Comment on: "Capital Controls and Monetary Policy Autonomy in a Small Open Economy" by J. Scott Davis and Ignacio Presno*

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1 Introduction

Before the Great Recession hit the world economy in 2008, the widespread consensus among policy makers and researchers that more open international capital markets were desirable. As a result, most countries in the world removed restrictions to inward and outward capital flows. The 2008 crisis has changed things quite dramatically, and the movement toward more open capital markets not only has stopped, but also has reversed, and, for the first time since the late 1970s, we are observing a prolonged reduction in world capital openness. Figure 1 shows these patterns by plotting the average, across all countries in the world, of the Chinn-Ito index (see Chinn and Ito, 2006) which measures de-jure restrictions to international capital flows. The 2008 crisis and the subsequent retrenchment in capital mobility has spurred a growth in work that reassesses why and how capital controls might be desirable. The paper by Davis and Presno (DP henceforth) belongs to this literature, and in particular focuses on whether and

*The views expressed herein are those of the author and not necessarily those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System.

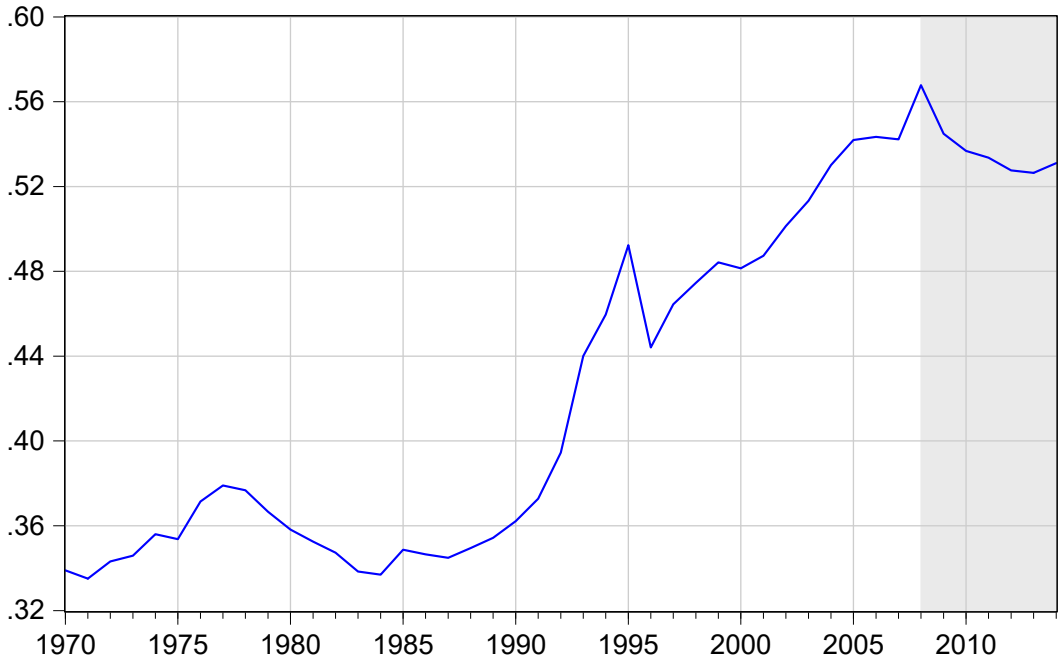

Figure 1: Chinn-Ito Index of International Financial Integration
Average for 182 counties, 1970-2014

how capital controls help monetary policy achieve its domestic objective in an economy facing shocks to foreign real rates. This comment will first briefly discuss the argument for capital controls and some of the recent literature on the issue, so to put DP in context. Then it will present a simple reduced form model to help the reader to better understand the argument of DP in favor of capital controls, and will discuss the role of exchange rates. Finally it will offer some concluding remarks.

