Journal of International Money and Finance 32 (2013) 822–843

Contents lists available at SciVerse ScienceDirect

Journal of International Money and Finance

journal homepage: www.elsevier.com/locate/jimf

Exchange rate volatility and the time-varying effects of aggregate shocks☆

Victor J. Valcarcel*

Department of Economics, Texas Tech University, 257 Holden Hall, Lubbock, TX 79409, USA

JEL classification:
E30
E41
E65

Keywords:
Bretton Woods
The Great Moderation
Stochastic volatility
Real exchange rates
Markov chain Monte Carlo
Structural vector autoregressions

A B S T R A C T

This paper investigates the dynamics of the real exchange rate and relative output among the US and five of its top six trading partners since the collapse of Bretton Woods. It employs long-run restrictions to identify the usual suspect macroeconomic shocks and their relative importance for exchange rate fluctuations. An improvement of the econometric application is that it allows for the contribution of each shock to the real exchange rate and relative output to vary over time. While the volatility of US output – both total and relative to that of the UK or Canada – is estimated to have substantially reduced since the mid-1980s, consistent with the *Great Moderation* findings of many others, the volatility of real exchange rates has experienced a gradual and continuous increase over the same period. Monetary shocks account for only a small fraction of these dynamics, although they do track well the increase in volatility of US output during the Great Inflation period. It is supply-type shocks that seem to be more important for the relative output volatility reductions of the mid-1980s. Conversely, demand shocks seem to account for the largest portion of the volatility increases in the real exchange rate. Perhaps unsurprisingly, both volatilities increase during the 2007 financial crisis and the ensuing 2008–2009 *Great Recession* – periods associated with higher economic uncertainty.

☆ I would like to thank Luca Gambetti and John Keating for helpful correspondence and an anonymous referee for constructive and insightful suggestions. All standard disclaimers apply.

* Tel.: +1 806 742 2466x239.
E-mail address: vic.valcarcel@ttu.edu.

0261-5606/$ – see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.jimonfin.2012.07.003

1. Introduction

In a heavily globalized world, the health of a given economy is often entwined with that of another. Business cycle fluctuations in large economies will have a direct impact in the demand for foreign goods, causing foreign economies to fluctuate as well. Furthermore, the short-run effects of supply shocks in a large economy, like that of the United States, likely spill over to other economies. If the short-run effects of these aggregate shocks disrupt economic stability within an economy, it is, then, possible for this phenomenon to be communicable across countries as well. This paper operates on two related research areas. One is the strand of the literature that studies business cycle synchronization, and the other is the area of study that deals with exchange rate volatility. The main purpose of this paper is to determine to what extent the dynamics of real exchange rates among the US and five of its largest trading partners experienced time variation since the end of the Bretton Woods arrangement. It is also of special interest to determine whether the contribution to the volatility of exchange rates and economic activity from the usual suspects – *supply*, *demand*, and *monetary* factors – has changed over time.

While there is ample evidence that the business cycle of many countries is strongly correlated with that of the United States, the source of the commonality, whether it be from the aggregate supply, aggregate demand, or monetary policy shocks, remains somewhat elusive. Kose et al. (2003) point to a single common factor as the main source of volatility in many countries' aggregates. Using a dynamic latent factor model, they find evidence of a "world business cycle." Ahmed et al. (1993) develop a two country model and find evidence that economic fluctuations are driven not only by a worldwide supply shock but also by relative demand and monetary shocks. This synchronicity[1] in international business cycles could stem from any number of channels: One source of this conjoined cycle could be the relatively recent tendency for a higher degree of coordination among central banks. Second, over time, financial markets throughout the world have also become more integrated. Third, the effects around the world of adverse supply shocks may have generally become less prevalent since the mid-1980s.

A separate, but related, line of research has outlined that both economic activity and exchange rates across countries do not seem to be well-characterized by constant volatility. For example, Stock and Watson (2002) observed that the volatility of many US aggregates fell substantially since 1984.[2] This *Great Moderation* in the volatilities of major aggregates is not an isolated phenomenon for the US; it has also been experienced by other industrialized economies (Summers, 2005; Cecchetti et al., 2006; Keating and Valcarcel, 2011).

Conversely, Mussa (1986) points out that the variance of real exchange rates has increased dramatically (8–80 times higher) since the collapse of Bretton Woods. This volatility increase in the real exchange rate has been mostly attributed to two factors: the increased importance of nominal shocks – where sticky price adjustment or monetary policy in general is central to short-run movements in real exchange rates; or the increased role of real shocks with large permanent components – driven by the apparent nonstationary behavior of the exchange rate. Essentially, this debate could be characterized as an aggregate demand versus aggregate supply explanation.[3]

A clear connection between the moderations in economic activity and exchange rate regimes has not been established. For example, Keating and Valcarcel (2012) show that, while the standard errors of US inflation and output growth have been at or near their historic lows at a time when the US let its exchange rate float, some of the largest reductions in volatility took place under a fixed exchange rate system.

An analysis of international business cycles involves, in essence, an analysis of second moment conditions. For starters, studies of correlations in short-run movements of aggregates among countries are certainly the first step. For example, Baxter (1994) and Backus et al. (1995) study correlations

[1] I use this term here rather than "convergence" as the latter is heavily used in the growth literature.

[2] Anywhere between 20% and 40%.

[3] Dornbusch (1976) and Mussa (1986) are two examples of the nominal explanation. The latter concludes that the close relationship between nominal and real exchange rates since Bretton Woods argues for a sluggish price adjustment explanation. Conversely, Huizinga (1987) attributes most of the variance of changes in real exchange rates since Bretton Woods to real shocks. Clarida and Gali (1994) provide a middle road where both monetary and real shocks are relevant, but they conclude that nominal factors such as monetary shocks are far from being the dominant source of real exchange fluctuations since the collapse of Bretton Woods.