Comments on Michael Devereux and James Yetman's paper

Ippei Fujiwara[1]

Introduction

How should central banks respond to exchange rates? This is one of the oldest questions in open economy macroeconomics, but still applies today. Although there are many cases of exchange rate controls in reality, traditional prescriptions tend to be against exchange rate stability. The seminal research by Friedman (1953) recommends exchange rate flexibility. Aoki (2001) theoretically proves this claim in a micro-founded monetary DSGE model. There is no welfare cost from fluctuations in inflation rates in flexible price sectors. On the other hand, those in sticky price sectors lead to price dispersions and therefore create welfare costs. Welfare costs from unstabilized inflation rates become larger when prices become stickier. Hence, central banks should aim to stabilize inflation rates in sticky price sectors. Since exchange rates are thought to be flexible, there is no need to stabilize exchange rates.

Devereux and Yetman (2014a) tackle this problem using a standard open economy DSGE model with imperfect pass-through as analyzed in Devereux and Engel (2003). With imperfect pass-through, the terms of trade improve with monetary expansion. In an extreme case of no exchange rate pass-through on impact, when evaluated by the domestic currency unit, exchange rate depreciation does not change import prices, but increases export prices. As a result, the terms of trade improve. Thus, expansionary monetary policy has beggar-thy-neighbour effects. With home bias in preferences, the role of which will be explained later, the central bank in each country has an incentive to manipulate exchange rates in favour of its own country.

Based on such a model, Devereux and Yetman (2014a) discuss whether exchange rate control can be still an effective tool even with changing economic as well as financial conditions in Asian economies. This is the main aim of the paper, which makes it very exciting and intellectually stimulating. In particular, Devereux and Yetman (2014a) show three dynamic characteristics in Asian economies and financial markets. They are: (1) the degree of exchange rate pass-through on imported goods has fallen; (2) financial markets are now more integrated globally; and (3) goods markets have become more integrated. Based on these observations, Devereux and Yetman (2014a) conclude that "the role of exchange rate movements in the optimal setting of monetary policy is decreasing in Asia."

This paper aims to give answers to the most important question in open economy monetary economics, with a very rigorous choice-theoretic model which is based on empirical facts. In addition, albeit technical, the idea of expressing the international financial markets as the convex combination of complete markets and

[1] Australian National University.

autarky is truly an ingenious one. Thus, I am sure that the paper will be a seminal study for discussing the pros and cons of exchange rate control.

Below, let me first discuss the relationship between monetary policy and exchange rate control. Secondly, I will discuss how three characteristics in Asian economies and financial markets are expressed in the model. Thirdly, I will try to give some intuition for the main result. Finally, I will comment on several issues, mainly about theoretical interpretation of empirical facts in Asian economies and financial markets.

Monetary policy and exchange rate control

According to standard macroeconomic theory, monetary policy is considered as the policy to control nominal (real when prices are sticky) aggregate spending through changes in nominal variables, such as money supply and nominal interest rates

$$\mu = PC,$$

where μ denotes the monetary policy stance. PC is nominal aggregate demand, that is, aggregate consumption C multiplied by aggregate price P. You may think of μ as money supply M. Then,

$$\mu = M = \frac{1}{V}PC.$$

Money supply together with constant velocity V can represent μ that constrains aggregate demand. μ can be also considered short-term nominal interest rates as consistent with current practice in many central banks. The intertemporal optimality condition, namely the consumption Euler equation

$$u'\left(C_t\right) = \beta \mathbb{E}_t \frac{1+i_t}{1+\pi_{t+1}} u'\left(C_{t+1}\right),$$

can be transformed into

$$\mu = 1 + i_t = \frac{1}{\beta} \frac{\mathbb{E}_t P_{t+1} C_{t+1}}{P_t C_t},$$

when preference is log-utility. Thus, short-term nominal interest rates control the growth rate of aggregate spending or the level of aggregate spending given expectations. In particular, when prices are sticky, changes in nominal variables will have real consequences.

In a country where most consumption goods are imported, nominal exchange rates can control aggregate spending. Let me consider an extreme situation, where all those produced are exported and all consumed are imported. Then, the resource constraint in this economy is given by

$$P_M C = P_X Q,$$

where P_M, P_X and Q denote import price, export price and output, respectively.

This can be re-written as

$$C = ToTQ = \frac{P_X}{P_M} Q_t = \frac{P_X}{SP_M^*} Q_t$$

.

ToT_t denotes the terms of trade. Also, I assume the law of one price or perfect pass-through for imported goods:

$$P_M = SP_M^*$$

where S is nominal exchange rates and P_M^* is import price in the foreign currency unit. Given output, changes in nominal exchange rates can control real aggregate spending when prices are sticky. Therefore, in an open economy exchange rate control can be a good option for central banks to control aggregate spending.