2 Recent interest in case for capital controls

Capital controls are restrictions to the private flows of capital in and/or out of a country. In partial equilibrium (i.e., keeping prices constant, and in absence of externalities), they simply reduce the choice set of private agents, and as such they are undesirable. In general equilibrium (i.e., when prices change in response to policies) and/or in presence of externalities (pecuniary or not), several cases for capital controls can be made. In these situations, the decision of

domestic private agents to invest in foreign assets (or the decision of foreign agents to invest in domestic assets) has a social benefit that is different from the private benefit, and thus capital controls, that limit these investment decisions, might be socially desirable. In general, the case for capital controls is either based on the presence of an externality, or on the fact that the change in prices that results from restricting private capital flows is beneficial either to the country that imposes the controls, or even to the world as a whole. Notice that for the latter to be true, the economy must be in a suboptimal situation to start with, because of some fundamental friction. To make things a bit more concrete let us illustrate a few, among many, examples of the recent (post Great-Recession) literature that has brought capital controls back to the forefront of international macroeconomics. One basic case for capital controls is similar to that for an optimal tariff in the trade literature. It is based on the argument that capital controls, by reducing the quantity of capital supplied to the rest of the world, can induce a favorable movement of interest rates toward the country that impose them (see Costinot, Lorenzoni and Werning, 2014). Private agents, being atomistic, do not perceive they can affect prices, but governments understand that policies restrict aggregate quantities and thus affect prices. Note that in this case, capital controls are beneficial to the country that imposes them, but damaging to the partner; moreover, the case can be made only insofar as the domestic economy has enough market power to affect the real interest rate at which it can trade assets with the rest of the world. Heathcote and Perri (2016) instead make the case that capital controls, in an economy with limited risk sharing, can engineer movements in international prices that help improve international risk sharing, and as such, they can be desirable for the world as a whole. Again, these beneficial price movements are not taken into account by atomistic agents. Finally, Brunnermeier and Sannikov (2015) make a case that is most closely related to that made by DP, in that capital flows can alter the price of domestic assets which are used as collateral, and hence they can affect the degree of financial frictions in the economy. The work by DP starts from this insight, and then focuses on how capital control versus standard monetary policy can be optimally used to minimize the impact of financial frictions. The next section will present an extremely simplified version of the DP setup that should clarify to the reader the workings of their basic mechanism.

3 A reduced-form model

Consider a simple, static small open economy populated by a large number of identical households. Residents of the economy have a unitary endowment of a single good that they can invest in domestic (b) or foreign (b^*) bonds, so that their budget constraint reads

$$b + b^* = 1.$$

Foreign bonds yield a real return r^*, which is exogenously given, whereas domestic bonds yield a real return r, which is set by the policy authority. The authority also sets capital controls, which are modeled exactly as in DP, that is as a tax τ on total returns to foreign bonds. The proceeds from this tax are rebated in a lump-sum fashion to households, so that the tax has only the effect of distorting the choices of households from foreign to domestic bonds. The utility of the domestic households can be represented as follows:

$$U(b, b^*) = \frac{[(1+r)b]^\alpha}{\alpha} + \frac{[(1+r^*)(1-\tau)b^* + T^*]^\alpha}{\alpha} - \phi r^2 + \chi \log(B), \tag{1}$$

where $0 < \alpha < 1$ captures the curvature of utility, and $T^* = \tau B^*$ is the lump-sum transfer, which is equal to the aggregate investment in foreign bond B^* times the tax rate. A few remarks are in order here. Households get utility independently from the payouts of foreign and domestic bonds. This is assumed to guarantee an interior solution to the portfolio problem, when domestic and foreign rates are not equalized.[1] The term $-\phi r^2$ is introduced to model the standard trade-off of monetary policy. In this setup the policy authority can control the real rate r and, say, a higher real rate has two effects on the economy. The first, stemming from the fact that a higher r results in higher consumption for households that save, is beneficial. The second, stemming from the fact that higher interest rates lead to lower investment and lower consumption from households and firms that are borrowing, is damaging. Since in this simple economy these borrowers are not explicitly modeled, this effect is captured in a reduced form by the term $-\phi r^2$. The policy authority, absent other considerations, will pick the value for r that balances these two effects, and which represents the optimal monetary policy. The final term in equation (1) shows that the utility function is increasing in B, (i.e. the aggregate investment in the domestic bond). The term is akin to the externality introduced in DP. In DP lower investment in domestic capital leads to a fall in the price of capital, a tightening in the borrowing constraint of the entrepreneur, which leads to an inefficient allocation of resources

[1] A more elegant, but more complicated, way to achieve this would have been to assume risky returns.

and lower utility of domestic residents. In the simple model here, this effect is also captured in a reduced form.

