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The Dilemma or Trilemma Debate: Empirical Evidence

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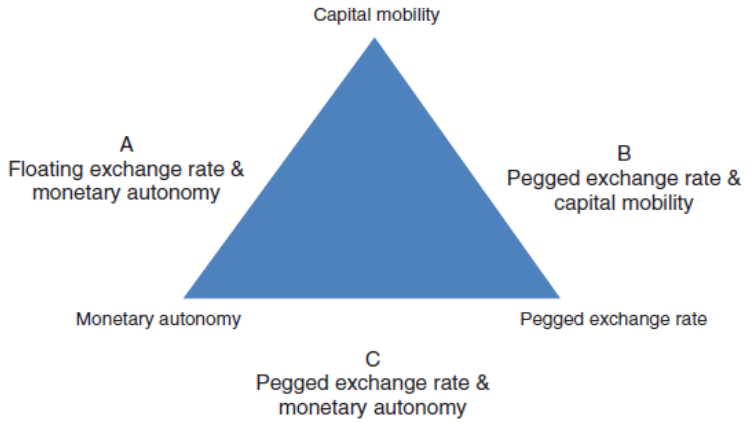
One of the central results in international economics is that an economy cannot have at the same time independent monetary policy, free capital flows, and a fixed exchange rate. Over the last few years, however, this so-called Mundell-Flemming 'trilemma' has increasingly been challenged. It is argued that given the rising importance and synchronization of capital and credit flows across countries and their underlying common driving forces, the 'trilemma' has morphed into a 'dilemma': an economy cannot have at the same time independent monetary policy and an open capital account, independent of the exchange rate regime. This Roundup provides a brief overview of the debate, reviews recent empirical findings on the topic, and outlines possible directions for future research.

The Mundell-Flemming Trilemma…

In international economics, policy choices in the open economy have been viewed as a trade-off between monetary autonomy, financial openness, and exchange rate stability ever since Mundell (1963) outlined the hypothesis of the monetary trilemma. The so-called Mundell-Flemming trilemma implies that under free capital flows, a country can have an independent monetary policy if its exchange rate is allowed to float freely. Even though the process of financial globalization has brought along an increasing importance of foreign shocks for domestic economic conditions, at least up to the financial crisis the trilemma was still consensus view among economists and policy makers alike: a higher degree of monetary autonomy can be retained by letting the exchange rate float (see Georgiadis and Mehl, 2015, and references therein).

Figure 1: Policy Trade-Offs in the Mundellian Trilemma.



Source: Klein, M. and J. Shambough (2013), "Is there a Dilemma with the Trilemma?" , VoxEU.org, 27 September 2013.

…has recently been questioned

Over the last few years, however, it has been increasingly questioned whether exchange rate flexibility alone is a sufficient condition for monetary policy independence, most prominently by Hélène Rey. She argues that there is a global financial cycle, a widespread co-movement in asset price, capital flows, and credit growth across countries. This global financial cycle is driven by monetary policy in the center country, the US, and transmitted to other countries through capital and credit flows. As financial conditions in all periphery countries are affected by the cycle independently of their exchange rate regimes, the classic trilemma is thus reduced to a dilemma or 'irreconcilable duo' - a trade-off between monetary policy independence and an open capital account.

A Global Financial Cycle…

In her seminal paper, Rey (2013) analyzes a dataset of capital flows by different asset classes in different geographical regions. She shows that there is a strong commonality in gross capital flows both across asset types and regions (see Figure 2). Moreover, she finds that the movements in gross capital flows are correlated with the VIX, an index capturing both aggregate market volatility and risk appetite of investors. Flows surge when the VIX is low and decline when the VIX goes up. A similar correlation with the VIX is found for credit growth in all area of the world and leverage growth in all the main financial centers. Rey argues that these results are consistent with the existence of a global financial cycle.

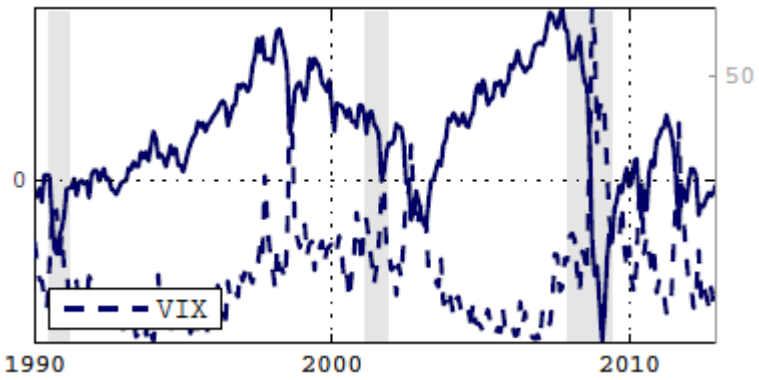
Figure 2: Correlation of capital inflows across asset classes and regions (positive correlations are depicted in green and negative correlations in red).

