

Impossible Trinity, Capital Flow Market and Financial Stability

Mo Pak-Hung*

“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.

I. INTRODUCTION

As observed by Calvo (2002), the world financial market is wrought with systemic hazards that are largely independent to the individual countries affected. Systemic problem requires systemic instrument. Based on the Mundell-Fleming model, we institute a capital flow market into an economy. After the additional market is introduced, countries can enjoy the benefits from opening their foreign exchange and capital markets but at the same time, be free from exchange rate volatility and financial crises as well as retain full autonomy in monetary and fiscal policies for maintaining internal balances. The ‘globalization hazard’ is resolved.

The Mundell-Fleming model suggests that an economy cannot simultaneously maintain exchange rate stability, free capital movement, and an independent monetary policy. This principle is frequently called the ‘Impossible Trinity’ or the Trilemma. The best possible option to an economy is choosing two out of the three. It can allow free capital movement and retain monetary autonomy, but at the cost of exchange rate volatility as the case in Canada; it can fix its exchange rate and retain monetary autonomy, but only when effective control on capital flows can be maintained as the case in China; an economy can fix its exchange rate with free capital movement at the expense of monetary autonomy as the case in Hong Kong. The model has become the

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workhorse for analyzing fundamental problems in international finance and the foundation for making related public decisions.

In recent decades, the validity of the Impossible Trinity has been repeatedly verified. The forces of globalization have made capital controls among countries increasingly porous due to the enormous increase of trade in goods and services. Some countries intentionally open up their capital account in order to tap the potentially benefits brought to their economies. In many cases, they also desire to maintain exchange rate stability by adopting a fixed exchange rate regime. The phenomenon is common in developing and emerging economies. When the economies are small and open with immature and thin financial sector, exchange rate stability is particularly valuable to their international transactions. However, in the long-run, the choice is incompatible as predicted in the Mundell-Fleming model. The economies making such choice experience periodical booms and busts in their asset and financial markets. They result in the extensively documented financial and currency crises as in the Latin American and Asian countries that cause widespread pains and destructions.¹ The experiences have made many developing economies extremely cautious in opening their currency and asset markets that becomes a formidable obstacle for further global integration and advancements. The global nature of the phenomenon suggests that the hazard is systemic and requires institutional solution. Achieving compatibility between financial/economic stability and capital mobility can remove the deadlock towards global integration that will be beneficial to both capital abundant and capital scarce economies.

We introduce the extended Mundell-Fleming model that includes a capital flow market in the next section. Section three discusses the potential effects of instituting the capital flow market and concludes.

II. THE MODEL

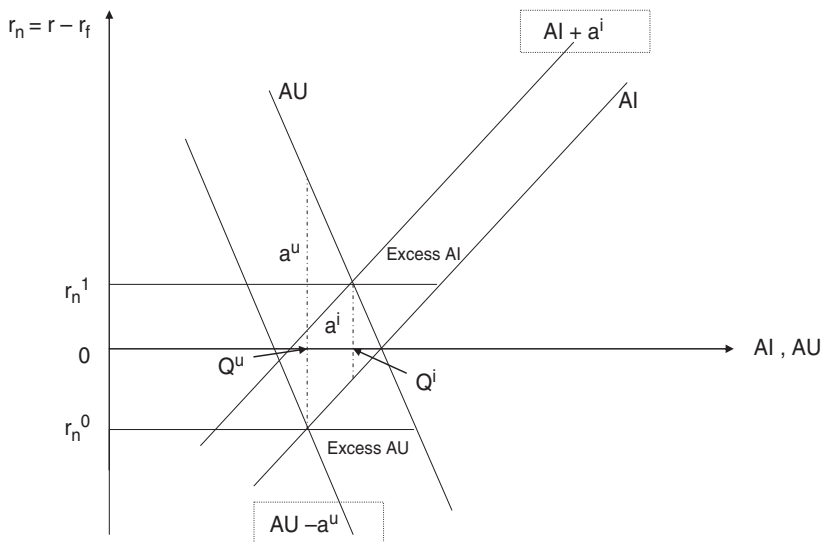
The IS-LM model captures the key interactions among the money and goods markets. Robert Mundell and Marcus Fleming extend the IS-LM model by incorporating international trade and capital flow factors into the model. The major conclusions of the model are based on comparative static analysis of the open-economy IS-LM model, augmented with a relation between capital flows and the domestic interest rate. (Mundell, 1963, 2002) In the case of a small open economy, interest rate is fixed and balance of payments can only be achieved by