It is now immediate to derive the optimal portfolio choices of the households, denoted by $\tilde{b}$ and $\tilde{b}^*$, that are given by

$$\begin{aligned} \tilde{b}^* &= \frac{1}{1+\left(\frac{1+r}{1+r^*}\right)^{\frac{\alpha}{1-\alpha}}\left(\frac{1}{1-\tau}\right)^{\frac{1}{1-\alpha}}} \\ \tilde{b} &= 1-\tilde{b}^*. \end{aligned}$$

Given the optimal portfolio choices, one can easily derive optimal policies as the solution to

$$\max_{r,\tau} U(\tilde{b}, \tilde{b}^*).$$

To better illustrate the properties of portfolio choices and optimal policies, the parameters of the simple model are set to numerical values ($\alpha = 0.9$, $\phi = 0.4$, $\chi = 0.2$), and Figure 2 plots these choices and policies as a function of the foreign interest rate r^*, so that we can analyze, as in DP, how domestic policies respond to changes in the foreign interest rate.

For pedagogical reasons, it is useful to consider three cases. First is the case of no externality from domestic bonds (i.e., $\chi = 0$), depicted in Figure 2 by the solid lines. Next is the case with externality (i.e., $\chi > 0$), and in which the authority can only use traditional monetary policy (i.e. r) (the dashed lines). Finally we have the case the case with the externality, but where the authority can use both traditional monetary policy and capital controls (i.e. τ) (the dotted lines). The top two panels (panels a and b) show investment in domestic and foreign bonds, and, not surprisingly, as the foreign rate increases, domestic households increase their investment in foreign bonds and reduce their investment in domestic bonds. Panel (c) shows traditional monetary policy (r), and panel (d) shows the use of capital control (τ). Notice that in the absence of the externality (the solid line), the monetary authority reduces the domestic interest rate in response to an increase in the foreign rate. The logic is that as foreign rates rise, households save more in foreign assets. Hence, a reduction in the domestic interest rate is less damaging to the savers, and so the monetary authority can set a lower interest rate which is beneficial to the borrowers (captured by the term $-\phi r^2$). Note also that in this case, the policy authority does not want to use capital controls because they only lead to an inefficient portfolio allocation without yielding any advantage, since the authority can pick the r that optimizes the tradeoff between borrowers and savers. When the externality is present (the dashed line), things change. Now as the foreign rate increases and households reduce domestic investment, social