Liability	Equity	Equity	Equity	Equity	Equity	Equity	Equity	FDI	FDI	FDI	FDI	FDI	FDI	FDI	Debt	Debt	Debt	Debt	Debt	Debt	Debt	Credit	Credit	Credit	Credi	Credit	Credit	Credi
Flows	N. Am.	LatAm	CE. EU	W. EU	Em.As	Asia	Africa	N. Am	LatAm	CE. EU	W. EU	Em.As	Asia	Africa	N. Am	LatAm	CE. EU	W. EU	Em.As	Asia	Africa	N. Am	LatAm	CE. EU	W. EU	Em.As	Asia	Africa
Equity N. Am	1.00																											
Equity LatAm	0.39	1.00																										
Equity CE. EU	0.52	0.49	1.00																									
Equity W. EU	0.63	0.35	0.50	1.00																								
Equity Em. As	0.37	0.24	0.28	0.47	1.00																							
Equity Asia	0.24	0.31	0.28	0.40	0.31	1.00																						
Equity Africa	0.41	0.22	0.26	0.55	0.34	0.26	1.00																					
FDI N. Am	0.54	0.06	0.07	0.45	0.52	-0.07	0.22	1.00																				
FDI LatAm	0.41	0.10	0.08	0.29	0.32	-0.07	0.04	0.68	1.00																			
FDI CE. EU	0.46	0.11	0.08	0.18	0.23	-0.12	0.09	0.61	0.65	1.00																		
FDI W. EU	0.57	0.21	0.19	0.38	0.35	0.01	0.16	0.61	0.59	0.75	1.00																	
FDI Em. As	0.47	0.24	0.16	0.34	0.36	-0.04	0.04	0.65	0.77	0.69	0.64	1.00																
FDI Asia	0.36	0.16	0.03	0.29	0.30	-0.17	0.05	0.60	0.70	0.57	0.51	0.69	1.00															
FDI Africa	0.33	0.01	0.10	0.18	0.03	-0.16	-0.19	0.31	0.36	0.35	0.35	0.34	0.27	1.00														
Debt N. Am	0.42	0.17	0.32	0.51	0.29	0.21	0.31	0.40	0.39	0.55	0.51	0.48	0.37	0.08	1.00													
Debt LatAm	0.20	0.40	0.33	0.16	0.13	0.00	-0.05	0.16	0.35	0.13	0.05	0.31	0.26	0.06	0.10	1.00												
Debt CE. EU	0.37	0.42	0.50	0.43	0.13	0.17	0.19	0.14	0.35	0.14	0.12	0.47	0.21	0.04	0.37	0.52	1.00											
Debt W. EU	0.49	0.05	0.33	0.50	0.23	0.27	0.47	0.29	0.10	0.44	0.27	0.25	0.02	0.10	0.58	-0.13	0.28	1.00										
Debt Em. As	0.40	0.58	0.65	0.35	0.20	0.23	0.20	0.13	0.24	0.25	0.37	0.35	0.15	0.02	0.32	0.38	0.53	0.14	1.00									
Debt Asia	0.16	0.18	0.24	0.22	0.16	-0.04	0.16	0.35	0.31	0.30	0.30	0.45	0.26	0.14	0.45	0.27	0.42	0.19	0.39	1.00								
Debt Africa	0.26	0.27	0.39	0.18	0.07	0.14	0.09	0.12	0.21	0.10	0.01	0.41	0.21	0.07	0.21	0.46	0.61	0.15	0.44	0.32	1.00							
Credit N. Am.	0.29	-0.02	0.21	0.38	0.15	-0.01	0.32	0.20	0.02	0.19	0.20	0.12	0.09	0.04	0.37	0.14	0.23	0.25	0.23	0.25	0.03	1.00						
Credit LatAm	0.41	0.34	0.21	0.26	0.12	0.04	0.22	0.38	0.35	0.42	0.27	0.48	0.35	0.24	0.35	0.25	0.41	0.30	0.29	0.46	0.28	0.22	1.00					
Credit CE. EU	0.42	0.25	0.27	0.28	0.32	0.15	0.21	0.54	0.38	0.72	0.55	0.47	0.36	0.28	0.54	0.14	0.13	0.56	0.25	0.48	0.12	0.17	0.55	1.00				
Credit W. EU	0.19	-0.03	0.24	0.31	0.19	-0.16	0.26	0.27	0.08	0.20	0.30	0.19	0.13	0.15	0.45	0.20	0.25	0.33	0.26	0.45	0.16	0.63	0.30	0.34	1.00			
Credit Em. As	0.25	0.54	0.39	0.21	0.10	0.16	0.05	0.22	0.16	0.30	0.29	0.38	0.24	0.00	0.40	0.31	0.33	0.15	0.56	0.51	0.27	0.24	0.45	0.48	0.28	1.00		
Credit Asia	0.08	-0.03	0.02	-0.01	0.00	-0.40	-0.12	0.23	0.23	0.32	0.24	0.31	0.23	0.25	0.32	0.18	0.17	-0.01	0.13	0.37	0.08	0.43	0.35	0.23	0.52	0.37	1.00	
Credit Africa	0.11	0.06	0.01	0.15	0.01	-0.20	0.12	0.40	0.30	0.35	0.33	0.24	0.37	0.18	0.32	0.11	0.00	0.13	0.03	0.34	-0.02	0.24	0.30	0.40	0.36	0.30	0.31	1.00