¹The transmission process and observations about capital flows, asset price, liquidity and financial volatility are discussed in detail in Adria and Shin (2008). Some representative thinkings about related issues on financial liberalization can be referred to Eichengreen, Hausmann and Panizza (2002), Tornell and Westermann (2005), among many others.

a change in exchange rate that is driven by the conditions in the trade as well as the capital flow sectors. However, the interest rate and/or the exchange rate that is desirable for internal balances might not coincide with its trade and capital flow effects and vice versa. In order to open the currency and asset markets while at the same time sheltered from financial crises, we construct a capital flow market by instituting a price for capital flow and an ‘asset dollar mechanism’ as a gate to regulate the size of capital inflow or outflow within a period. Similar to the price in every market, this market-driven price will regulate the allocation of capital inflow or outflow to the highest value users and automatically equate the amount of capital inflow and outflow. As illustrated in Figure 1, when capital inflow is larger than outflow as at r_n^1 , the government sets a quota on the size of capital inflow that equals to the amount of expected uncontrolled outflow Q^i . The inflow quota is auctioned to qualified institutions to serve as the market-makers and wholesalers of the quota that is called asset dollar. The market price of the quota is called asset premium which is denoted by ‘a’. ‘a’ can be positive or negative. Negative ‘a’ represents charging a price on the capital outflow when the outflow is larger than the

Figure 1

Capital Flow Market and Asset Premium: Excess Inflow and outflow



AI/AU : amount of capital inflow/outflow; Q^u / Q^i : outflow/inflow quota;
 a^u/a^i : outflow/inflow premium; r/r_f : return rate of domestic/foreign assets

inflow such as the situation at r_n^0 in Figure 1. The introduction of the asset premium that serves as the price entering the international asset trading market can achieve a balanced capital account.²

Under a flexible exchange rate regime, exchange rate fluctuation is mostly driven by international speculative flows that tend to be very volatile and destabilizing to the asset and financial markets. When capital flows are stabilized under the asset dollar system, a flexible exchange rate regime can be adopted that will automatically balance the trade account. After the capital flows are regulated by its own price, exchange rate will be purely driven by trading transactions that normally evolve steadily over time. Even under a flexible exchange rate regime, the volatility of exchange rate and the associated costs and risks to international transactions will be substantially reduced. When the balances of the capital and trade accounts are regulated by their respective prices, a country is free to adopt monetary and fiscal policies to attain its internal balance.

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.

i. The Balance of Current Account

$$\text{Net Export (NX)} = \text{export} - \text{import} = \text{NX}_0 - \varepsilon_1 e - \varepsilon_2 Y + \varepsilon_3 Y_f,$$

where NX_0 is the autonomous net export; e ($\$/\$_d$) 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, $\text{NX} = 0$, we have:

$$\varepsilon_1 e + \varepsilon_2 Y = \text{NX}_0 + \varepsilon_3 Y_f = \text{NX}_n \quad (\text{E1})$$

²One may note that imposing a floating asset premium equals to the market price 'a' has the same effect of the quota auction system. However, setting the premium equal to the market-clearing 'a' which constantly fluctuates with the information about domestic and international environments is almost impossible without the quota market. The quota auction system can be interpreted as a tool for generating information on the market value of the quota in the capital flow market. As illustrated in Figure 1, when there is an excess demand for capital inflow given the desired domestic interest rate for internal balance, we raise the opportunity cost of capital inflow by imposing an inflow premium, a^1 ; when there is an excess demand for capital outflow, we reduce the benefit of capital outflow by imposing an outflow premium a^2 . The AI and AU curves and hence the asset premium constantly adjust according to the market conditions.

ii. The Balance of Capital Account

$$\text{Net Capital Inflow (NA)} = \text{inflow} - \text{outflow} = \text{NA}_0 - \eta_1 a + \eta_2 r - \phi e,$$

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.³

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 domestic interest attracts/reduces capital inflow/outflow.