Central banks need to control aggregate spending to eliminate distortions. Suppose a positive technology shock hits the economy. This will reduce the marginal cost. When all prices are flexible, prices decrease and therefore demand and output increase. On the other hand, when prices are sticky, prices do not change and output is also sticky. As a result, labour demand decreases. In the latter case, due to the distortion stemming from price stickiness, the output is suboptimally low and the price and the markup are suboptimally high. Hence, an increase in aggregate demand through accommodative monetary policy can lead to higher welfare.

Welfare becomes higher by eliminating unnecessary fluctuations in consumption, namely by consumption smoothing. In the open economy considered in Devereux and Yetman (2014a), there are two distortions to prevent consumption smoothing. They are: (a) markup fluctuations across time and states; and (b) incomplete international financial markets.

Regarding the former, there are also two types of distortions. One is staggered price setting, which creates price dispersions. The implication is that the central bank should achieve price stability in order to eliminate the fluctuations in marginal costs. The other is imperfect pass-through, which creates international price dispersions. Devereux and Engel (2003) show the possible gains from exchange rate stability. By fixing exchange rates, we can avoid international price dispersion arising from this second distortion. Both distortions result in markup fluctuations. Households buy too much of the cheaper goods when the markup is low. Therefore, it is better to stabilize the markup or marginal costs as the inverse of the markup. This prescription of markup stabilization is based on the classic idea from Lerner (1934) that "If the social degree of monopoly is the same for all final products there is no monopolistic alteration from the optimum at all."

Regarding welfare costs from financial market incompleteness, let me explain this using a simple example. Suppose two agents receive income exogenously of 100 on average. The sum of their income is 200, but it can be distributed as 80–120 or 190–10. The optimal contract is to commit to receive 100. Anything more or less than 100 is transferred. This is the allocation under the complete market. If the market is incomplete, neither country can smooth consumption since income is subject to idiosyncratic fluctuations. This will create unnecessary fluctuations in consumption and therefore result in welfare costs.

Monetary policy as aggregate spending control should be utilized in order to reduce welfare costs stemming from these two distortions.

Model and empirical facts

As stated in the introduction, Devereux and Yetman (2014a) show three developments in Asian economies and financial markets: (1) the degree of exchange rate pass-through on imported goods has fallen; (2) financial markets are now more integrated globally; and (3) goods markets have become more integrated.

(1) is expressed by $\delta \to 0$ in

$$P_{F,t} = \left(1-\delta\right) S_t P^*_{F,t} + \delta \arg\max_{P_{F,t}} \mathbb{E}_t \sum_{t=0}^{\infty} m^*_{t,t+1} \omega^t \pi \left(\frac{P_{F,t}}{S_t} C_{F,t} - MC^*_t C_{F,t} \right),$$

where $\pi\left(\cdot\right)$ is the periodic profit function. ω is the Calvo parameter. With probability $1-\omega$, firms can change export prices. $P_{F,t}$, $P^*_{F,t}$, $m^*_{t,t+1}$, $C_{F,t}$, and MC^*_t denote the price of imported goods in the domestic currency unit, the price of imported goods in the foreign currency unit, the stochastic discount factor in the foreign country, demand for imported goods and marginal costs in the foreign currency unit, respectively. When $\delta = 0$, this equation implies perfect pass-through or producer currency pricing. On the other hand, when $\delta = 0$, each firm aims to set prices directly in the foreign currency unit while taking possible future exchange rate fluctuations into account. Under this local currency pricing, exchange rate fluctuations will not be fully reflected in import prices.

(2) is expressed by $\lambda \to 1$

$$\left[\frac{P_t u'\left(C_t\right)}{S_t P^*_t u'\left(C^*_t\right)} \right]^{\lambda} \left(\frac{\bar{P}_t Y_t - \Delta\left(FR_t\right)}{P_t C_t} \right)^{1-\lambda} = 1 \quad . \tag{1}$$

where $\bar{P}_t$ is the average price under financial autarky but only financial transactions through foreign reserves FR_t are allowed. This is an ingenious idea also used in the accompanying paper, Devereux and Yetman (2014b). Usually, so far, open economy macroeconomists tend to discuss the cases with complete and incomplete markets separately. By having this convex combination between complete and incomplete financial markets, we can express the realistic open economy between these two polar cases. When $\lambda = 1$, the above equation collapses to

$$u'\left(C_t\right) = \frac{S_t P^*_t}{P_t} u'\left(C^*_t\right) \quad . \tag{2}$$

This is the complete market condition. In particular, when purchasing power parity,

$$P_t = S_t P^*_t \ ,$$

holds, this condition implies that consumption must be equated between the two countries. On the other hand, when $\lambda = 0$,

$$\bar{P}_t Y_t - P_t C_t = \Delta FR_t \ .$$

Since private holdings of foreign assets are prohibited, net exports, namely production minus spending, must be equal to the difference of foreign reserves.