Source: Rey (2013) Dilemma not Trilemma: the Global Financial Cycle and Monetary Policy Independence, Proceedings of the Economic Policy Symposium at Jackson Hole, Federal Reserve Bank of Kansas City.

Further evidence is provided by Miranda-Agrippino and Rey (2015). They consider a collection of 858 price series of different risky assets accounting for commodities, corporate bond indices, and stocks traded in North America, Europe, Asia Pacific, and Australia. A dynamic factor model partitions the movement in the returns of these assets into a global factor and a set of regional and asset specific components. It shows that the global factor alone accounts for about 25 % of the variation in the very heterogeneous dataset, indicating a high degree of co-movement. Moreover, this global factor is also negatively correlated with the VIX (see Figure 3). Other research detects a similar co-movement between the VIX and different measures of global financial conditions like worldwide credit growth (see Bruno and Shin, 2015a), worldwide leverage (see Passari and Rey, 2015), or gross capital flows (see, among others, Forbes and Warnock, 2012).

Figure 3: The global factor from Miranda-Agrippino and Rey (2015) and the VIX.



Source: Miranda-Agrippino Rey (2015): World Asset Markets and the Global Financial Cycle, NBER Working Papers No. 21722, National Bureau of Economic Research, Inc.

…driven by monetary policy in the US…

Regarding potential drivers of the global financial cycle, most studies focus on U.S. monetary policy. In a domestic U.S. context, Bekaert et al. (2013) find a link between monetary policy and the VIX. Bruno and Shin (2015a,b) and Rey (2013, 2016) show that federal funds rate shocks have significant effects on the VIX, the US dollar real effective exchange rate, US broker-dealer leverage, and international banking flows. Miranda-Agrippino and Rey (2015) find a significant impact of US monetary policy shocks on a number of additional variables related to the global financial cycle like credit provision at a global level, cross-border credit to banks and non-banks, leverage of US and European banks, and, importantly, their identified global asset price factor.

…makes the trilemma obsolete?

The existence of a global financial cycle alone, however, does not conclude the dilemma or trilemma debate. The exchange rate regime could still help insulating countries from the cycle and US monetary policy as an underlying driving force. Passari and Rey (2015) assess this issue in different ways. First, they show that the pattern of positive correlations between global gross capital flows does not seem to be noticeably affected by the exchange rate regime. Second, they find that the correlation between the VIX and the US Federal Funds Rate with countries' domestic stock prices and domestic credit growth is not systematically associated with the underlying exchange rate regime: more rigid exchange rate regimes do not imply a higher sensitivity to the global financial cycle. Third, they analyze spillovers of US monetary policy shocks on the United Kingdom, a country with a flexible exchange rate and an inflation targeting regime that should be relatively insulated from US monetary policy. However, they find that US shocks have significant effects on the UK mortgage spread, their proxy of UK's external finance premium. Rey (2016) extends this analysis to a set of advanced economies with floating exchange rates and inflation targeting regimes: Canada, New Zealand, and Sweden. In all three countries, US monetary shocks have a significant effect on domestic financing conditions. More generally, Dedola et al. (2015) find that U.S. monetary policy significantly affects macroeconomic variables in both advanced and emerging economies. Further, they find that financial conditions in emerging market

economies are influenced by U.S. monetary policy, regardless of countries' exchange rate regime.