With $\text{NA} = 0$, we have:

$$-\eta_2 r + \eta_1 a + \phi e = \text{NA}_0 \quad (\text{E2})$$

In E2, 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.⁴

iii. The Money Market Equilibrium

$$\text{Demand for money} = M_d = -\beta_1 r + \beta_2 Y,$$

$$\text{with } \beta_1, \beta_2 > 0.$$

Money supply = $M_s = \text{MS}_0$, is exogenous and controlled by government.

In equilibrium, $M_s = M_d$ implies:

$$-\beta_1 r + \beta_2 Y = \text{MS}_0. \quad (\text{E3})$$

iv. The Goods Market Equilibrium

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

³Having 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.

⁴Imposing 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.

$$\text{Investment function : } I = I_d + I_f = I_0 - \delta_1 r - \delta_2 a,$$

$$\text{Net export : } NX = NX_0 - \varepsilon_1 e - \varepsilon_2 Y + \varepsilon_3 Y_f,$$

$$\text{Aggregate expenditure : } AE = C + I + G + NX,$$

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:

$$\varepsilon_n Y + \delta_1 r + \delta_2 a + \varepsilon_1 e = AE_0, \text{ with } \varepsilon_n = (1 - \rho + \varepsilon_2) \quad (\text{E4})$$

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

Solving E1 to E4, we have:

$$Y^* = \frac{-\beta_1 \delta_2 \varepsilon_1 NA_0 + \varepsilon_1 (\delta_1 \eta_1 + \delta_2 \eta_2) MS_0 + \beta_1 (\phi \delta_2 - \varepsilon_1 \eta_1) NX_n + \varepsilon_1 \beta_1 \eta_1 AE_0}{|A|} \quad (\text{E5})$$

$$r^* = \frac{-\beta_2 \delta_2 \varepsilon_1 NA_0 - [\varepsilon_1 \eta_1 (1 - \rho) + \phi \delta_2 \varepsilon_2] MS_0 + \beta_2 (\phi \delta_2 - \varepsilon_1 \eta_1) NX_n + \beta_2 \varepsilon_1 \eta_1 AE_0}{|A|} \quad (\text{E6})$$

$$e^* = \frac{\beta_1 \delta_2 \varepsilon_2 NA_0 - (\delta_1 \varepsilon_2 \eta_1 + \delta_2 \varepsilon_2 \eta_2) MS_0 + (\beta_2 \delta_1 \eta_1 + \beta_2 \delta_2 \eta_2 + \beta_1 \eta_1 \varepsilon_n) NX_n - \beta_1 \varepsilon_2 \eta_1 AE_0}{|A|} \quad (\text{E7})$$

$$a^* = \frac{[\beta_2 \delta_1 \varepsilon_1 + \beta_1 \varepsilon_1 (\varepsilon_n - \varepsilon_2)] NA_0 + [\delta_1 \phi \varepsilon_2 + \varepsilon_1 \eta_2 (-1 + \rho)] MS_0 - (\beta_2 \delta_1 \phi + \beta_2 \varepsilon_1 \eta_2 + \beta_1 \phi \varepsilon_n) NX_n + (\beta_1 \phi \varepsilon_2 + \beta_2 \varepsilon_1 \eta_2) AE_0}{|A|} \quad (\text{E8})$$