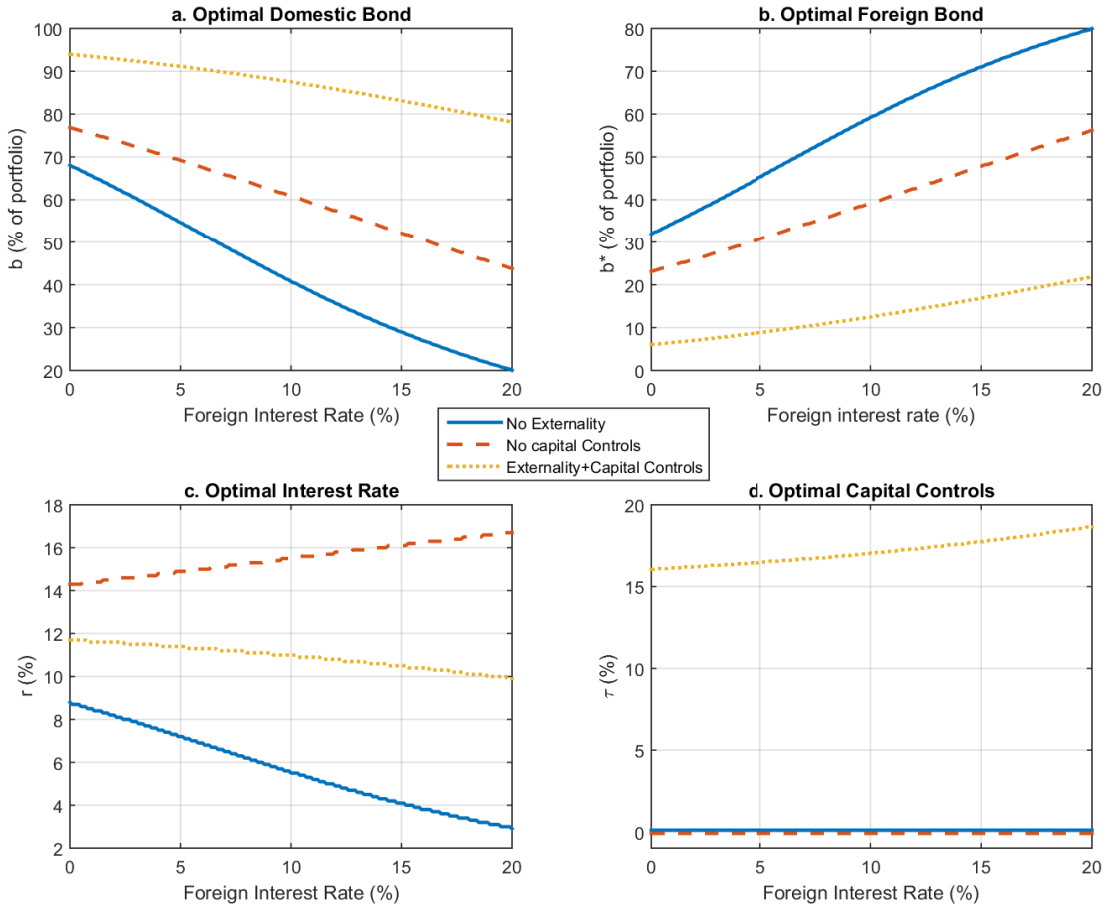

Figure 2: Portfolio Choices and Optimal Policies

welfare is reduced through the externality term $\chi \log(B)$. The policy authority understands that, and in response to an increase in the foreign rate, it now increases the domestic rate. This is damaging to the borrowers (i.e.. the term $-\phi r^2$ falls), but the policy authority elects to raise the interest rate anyway to avoid the capital outflows that reduce the welfare of the economy through the externality. Note importantly that the presence of the externality has changed *qualitatively* the way monetary policy responds to a foreign shock: in panel (c) the solid line is downward sloping, whereas the dashed line is upward sloping. What happens instead when the capital controls can be used? Perhaps not surprisingly, panel (d) shows that in this case, in response to a foreign shock, the policy authority increases capital controls, so that there is less foreign investment, more domestic investment, and so the welfare deriving from the externality term is higher. In a sense, the authority can use the capital controls to take care of the externality, so that it can lower the interest rate in response to higher foreign rates, as it was doing in the case without the externality. In other words, in the absence of the externality, the solution to the households' portfolio problem is efficient, and the policy authority can use monetary policy to achieve its goals (which in this simple model are redistributive goals, while in the DP model are to minimize frictions due to sticky prices). With the externality, the private portfolio allocation is not efficient, and thus monetary policy faces a trade-off, either pursue its goals or correct the externality. With capital controls, the policy authority can use those to correct the externality, and use monetary policy to achieve its goals.

4 Capital controls and exchange rates

The simple model in the previous section has no nominal exchange rates. This omission is because the role of exchange rate adjustment and its interaction with monetary policy are still a bit unclear in DP. To see this point, it is useful to assume, for simplicity, that the marginal utility of domestic agents is constant, and consider equation (5) in the DP paper, which it is just the uncovered interest parity, modified to include capital controls τ:

$$(1+i)\frac{S}{E(S')} = (1+i^f)(1-\tau), \tag{2}$$

where i is the domestic nominal rate, S and S' are current and future nominal exchange rates, and i^f is the foreign real rate. What should be clear from the paper and from the simple model above is that, when the externality is present, an increase in the foreign real rate i^f is damaging to the economy. Equation (2) also makes it clear that by increasing τ the policy

authority can insulate the economy from the shock to the foreign real rate. What is less clear is why, in the case in which capital controls cannot be used, would the monetary authority want to raise the domestic nominal interest rate i in response to an increase in i^f. If capital controls cannot be used, when the foreign rate raises the domestic economy will face an increase in real rate. One thing the policy authority can achieve by raising the domestic nominal rate is to lower the equilibrium expected exchange rate appreciation or, keeping $E(S')$ constant, lower the instantaneous exchange rate depreciation, (i.e. lower the increase in S that would result from an increase in the foreign rate). But it is a bit hard to understand from DP why and if a smaller increase in S_t helps the economy deal better with the financial friction. Notice that in other related works (see, in particular, the work by Aoki, Benigno, and Kiyotaki, 2016) the reason the monetary authority elects to raise the nominal interest rate in response to an increase in foreign rates is exactly to avoid the exchange depreciation. These other works assume that institutions in the domestic economy borrow in foreign currency; hence a nominal depreciation raises their debt burden, thus tightening financial frictions. In other words, in an economy with debt denominated in foreign currency, raising the domestic nominal rate in response to an increase in the foreign rate is the right policy because it avoids depreciation and the associated adverse balance sheet effect. However, in DP all debt is denominated in local currency, so this channel is not operative. Nevertheless, as discussed in the results in Table 3 in DP, with an open capital account the monetary authority raises domestic rates in response to an increase in the foreign real rate. One conjecture is that in DP, the estimated response of the domestic rate to the foreign rate (under an open capital account) does not stem from the attempt of the central bank to deal directly with the tighter financial friction. Since all debt is domestic, and the friction depends on the increase in the real rate, which is exogenous, the central bank in DP cannot directly affect the friction. Instead, that estimated response is the result of the indirect response of the monetary authority to the deviations in the output gap and inflation caused by the foreign shock, and as such the exchange rate adjustment might just play a residual role (and this is what DP hints at in footnote 9). An interesting future research direction would to study in more detail the role played by nominal exchange adjustment versus interest adjustment when setting domestic policies in response to foreign shocks, without capital controls.

