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Capital Controls, Global Liquidity Traps. And the International Policy Trilemma
by Michael B. Devereux and James Yetman

I. Motivation

In *Capital Controls, Global Liquidity Traps and the International Policy Trilemma*, Devereux and Yetman primarily explore the interaction of the zero lower bound on interest rates and effective monetary policy for countries with open markets and floating exchange rates. The paper is motivated by observed changes in the nature of liquidity traps following the international financial market crisis in 2008-9. Countries with highly integrated markets experience concurrent downward trends in both GDP and policy interest rates, often to levels near zero. In these cases, exogenous savings shocks push natural interest rates below zero and policy interest rates to near zero, resulting in a liquidity trap and an inability on the part of the government to set effective monetary policy.

Following this discussion, the authors ask the question: how can effective monetary policy be restored? The answer lies with capital controls, given that the home country has floating exchange rates. With capital controls, natural interest rates are able to vary from country to country, and the home country will be able to use monetary policy in cases where an external shock would have driven them to low to near-zero policy interest rates. They then find the optimal monetary policy for these types of external shocks. Since imposing capital controls also decreases welfare, Devereux and Yetman also explore policies that may offset these potential losses.

The question of introducing policy alternatives to liquidity traps is becoming more and more important as countries become more financially integrated on the international stage and more susceptible to externally precipitated shocks.

II. Methods

In order to analyze how to escape the liquidity trap, the authors use a new Keynesian Dynamic Stochastic General Equilibrium model. They use a DSGE model to explore the effect of shocks that push a country's monetary authority towards the zero lower bound on interest rates. First the authors assume two countries, "home" and "foreign", in a general equilibrium economy, where households provide labor and firms sell goods. The authors assume that governments also have access to lump-sum taxation on financial goods. Second the authors characterize monetary policy as a targeting rule. This means that the monetary authority will be seeking an optimal interest rate subject to the zero lower bound constraint. In this model, it is possible that the optimal interest rate is zero in one or both countries. The following equations will describe how the authors determine the optimal monetary policy. The easiest place to start the model is with the following equation:

$$\lambda(\sigma(c_t - c_t^*) - \epsilon_t + \epsilon_t^*) + (1-\lambda)(c_t - y_t + \frac{1}{2}\tau_t) = 0.$$

Where y_t is income in the home country, c_t is consumption in the home country and ε is the measure of a positive demand shock in the home country. The variables with asterisks are the variables for the foreign country. τ is the home country's terms of trade. λ is the degree of capital market integration. The first expression in the brackets is shows the condition for complete markets. The second expression gives us the condition for financial autarky. Thus when , we will have complete markets, that is capital will flow freely between the two countries. If we will have financial autarky. The authors use this solutions of this equation to build a model for the natural interest rates given by the following expressions:

$$\tilde{r}^*(\lambda, \epsilon_t, \epsilon_t^*) = \rho + \omega\frac{1}{2}\frac{(1-\mu)\phi(\epsilon_t + \epsilon_t^*)}{(\phi+\sigma)} + (1-\omega)\frac{1}{2}\frac{(1-\mu)((\sigma+2\phi)\epsilon_t^* - \sigma\epsilon_t)}{(\phi+\sigma)},$$

$$\tilde{r}(\lambda, \epsilon_t, \epsilon_t^*) = \rho + \omega\frac{1}{2}\frac{(1-\mu)\phi(\epsilon_t + \epsilon_t^*)}{(\phi+\sigma)} + (1-\omega)\frac{1}{2}\frac{(1-\mu)((\sigma+2\phi)\epsilon_t - \sigma\epsilon_t^*)}{(\phi+\sigma)},$$

With $\omega = \frac{2\sigma\lambda}{2\sigma\lambda+1-\lambda}$. and ρ is the rate of time preference. Note that if $\lambda = 1$ then $\omega = 1$. Next the authors implement sticky prices and derive equations which determine the dynamics of inflation and output gaps in the two countries. They define π as the Producer Price Index inflation for home country, and is the same for foreign. Then they give the equations :

$$\pi_t = k((\phi + \frac{1+\sigma}{2})\hat{y}_t + \frac{\sigma-1}{2}\hat{y}_t^*) + \beta E_t\pi_{t+1},$$

$$\pi_t^* = k((\phi + \frac{1+\sigma}{2})\hat{y}_t^* + \frac{\sigma-1}{2}\hat{y}_t) + \beta E_t\pi_{t+1}^*,$$

