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Modeling news-driven international business cycles ☆

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ABSTRACT

This paper reexamines the question of how to explain business cycle co-movements within and between countries. First, we present a simple flexible price models to illustrate how and why news shocks can generate robust positive co-movements in economic activity across countries. We also discuss under what conditions a two-sector version of the model generates appropriate business cycle patterns within countries. Second, we develop a quantitative two-country two-sector model that is capable of replicating news driven international business cycles. The model is a two-country extension of the closed economy model of Beaudry and Portier (2004), in which there are limited possibilities to reallocate factors between investment and consumption-good sectors.

0. Introduction

The macroeconomic literature often emphasizes the role of the expectations of investors in driving business cycles. These ideas go back at least to A.C. Pigou and J.M Keynes. One embodiment of this literature stresses the role of expectations regarding future productivity growth in creating fluctuations. This line of research is supported by empirical evidence suggesting that Total Factor Productivity improvements are reflected in stock prices fluctuations many quarters before they actually arise in measured TFP (see Beaudry and Portier, 2005, 2006; Haertel and Lucke, 2007), and that news shocks are an important component of business cycles (Schmitt-Grohé and Uribe, 2008; Beaudry and Lucke, 2009). Theoretical and quantitative explanations of how news shocks affect economic activity have been investigated within a closed economy setups in a set of recent papers (Beaudry and Portier, 2004; Beaudry et al., 2006; Christiano et al., 2008; Jaimovich and Rebelo, 2008; Den Haan and Kaltenbrunner, 2009). In this paper, we examine the extent to which such changes in expectations, as captured by "news shocks", helps understanding international business cycle fluctuations.

Business Cycles are known to display two important and quite distinctive features. The first one, that we label "National Business Cycles" (hereafter *NBC)* is the fact that macroeconomic aggregates (consumption, investment, output, worked hours) are positively correlated. The second one, that we label "International Business Cycles" (hereafter *IBC*) is the fact that these same aggregates are pairwise correlated across countries. These two set of facts are well documented in the literature (see for example Ambler et al., 2004), and happen to be quite challenging to replicate for standard equilibrium macroeconomic theory. At first sight, the challenge seems easy to meet. As shown by Backus, Kehoe and Kydl (1995) (hereafter BKK),

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a two country Real Business Cycle model in the tradition of Kydland and Prescott (1982) can display both NBC and IBC properties when perturbed by technological shocks. Note however that this result crucially relies on two assumptions: first that technological shocks are surprises and second that they are common across countries. These two assumptions, which are needed to generate NBC and IBC are questionable. First, technological improvements appear forecastable to a large extent, as Beaudry and Portier (2006) have shown that (permanent) technology improvements likely diffuse only slowly over time. Second, technological shocks are not common nor highly correlated across countries as shown in Ambler et al. (2004). High correlation is needed in BKK type of models to replicate IBC facts, as purely local technological shocks lead to the reallocation of capital across countries and therefore generate negatively correlated cycles across countries.

As technology shocks appear insufficiently "global" to reproduce IBC facts, other shocks or market frictions seems to be needed for business cycles synchronization across countries to arise, as illustrated by Wen (2007). We show in this paper that news shocks offer a driving force that can generate cross-country synchronization of activity even in a frictionless and flex-price economy. The key insight to understand the result is that, because news shocks are common knowledge and do not affect current fundamentals, they act as a common "demand" shock. In Section 1 of this paper, we formally prove the synchronizing effect of news. In Section 2, we propose a frictionless two-country quantitative model that builds on Beaudry and Portier (2004) closed economy model, and that is able to generate news-driven IBC. We also clarify why typical international RBC models fail generating news driven international business cycles. Section 3 concludes.

1. The cross-country effects of news shocks

In this section, we study the consequences of country-specific news shock in multi-country models. Even when news are about the fundamentals of only in one country, the news shock changes expectations in all countries and is therefore a powerful source of synchronization in activity between countries. We make this claim most clearly in a setup with full capital mobility, where the equilibrium allocations display perfect symmetry across country after the arrival of new information but before the realization of the change in fundamentals.

Although news shocks generate symmetric response between countries, we also show that in two-country models with one sector and full capital mobility, they create opposite movements of consumption one the one side and investment and worked hours on the other side. In one-sector economies, news shock therefore cannot be an important driver of the business cycle. We then present a version of a two-sector two-country models where news shocks can increase investment and hours on impact without decreasing consumptions, therefore creating business cycle like fluctuations.

1.1. A one-sector setup with full capital mobility

1.1.1. The setup

The economy we study is composed of two countries, A and B. Country A hosts a fraction $0 < \pi < 1$ of world population.

Both countries produce an homogeneous final good, which can be devoted to consumption or to augment the world stock of capital per capita K_t. This good is produced with the same concave technology in both countries, $F(K_{J,t}, H_{J,t}; \theta_{J,t})$, with strictly positive and strictly decreasing marginal products. $H_{J,t}$ and $K_{J,t}$ respectively denote the labor and capital input per capita used in country J at date t. The technology index $\theta_{J,t}$ has a forecastable component and may have a non-forecastable one, but we do not need to explicit its stochastic process at this stage. To deliver our result in the simplest possible form we focus on the case where the world stock of capital K_t is predetermined but it can be allocated freely across countries within a period.[1] The constraint on the allocation of capital is therefore given by

$$K_t \geqslant \pi K_{A,t} + (1-\pi)K_{B,t}.$$

There is one representative agent in each of the two-country, with the same concave period utility $U(C_{J,t}, 1 - H_{J,t})$. Preferences are given by:

$$U(C, 1-H) = \frac{C^{1-\sigma}}{1-\sigma} \times v(1-H)$$

with $\sigma > 0$ and $\sigma \neq 1$, or

$$U(C, 1-H) = \log C + v(1-H).$$

Appendix A states the conditions on v under which U is a concave function and shows that under these conditions consumption and leisure are normal goods. The inter-temporal utility is the discounted sum of period utilities, with discount factor β.

[1] This assumption will be removed in the quantitative exercise.