



Does the economic integration of China affect growth and inflation in industrial countries? [☆]



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ABSTRACT

The Chinese economic development affects GDP growth and inflation in the advanced countries. The size of the effects is inferred from multivariate time series and structural econometric methods. In particular, the GVAR and the NiGEM are employed to examine the interdependencies between the business cycles in China and industrial countries, including the US, the euro area and Japan. Evidence is based on the responses to a Chinese GDP shock, which is traced to the recent fiscal stimulus package. The different model environments show quite similar results, implying that the impact on GDP growth in the advanced economies is substantial especially for Japan. Real economic effects to the US and the euro area responses are much lower. In addition, international inflation spillovers should be expected.

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1. Introduction

The integration of China into the world economy has been one of the most spectacular events in recent economic history. In only three decades, China transformed from a closed and agricultural country to the second largest economy in the world, with a share of 15% of global GDP in PPPs. The industrial countries have largely benefitted from the evolution due to manufactured and intermediate products at lower costs and new export markets. China absorbs more than 10% of the exports from the advanced economies, after 5.5% at the turn of the century. More than 40% of the total increase of Japanese exports over the last 5 years has been delivered to China. The shares are 16% for the US and 8% for the euro area, respectively. At the same time, however, concerns have risen in the industrialized world, as the manufacturing and labor intensive industries have gone under higher competitive pressure. The reservations became even more relevant as unemployment increased in many countries during the financial crisis. Although the global imbalances declined since then, they will likely pick up again (Feldstein, 2011; Rodrik, 2010).

The rising economic power of China might affect the macroeconomic performance in industrial countries. Besides that, the Chinese integration

can contribute to a stronger divergence of international business cycles, i.e. decoupling in the world economy. For example, it would be of high economic relevance if the emergence of China at the global economic landscape could allow the US and the euro area to synchronize their cycles less closely. Following Kose et al. (2012), business cycles have converged among the groups of advanced and emerging market economies, respectively. There is cyclical convergence within each group, but increasing divergence between them. Globalization did not affect the degree of the pattern of international synchronization. While common components play a larger role for business cycles in the group of advanced economies, country specific factors seem to be more relevant for the emerging markets. One rationale might be that many emerging countries reached only intermediate levels of financial integration so far, i.e. they are not able to improve risk sharing opportunities (Kose et al., 2003). In this regard, the high savings rate in China of 50% in the aggregate may be interpreted as an indication of poorly developed financial markets.

Only a few studies looked at the Chinese impact on the economic performance in industrial countries. Fidrmuc et al. (2008) found only little evidence for comovement between industrial countries and China at business cycle frequencies, as many correlations are negative. However, ties are positive in the very short run, indicating strong relationships between suppliers in China and final producers in developed countries. Pula and Peltonen (2009) emphasized that trade statistics overestimate the level of integration that actually takes place, due to multiple counting of products in largely fragmented production processes.

To explore the interdependencies across countries, authors often examine bivariate correlation patterns of the cyclical components of

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output or look at the ability of global or regional factors to explain national business cycle movements. However, the directions of causality are ignored by this research (Chen and Chihying, 2008). To make progress, this paper applies both multivariate time series and structural econometric model to determine the impact of a Chinese shock on output growth and inflation in industrial countries, namely the US, the euro area and Japan.

The time series tool is based on a Global VAR (GVAR) model. Recently, Cesa-Bianchi et al. (2012) proposed a similar approach to explore the impact of China on the global economy. They investigate how changes in trade linkages between China, Latin America and the rest of the world altered the transmission mechanism of international business cycles to Latin America. In contrast, this paper focuses on the Chinese impact on industrial countries, and compares the results to those obtained by a leading structural econometric model, the National Institute Global Econometric Model (NiGEM), see National Institute for Economic and Social Research (2011). The recent Chinese fiscal stimulus package is taken as an example for a huge Chinese shock. As it is based on a two-sided approach, the analysis can shed some lights onto the robustness of the results.

The findings are quite similar for both models and suggest that the Chinese impact on GDP growth and inflation in the advanced economies is substantial for the Asian region due to geographical proximity and tight trade linkages. The expansionary effects for the US and the euro area responses are much lower, especially in the NiGEM environment. In addition, international inflation spillovers should be expected. As Chinese firms participate in international production chains, an increase in domestic inflation will affect the evolution in the rest of the world.

The rest of the paper is structured as follows. The next section (Section 2) presents the Chinese fiscal stimulus program as an illustration for a huge GDP shock. Econometric tools are reviewed in Section 3. They are split into global VAR (Section 3.1) and structural macroeconomic models (Section 3.2). Simulation results are discussed in Section 4. Finally, Section 5 concludes.