Combining this with the natural interest rate equations we have the following expression

$$E_t\frac{(\sigma+1)}{2}(\hat{y}_{t+1} - \hat{y}_t) + E_t\frac{(\sigma-1)}{2}(\hat{y}_{t+1}^* - \hat{y}_t^*) = r_t - E_t\pi_{t+1} - \tilde{r}_t,$$

$$E_t\frac{(\sigma+1)}{2}(\hat{y}_{t+1}^* - \hat{y}_t^*) + E_t\frac{(\sigma-1)}{2}(\hat{y}_{t+1} - \hat{y}_t) = r_t^* - E_t\pi_{t+1}^* - \tilde{r}_t^*$$

Finally the authors derive a welfare equation that allows them to combine the above equations to optimize the natural interest rate through a lagrangian. The welfare function is :

$$V_t = (1-\sigma)\left(\frac{\hat{y}_t + \hat{y}_t^*}{2}\right)^{-} - \frac{(\phi+1)}{2}\hat{y}_t^2 - \frac{(\phi+1)}{2}\hat{y}_t^{*2} - \frac{\theta}{2k}\pi_t^2 - \frac{\theta}{2k}\pi_t^{*2} + V_{Ft}$$

$$V_{Ft} = \frac{(1-\sigma)}{2}c_t^2 + \epsilon c_t - \frac{(\phi+1)}{2}y_t^2 + \frac{(1-\sigma)}{2}c_t^{*2} + \epsilon^* c_t^* - \frac{(\phi+1)}{2}y_t^{*2}$$

Putting this all together they have the following Lagrangian

$$
\begin{aligned}
P1 \max_{\hat{y}_t,\hat{y}_t^*,\pi_t,\pi_t^*,r_t,r_t^*} L_t = V_t &+ \psi_{1t}\left[\pi_t - k((\phi+\frac{1+\sigma}{2})\hat{y}_t + \frac{(\sigma-1)}{2}\hat{y}_t^*) - \beta E_t\pi_{t+1}\right] \\
&+ \psi_{2t}\left[\pi_t^* - k((\phi+\frac{1+\sigma}{2})\hat{y}_t^* + \frac{(\sigma-1)}{2}\hat{y}_t) - \beta E_t\pi_{t+1}^*\right] \\
&+ \psi_{3t}\left[\frac{(1+\sigma)}{2}E_t(\hat{y}_{t+1}-\hat{y}_t) + \frac{(\sigma-1)}{2}E_t(\hat{y}_{t+1}^*-\hat{y}_t^*) - E_t(r_t-\tilde{r}_t-\pi_{t+1})\right. \\
&+ \psi_{4t}\left[\frac{(1+\sigma)}{2}E_t(\hat{y}_{t+1}^*-\hat{y}_t^*) + \frac{(\sigma-1)}{2}E_t(\hat{y}_{t+1}-\hat{y}_t) - E_t(r_t^*-\tilde{r}_t^*-\pi_{t+1}^*\right. \\
&+ \gamma_{1t}r_t + \gamma_{2t}r_t^*,
\end{aligned}
$$

The solution to this problem will depend on the value of λ , which again, is interpreted as the capital mobility parameter.

III. Findings

Using the DSGE model described above, the authors give four propositions to explain their findings.

Proposition 1

For the first proposition if the natural interest rate in the home country is less than zero and the natural interest rate in the foreign country is higher than in the home country than the optimal monetary policy condition would be to set the real interest rate in the home country to zero and in the foreign country equal to the maximum of 0 or $\widetilde{r_t^*} - \frac{\Omega_\sigma - \Omega}{\Omega_\sigma + \Omega}\widetilde{r_t}$. Where the omegas are parameters and $\widetilde{r_t^*}$ represents the natural interest rate in the foreign country and $\widetilde{r_t}$ represents the natural interest rate in the home country. Proposition 1 shows the effect of capital controls on optimal monetary policy, depending on the degree of capital market integration which they use the parameter of λ. If $\lambda = 1$ then there is full capital mobility between the two countries and if $\lambda = 0$ then there is no capital mobility between the two countries.

