 \eta_1 + \beta_1 \varepsilon_1 \eta_1 (\varepsilon_n - \varepsilon_2) + \beta_2 \delta_2 \varepsilon_1 \eta_2 > 0.$

The solution set (Y^*, r^*, e^*, a^*) is compatible with the equilibriums set in the model. Similar to the role of interest rate in equating the money demand to the money supply that is controlled by the authority, the equilibrium asset premium that is driven by the domestic and international conditions serves to equate the capital inflow and outflow for preventing the potentially disruptive capital flows and the associated financial and economic instabilities.[9]

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[9] For maintaining internal balance such that Y equals to the non-inflationary output level, Y_N, a government can pick a combination of fiscal and monetary policy, that is, MS_0 and AE_0, and therefore r^* while leaving the trade and capital flow markets adjusting automatically to their equilibriums with their respective prices.

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