(3) is expressed by $\upsilon \to 1$ in

$$C_t = \left(\frac{C_{H,t}}{\upsilon/2}\right)^{\frac{\upsilon}{2}} \left(\frac{C_{F,t}}{1-\upsilon/2}\right)^{1-\frac{\upsilon}{2}}.$$

Devereux and Yetman (2014a) assume two countries with equal size. So, υ implies that there is no home bias.

Intuition of main results

The main conclusion in Devereux and Yetman (2014a) is that because (1) the degree of exchange rate pass-through on imported goods has fallen, (2) financial markets are now more integrated globally, and (3) goods markets have become more integrated, "the role of exchange rate movements in the optimal setting of monetary policy is decreasing in Asia". Let me try to explain the intuition as to why (1) to (3) will lessen the effectiveness of exchange rate controls.

Regarding (1), in an extreme case when $\delta = 1$, there is almost no exchange rate pass-through on imported goods.

$$C = \frac{P_X}{P_M} Q \neq \frac{P_x}{SP_M^*} Q.$$

So, nominal exchange rates cannot control real aggregate spending anymore.

Regarding (2), when $\lambda \neq 1$, central banks have an incentive to achieve higher welfare by controlling foreign reserves in equation (1) so that the allocations become closer to equation (2). Yet, when $\lambda = 1$, namely under full financial market integration or complete financial markets, without any action, the optimal allocations in equation (2) are already achieved. So, there is no need to use foreign exchange rate intervention (foreign reserves) to achieve better allocations.

Regarding (3), as shown by Devereux and Engel (2003), if there is no home bias $(\upsilon = 1)$ and prices are flexible, $C_t = C_t^*$. This is the allocation which both central banks in two countries aim to achieve under sticky price equilibrium. CPI (inflation) stabilization in both countries can achieve nominal as well as exchange rate stabilization. As equation (2) implies, this results in the optimal allocation $C_t = C_t^*$. On the other hand, when there is home bias $(\upsilon \neq 1)$, Duarte and Obstfeld (2008) show that such a prescription of fixing the nominal exchange rate through CPI stabilization is no longer optimal. Central banks have incentives to manipulate nominal as well as real exchange rates to attain optimal allocations under home bias.

Comments

This paper discusses the most important question in open economy monetary economics using a rigorous choice-theoretic model reflecting empirical facts observed in Asian economies and financial markets. Thus, I am sure that this model will be a benchmark for discussing the effectiveness of exchange rate control.

Below, I would like to make comments from four different angles: (1) the (new) role of foreign reserves; (2) empirical facts and model setting; (3) depreciation bias; and (4) incomplete markets.

Regarding foreign reserves, in the model, foreign reserves are used to mimic the allocations under a complete financial market. A question that comes to my mind is whether this is what is observed in Asian central banks in reality. Sterilized intervention is usually recognized as a tool to induce the signalling effect. So I would like to know how changes in foreign reserves alter nominal exchange rates in this model. Second, the model may miss an important role of foreign reserves. For example, Obstfeld, Shambaugh and Taylor (2010) show that a country with a higher level of foreign reserves experienced less currency depreciation. They point out a new role of foreign reserves as an insurance device. If this is true, a policy using foreign reserves should not be considered as monetary policy in controlling aggregate spending.

Regarding the second point, some empirical facts stated in this paper seem to be inconsistent with the model settings. In the paper, goods market integration in terms of increasing openness observed in the data is considered to imply less home bias. I am not quite sure about this relationship. Ability to trade or reduced trade barriers may have nothing to do with home bias. There should be the case where home bias remains even without frictions in trade. Also, financial market integration in terms of increasing cross-border financial transactions is considered to imply a situation closer to complete international financial markets. I am not quite sure whether this is true. If true, it seems that the global imbalance, which increases cross-border transactions, has contributed to equalizing consumption growth rates across different countries. Data will not support this view.

Regarding the third point, I wonder whether Asian central banks have really aimed to achieve exchange rate stability. Rather, they seem to have depreciation bias. Increases in foreign reserves hint at the existence of depreciation bias in addition to the need for insurance. In this context, Asian countries may have been interested in output rather than consumption maximization. This may reflect the existence of increasing returns to scale (or infant industry protection) or the need to speed up the technology catching-up with "learning by doing", as considered in Day and Fujiwara (2013).

Regarding the final point, what types of incomplete markets can equation (1) replicate?[2] For example, which λ can replicate the allocations in incomplete markets only with one period bond? I would like to know whether equation (1) can capture any form of incomplete international financial markets.

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[2] This is a comment pointed out by Prof. Richard Dennis at the conference.

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