Proposition 2

For the second proposition the authors conclude that when a country is not experiencing a liquidity trap, capital controls are always welfare reducing. Just like for proposition one they use $\lambda = 1$ for no capital controls and $\lambda = 0$ for full capital controls. Thus, if the country is not constrained by a liquidity trap then in theory the two countries would want to share capital without any constraints such as laws. If the countries were to impose restrictions on capital flows and move λ closer to zero than that decreases the overall welfare of the countries.

Proposition 3

Proposition 2 shows that increased capital controls will always decrease social welfare if neither the foreign or home country is experiencing a liquidity trap. The follow-up to that proposition is, of course, will capital controls increase welfare when either foreign, home, or both are constrained by the zero lower bound? In the case where $\lambda < \lambda_H$ (the degree of capital market integration is higher in the home country) and the foreign country imposes capital controls (and has effective monetary policy as a result), the authors show that when the savings shock is less than zero ($\varepsilon_t < 0$), increasing (decreasing) λ will also increase (decrease) social welfare. They also show the same result for $\lambda_H \leq \lambda$, where both countries experience the zero lower bound. Therefore, it can be stated that an increase in capital controls (a decrease in λ), will reduce welfare even when capital controls effectively move one country out of the zero lower bound given that policy is constantly adjusted with respect to changes in capital controls.

Proposition 4

From proposition 3, the question remains: can increasing capital controls increase social welfare when policy is not continuously responding to changes in λ? They show that, yes, an increase in capital controls can lead to an increase in social welfare if and only if the natural interest rate is positive. In particular, there exists an interval ($\bar{\lambda}$ to λ_H) and $\bar{\lambda} < \lambda_H$ and some $\lambda_I \in I(\bar{\lambda}, \lambda_H)$ such that a decrease from λ_I to $\bar{\lambda}$ will yield increased social welfare. While this does prove that there are some cases where capital controls are beneficial to welfare, it only does so when monetary policy is suboptimal in the first place.

IV. Discussion

This paper sufficiently models the dynamics of liquidity traps between two countries with open capital markets and an independent monetary authority in a new keynesian framework. The authors go further than previous researchers by looking at this problem with floating exchange rates, whereas previous research focused on fixed exchange rates. This provides the paper with increased external validity compared to previous inquiries into the subject matter. Their model adequately details the situations in which countries can find themselves encountering the zero lower bound, including fully integrated financial markets and financial autarky. The model then demonstrates the solution to monetary policy normalization in a liquidity trap. By implementing capital controls monetary policy independence can be restored, however this will result in welfare loss due to decreased risk sharing.

Devereux and Yetman explore the mechanics of monetary policy in a liquidity trap with open markets and floating exchange rates. Specifically they are interested in tools with which to

restore monetary policy independence. They find that capital controls are effective at resolving the issue, however, with negative effects on societal welfare. Ultimately the authors provide a convincing answer to their research question.

The ability of capital controls to restore monetary policy independence is a very important revelation. During and after the 2008 Financial Crisis and the Great Recession many central banks lowered interest rates to the point where they were constrained by the zero lower bound and unable to perform traditional expansionary monetary policy. With many countries undergoing austerity measures or having their capacity to perform fiscal policy hamstrung in other ways many central banks resorted to unconventional monetary policies in order to stabilize their countries economies. Devereux and Yetman have provided a theoretical framework for central banks to restore the use of conventional monetary policy tools. However, this does have negative effects on societal welfare so if pursued it may in fact exacerbate recessionary pressures before the central bank can then return to expansionary policy.

There is a potential issue with this papers conclusion. While the authors effectively demonstrated an avenue with which to restore monetary policy independence they note that implementing capital controls is not desirable from a welfare perspective. This does call into question whether imposing capital controls would be superior to implementing unconventional monetary policies. While it is possible that an economy would be better off in the long run using capital controls to restore monetary policy independence, in the short run it will be unpopular. This provides a disincentive for a country to undergo these measures as the implementers will likely face significant political pressures to reverse course. So while this a useful theoretical tool for central banks to have at their disposal it is unlikely to be implemented over other unconventional tools.