2. China's fiscal stimulus package

After the collapse of Lehman brothers, major export markets in the industrial countries deteriorated, especially in the US, the euro area and Japan. Thousands of Chinese firms closed down especially in the export-oriented coastal areas and millions of workers lost their jobs from one day to the other. A decline of GDP growth is a matter of concern for the Chinese government for a variety of reasons. According to many observers, an annual rate of 7.5% is the minimum to generate enough jobs to ensure a smoothed integration of labor migrants into the Chinese workforce and to avoid social unrest that can otherwise destabilize the country. High growth is also a way of papering over existing weaknesses of the economy and provides one of the most appropriate instruments to solve structural problems (Prasad, 2009).

It is against this background that the Chinese government decided to launch a huge fiscal stimulus package. The measures amounted to 6% of GDP over two years, 2009 and 2010, i.e. approximately 3% per annum. They include higher investment in infrastructure especially in rural areas, large scaled projects like railroads, roads and airports and to a minor extent measures to improve the livelihood of the people, such as a stronger social safety net, the construction of low rent housing, and better quality of public healthcare and education. See Naughton (2009) for a detailed breakdown of the individual components.

To some extent, the package may support the Chinese economic transformation towards domestic driven economic growth. It can lead to a higher path of private consumption as the need of precautionary savings is reduced. The decrease of public transfers is often seen as a major factor behind the decline of the consumption to GDP ratio in the pre-crisis period. Private households tend to save more in order to finance health and consumption in the retirement age (Baldacci et al., 2010; Dreger et al., 2013). However, the stimulus package did not

reverse the export- and investment-led growth strategy (Xu, 2010). Export oriented industries will be supported even under the conditions of the current five-year plan. Nonetheless, the goal is to achieve a more balanced path of output growth, putting higher weight on the production of non-tradables and services. By implementing this strategy, the country could become less vulnerable against global shocks.

Despite the severe breakdown in export activities due to the global financial crisis, the Chinese economy continued to increase at high rates. This is in marked contrast to the experience in major industrial countries, where the packages could not avoid a recession. See for example Cogan et al. (2010) for the US experience. It should be noted, however, that the long run effects of the fiscal package are quite unclear, even for the Chinese economy. Public firms benefitted from huge infrastructure projects and received further credit from state owned banks. Competition pressure declined, impeding faster structural change towards a higher weight of the private sector in the economy. Public debt likely increased in many regions to provide funding for prestigious projects.¹

3. Econometric tools

3.1. Global VAR models

Global VAR (GVAR) models provide a convenient framework to explore the international transmission of business cycles. The model is based on individual VARs for $N + 1$ countries, see Pesaran et al. (2004) and Garratt et al. (2006). The country specific models are linked as foreign variables are allowed to enter the equations. Due to the low number of degrees of freedom, the foreign variables are included in aggregate format, where a weighting scheme is involved. In the VARX* (1, 1) specification

$$x_{i,t} = a_{i,0} + a_{i,1}t + \Phi_i x_{i,t-1} + \Lambda_{i,0} x_{it}^* + \Lambda_{i,1} x_{i,t-1}^* + u_{i,t} \quad (1)$$

i is the country index and t denotes time. Furthermore $x_{i,t}$ is a vector of k_i domestic variables, and $x_{i,t}^*$ a vector with k_i^* country specific foreign variables, i.e. constructed by weights relevant for the specific country. The system might be extended by common factors representing global variables such as oil prices. In addition, Φ_i is a $k_i \times k_i$ matrix of coefficients for lagged domestic variables, and $\Lambda_{i,0}$ and $\Lambda_{i,1}$ are $k_i \times k_i^*$ matrices associated with the coefficients of the foreign variables that can enter in contemporaneous and lagged form. Deterministic components might include intercepts and linear time trends. Finally, $u_{i,t}$ is a vector of k_i serially uncorrelated idiosyncratic shocks with zero mean and nonsingular covariance matrix. In case of autocorrelation patterns, further lags are added to the VARX*. Shocks can be contemporaneously correlated, both across equations for a specific country and across countries. International spillovers can arise because of a contemporaneous impact of the foreign on the domestic variables, through a dependence on global variables and through the contemporaneous correlation structure of the shocks.

Foreign variables are constructed by employing a country-specific weighting scheme. In the analysis, weights are chosen in line with bilateral trade flows (Dees et al., 2007). As an alternative, Vansteenkiste (2007) proposed weights based on the geographical distance between regions, and Hiebert and Vansteenkiste (2010) employed weights from input-output tables across sectors. The set of foreign specific variables for the i th country is

$$x_{i,t}^* = \sum_{j=1}^N w_{i,j} x_{j,t} \quad (2)$$

where $w_{i,j}$ denotes the weights that add up to unity with $w_{i,i}$ equal to zero. The weights can vary over time as long as they are predetermined.

¹ As hard data are not available, the court of auditors recently got the mandate to determine the stock and the development of debt at the provincial level.

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