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

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.⁵

III. CONCLUSION

The innovation in this paper is the introduction of a mechanism and the related market price into the capital flow market. In this system, the market-driven asset premium 'a' adjusts automatically to equilibrate the capital flows in response to the changes in related market conditions. The fully flexible exchange rate adjusts to clear the trade market and monetary policy can be sheltered from international capital flows and be able to attain desirable internal stability through the interest rate channel. Now, each key market in the economy has a variable that can exert direct influence on the desirable situation. An economy can enjoy the benefits from opening the international capital flows, currency and asset markets while at the same time maintaining internal economic stability. Although the details on implementation may need to be further investigated, the theoretical possibility and the adjustment mechanism are provided in our model.⁶ This extended Mundell-Fleming model suggests that after instituting the capital flow market, an economy, large or small, developing or developed, will be able to:

- i. have a fully flexible exchange rate regime and the balance of trade is rapidly and automatically attained. The exchange rate tends to be very stable as it is predominantly driven by trade conditions only.
- ii. enjoy the benefits of capital mobility as well as a stable and balanced capital account while at the same time, having independent monetary and fiscal policies for attaining internal goals.
- iii. prevent erratic international capital flows that disturb the domestic credit and asset markets. Periodical booms and busts with financial and currency crises will be eliminated.

⁵For 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.

⁶In implementation, the system is equivalent to imposing a floating transaction tax equal to 'a' on asset trading. When capital inflow is larger than the outflow, buyers of assets have to pay a premium equal to the market price of the capital inflow quota. This will lower the return of assets in par with the international market. When outflow is larger than inflow, asset sellers have to pay a 'premium' equals to the market price of the capital outflow quota that will reduce the benefits of the outflow. The value of 'a' is market-driven and automatically generated by the quota trading market. The management cost is low and the outcome is precise. Effectively, the exchange rate, domestic asset price and credit fluctuations driven by international capital flow are replaced by the fluctuation in the asset premium, the price of participating in international capital flow and asset trading.

At present, there are enough evidences that all developing and emerging economies are susceptible to the damages caused by the massive and erratic international speculative capital flows. The asset dollar system eliminates the risks of opening the capital flow and currency markets that are two formidable obstacles toward global economic integration. Induced by the direct fiscal revenue generated from the higher asset premium and active asset trading, governments will improve the domestic investment environments and the efficiency of the asset markets. Moreover, the additional fiscal revenue can be used to replace some counter-productive taxes that can further facilitate improvements in economic well-being. Under the system, global economic integration and socio-economic advancements will surge when all governments attempt to capture the potential benefits of opening up their currency, capital flow and asset markets.

REFERENCES

- Adria, T. and H.S. Shin (2008). Liquidity, Monetary Policy, and Financial Cycles, *Current Issues in Economics and Finance*. 14(1).
- Calvo, G.A. (2002). Globalization Hazard and Delayed Reform in Emerging Markets, *Economía*. 2(2): 1–29.
- Eichengreen, B., R. Hausmann and U. Panizza (2002). “Original Sin: The Pain, the Mystery, and the Road to Redemption,” Paper prepared for the conference “Currency and Maturity Matchmaking: Redeeming Debt from Original Sin,” Inter-American Development Bank, Washington, D.C., 21–22 November 2002.
- Mundell, R.A. (2002). Notes on the Development of the International Macroeconomic Model, in *The Open Economy Macromodel: Past, Present, and Future*. ed. by Arie Arnon and Warren Young, Boston: Kluwer Academic Publishers: 1–16.
- Mundell, R.A. (1963). Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rates, *Canadian Journal of Economics and Political Science*. 29: 475–85.
- Tornell, A. and F. Westermann (2005). *Boom-Bust Cycles and Financial Liberalization*. Cambridge, MA: MIT Press.

SUMMARY

As observed by Calvo (2002), the world financial market is wrought with systemic hazards that are largely independent to the individual countries affected. Systemic problem requires systemic instrument. Based on the Mundell-Fleming model, we institute a capital flow market into an economy. After the additional market is introduced, countries can enjoy the benefits from opening their foreign exchange and capital markets but at the same time, be free from exchange rate volatility and financial crises as well as retain full autonomy in monetary and fiscal policies for maintaining internal balances. The ‘globalization hazard’ is resolved.

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