On the opposite side, Klein and Shambough (2015) provide evidence indicating that countries with floating exchange rates, that do not have to follow base-country interest rates as closely as countries with a fixed exchange rate, tend to adjust their domestic interest rates more strongly to stabilize domestic inflation and economic growth. This finding indicates that a floating regime indeed offers a higher degree of monetary policy autonomy. Moreover, they show that soft peg arrangements seem to generate more monetary policy autonomy than hard pegs, but not as much as floating exchange rates, which supports the trilemma view. Aizenmann at al. (2015) investigate how financial conditions - policy interest rates, stock market prices, and real effective exchange rates - for a large set of 100 developing and emerging economies (periphery countries) are affected by movements in the U.S., Japan, the Eurozone and China (center countries). They find that a country that pursues greater exchange rate stability has a stronger link with the center economies, concluding that the trilemma remains a useful description of policy trade-offs.

Foreign currency exposure and the trilemma

Georgiadis and Mehl (2015) take a different approach in addressing the debate and assess the effectiveness of domestic monetary policy for a set of advanced and emerging economies. They find that domestic monetary policy effectiveness is indeed reduced in countries that are financially more integrated. However, they also detect an amplification of monetary policy effectiveness due to another feature of financial globalization: economies are increasingly net long in foreign currencies. If the net foreign currency exposure of a country is large, an expansionary domestic monetary policy shock, that triggers a depreciation of the exchange rate, will have a positive valuation effect on net foreign asset positions. Hence, the monetary policy impulse is amplified by a loosening in domestic financial conditions though valuation gains. They conclude that their results support the trilemma view of the world: while all countries are affected by a loss in policy efficiency due to financial globalization, only countries with a floating exchange rate regime profit from valuation gains if they are net long in foreign currency.

However, in particular for emerging economies, an exchange rate depreciation does not necessarily lead to a loosening of domestic economic conditions. Although emerging economies have continually improved their net foreign currency positions in the past decades, this development often masks significant heterogeneities across sectors (see Avdjiev et al., 2015). On the one hand, governments and central banks have increasingly accumulated foreign exchange reserves. On the other hand, the corporate sector can still be a large debtor in foreign currency, in particular in US dollar, as its dollar-denominated debt is often backed by assets and cash-flows in local currency. If such a valuation mismatch on corporate balance sheets exists, Bruno and Shin (2015b) and Hoffmann et al. (2016) show that a currency appreciation against the US dollar can have expansionary effects on financial conditions through the so-called 'risk-taking channel' of exchange rate appreciation. When the currency appreciates against the dollar, private balance sheet positions look stronger and banks or investors are willing to extend credit, i.e. the capacity of creditors to extent credit is higher for any given exposure limit and credit supply increases. If no automatic mechanism is in place that offsets private sector effects with valuation effects on official reserves, then the risk-taking channel will directly affected domestic financial conditions. Hoffmann et al. (2016) find evidence for such a channel in a panel of emerging market economies: an appreciation of the domestic

currency against the US dollar is associated with a compression of sovereign yields, due to shifts in the risk premium.

Conclusion and possible paths for further research

While the discussion on the dilemma or trilemma question is still ongoing, some conclusions from the existing research can already be drawn. On the one hand, the choice of the exchange rate regime still matters for monetary policy autonomy and the absorption of cross-country spillovers, indicating that the trilemma should not yet be disregarded. On the other hand, however, a floating exchange rate alone does not appear to be sufficient to insulate countries from the global financial cycle. If the global cycle and US monetary policy as a driving force are a mayor determinant of a country's financial conditions, the dilemma view might be a more relevant description of policy trade-offs.

Still, more research along different dimensions is necessary. First, several of the above-mentioned studies rely on cross-country panel frameworks. While these models are helpful to detect correlations in the data, they do not take into account dynamic relations over time and between countries. Moreover, they do not yield results for individual countries that might face differing policy trade-offs. One interesting addition could be to study the relation between policy choices and international shocks in global VAR or panel VAR models, aiming at quantifying the impact of different shocks on individual economies.

Second, while most studies focus on international spillovers from US monetary policy and its role in driving the global financial cycle, this is not the only driving force. Future research should try to assess how policy choices interact with other potential driving forces, like the risk appetite of global banks and investors or the global business cycle.

Third, if exchange rate regimes do not help to insulate countries from shocks, policy makers might turn to capital controls for policy autonomy. However, evidence on how efficient capital controls are and on their associated costs and benefits is limited. Klein and Shambough (2015) find that partial capital controls do not allow for greater monetary autonomy than an open capital account, unless they get quite extensive. Forbes et al. (2015) show that certain macroprudential measures are indeed effective in managing capital flows. However, they find no evidence suggesting that most capital-flows management measures can significantly affect exchange rates, capital flows, interest-rate differentials, inflation, and equity indices. More research along these lines is needed, in particular on macroprudential tools, like a tighter financial regulation or restrictions on cross-border financial instruments.

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