5 Concluding remarks

The goal of the simple model presented in this comment is to exemplify the main argument of DP: in an economy in which investment in domestic assets has a positive pecuniary externality, there is a natural case for capital controls, in particular in response to an increase in the foreign interest rate. This is because increases in the foreign interest rate tend to generate an outflow of capital that reduces investment in domestic assets. Monetary policy could deal with the outflow by raising rates, but that is in general costly, because the policy authority might want to use monetary policy to pursue domestic objectives. Capital controls, by directly reducing the outflow of capital in response to a raise in the foreign rates (or in other words, by insulating the economy from the increase in foreign rate), deals with externality and allow monetary policy to pursue its objectives, restoring more monetary autonomy. Notice that this argument holds independently of the exchange rate regime. When exchange rates are fixed and capital markets are open, domestic interest rates have to track foreign rates, and thus capital controls are needed to restore any form of monetary autonomy. With flexible exchange rates, domestic rates can in principle deviate from foreign rates, yet in the absence of capital controls, the policy maker might need to use domestic rates to prevent too much capital inflows or outflows, and thus capital controls might be equally important to give the policy maker the ability to use monetary policy to pursue domestic objectives. Overall, the case for capital controls made by DP is a relevant one, and an important contribution of the paper is to offer a formal and quantitative evaluation of this case (which has put forth before; see, for example, Rey 2013). One issue with the paper is the one outlined in the previous section, regarding the role of the nominal exchange rate. Another issue is, given the particular externality that is assumed, whether capital controls are the best way to deal with it. As well explained in DP (Section 3.4.1):

> "The rise in the interest rate leads to a fall in physical capital investment. The fall in physical capital investment leads to a fall in the price of existing capital due to the presence of investment adjustment costs and the declining marginal product of physical capital investment [...] The fall in the price of existing capital tightens the entrepreneurs' borrowing constraint."

The externality operates through a fall in investment. But if that is the channel, capital controls are a rather indirect way to deal with it, and possibly a direct tax/subsidy to investment might be equally effective and do less collateral damage. Although this is a general

criticism that applies to many models of capital controls, an interesting future extension would be to evaluate, in the context of this quantitative model, the effectiveness of capital controls vis-à-vis alternative and more direct macro-prudential policies.

References

[1] Aoki, K. Benigno, G., Kiyotaki N., 2016. Monetary and financial policies in emerging markets. Working paper.

[2] Brunnermeier, M.K., Sannikov,Y., 2015. International credit flows and pecuniary externalities. American Economic Journal: Macroeconomics 71 (1), 297-338.

[3] Chinn, M.D., Ito, H., 2006. What matters for financial development? capital controls, institutions, and interactions. Journal of Development Economics 81 (1), 163-192.

[4] Costinot, A., Lorenzoni, G. Werning, I., 2014. A theory of capital controls as dynamic terms-of-trade manipulation. Journal of Political Economy 122 (1), 77-128.

[5] Davis, J.S., Presno, I.,2016. Capital controls and monetary policy autonomy in a small open economy. Journal of Monetary Economics, forthcoming.

[6] Heathcote, J., Perri, F., 2016. On the desirability of capital controls. IMF Economic Review 64 (1), 75-102.

[7] Rey, H., 2013. Dilemma, not trilemma: the global financial cycle and monetary policy independence. Federal Reserve Bank of Kansas City Economic Policy Symposium.