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The global recession and China's stimulus package: A general equilibrium assessment of country level impacts

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ABSTRACT

A dynamic computable general equilibrium model is developed to assess the impact of the recent global recession and the Chinese government's stimulus package on China's economic growth. By designing two scenarios – one with and one without the stimulus package – the model results show that GDP growth rate in 2009 could have fallen to 2.9% without the stimulus package, mainly as a result of the sharp decline in exports of manufactured goods. Under the stimulus scenario, with the generated additional demand on investment goods, the Chinese economy grows 8–10% in 2009 and the succeeding years. The model also measures the overall gains of the stimulus package, and the cumulative GDP growth difference between the two scenarios for 2009–15 is about RMB76 trillion.

1. Introduction

Starting in 2008, the world economy has been experiencing its worst recession since the Great Depression of the 1930s. The financial crisis of 2008 that started in the United States and some European Union countries quickly spread around the world, affecting almost all developed and developing countries. While economic growth seems to have returned to many developing countries by 2010, many developed countries are still struggling with issues caused by the recession, such as high unemployment rates and stagnant growth.

As one of the world's largest exporting countries, China's economy was hit by the global recession in late 2008 and early 2009. Unlike many countries, China responded early and quickly to the crisis, implementing one of the largest stimulus packages in the world, at 4 trillion yuan (about US$600 billion), and adjusting its macroeconomic policies as part of its strategic response. As a result, China is one of the few countries that recovered quickly in the second half of 2009. By 2010, Chinese growth had returned to its pre-crisis path.

While China's quick recovery has attracted ample attention from media, business circles, and politicians around the world, only a few studies have analyzed the role of the stimulus package for China to regain its growth momentum. The World Bank, International Monetary Fund (IMF), Asian Development Bank (ADB, 2009), and other international organizations have carried out a number of studies on the impacts of the financial crisis on developing countries, but none of them included China. The Overseas Development Institute (ODI) summarized the impact of the financial crisis on 10 developing countries but only provided a brief description of China's policies for dealing with the financial crisis and a short discussion about the implications for other

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developing countries (Mareike & Kennan, 2009). In China, while quite a few initiatives have been launched to examine the effects of the global recession and the government's measures to alleviate its effects on different sectors of the Chinese economy, few have been published. Wang and Cai (2009), for example, analyzed the impacts of the world financial crisis on domestic employment in China and discussed necessary coping measures. The Development Research Center of State Council (2009) synthesized the Chinese government's measures in response to financial crisis and evaluated their effects.

Aside from these descriptive studies focusing on the short-run impacts of the financial crisis, a few quantitative analyses have been published recently. He, Zhang, and Zhang (2009), for example, assessed the effect of China's stimulus package on output and employment based on two independent models, an input–output (IO) model and the Global Integrated Monetary and Fiscal (GIMF) model calibrated to China. While the IO analysis considers the structure of the Chinese economy and includes 17 production sectors, a linear IO model with fixed input–output coefficients, fixed prices, and perfectly elastic supply often exaggerates the size of intersectoral linkages resulting in unrealistic multipliers (Haggblade, Hammer, & Hazell, 1991). Although the GIMF is a dynamic general equilibrium model, it focuses on the aggregated economy without taking into consideration intersectoral linkages. Liu (2009), on the other hand, conducted a structural vector autoregression analysis to quantify the impact of the global financial crisis on China using data up to 2008. While the results of such an exercise indicate the sizable impact of the decline in economic growth of the United States, the European Union, and Japan on the Chinese economy, it is unable to assess the possible effects of China's stimulus package.

The objective of this paper is to examine quantitatively both the effect of the recent global recession and the Chinese government's stimulus packages on China's economy in both the short- and medium-terms. In this study, a dynamic computable general equilibrium (CGE) model is developed for and applied to China. The study finds that without the introduction of the stimulus package, China's economy could have been more negatively affected by the global recession than it was and the decline in growth from the recession could have lasted for many years. The stimulus package has not only allowed China to avoid a continuous decline in economic growth, but it has also provided China with a different engine for future growth through an enhanced domestic market. In total, the cumulative gains of China's stimulus package, measured by the increases in the country's GDP, will be about 76 trillion renminbi (RMB) over the next 7 years, which is about three times China's 2007 GDP.

The paper is organized as follows. We first describe the CGE model for China in Section 2. The model calibration process is discussed in Section 3. In Section 4, the model is initially applied to quantitatively measure the short- and medium-term impacts of global recession without the government's stimulus packages. Then the stimulus packages are introduced and their potential impacts are simulated using the CGE model. The sensitivity tests are conducted and reported in Section 5. Section 6 concludes.

2. The CGE model for China

A dynamic CGE is developed for this study to assess the economic impacts of the recent global recession and China's stimulus package. Various CGE models have been developed for China and applied to analyze different economic development issues. The most recent examples include Horridge and Witter (2008), who adapted the Australian Economic Regional Model (Horridge, Madden, & Witter, 2005) to China and constructed a highly disaggregated input–output dataset at China's provincial level. While their paper focuses on outlining this unique database prepared for the multi-regional CGE model for China, as an illustrative example, the paper analyzes the short-run economic impact of construction of the rail link between Chongqing and Lichuan. They find that, while GDP increases in both provinces (Chongqing and Hubei), the impact is relatively more modest than that predicted by an input–output model, as regional supply constraints are considered in the CGE model.

While highly sectoral disaggregated CGE models are helpful in understanding inter-sectoral linkages and can better assess the economy-wide impact of policy and public investment, Chari, Kehoe, and McGrattan (2007, hereafter CKM) argue that a prototype growth model with time-varying wedges representing different types of distortions and shocks is equally powerful, particularly in understanding the contributions of different factors to economic growth performance. Following CKM, He, Chong, and Shi (2009) introduce an open economy, dynamic stochastic general equilibrium model with time-varying wedges, representing shocks to total factor productivity (TFP) and real interest rate, and distortions in labor and capital markets. Through this type of accounting exercise, they find that TFP best explains the behaviors of aggregate economic variables in China throughout the reform era between 1978 and 2006. While the foreign debt and the investment wedges are important driving forces of consumption and investment movements, they play a modest role in tracking the direction of output movement after 1994. The third finding of He, Chong, et al. (2009) is that the labor wedge plays a major role in the movement of labor force and the final finding is that the fluctuation of trade balance can be best explained by the movement of the foreign debt wedge. While the first two findings of He, Chong, et al. (2009) are highly relevant to our findings that will be displayed later, the last finding is less relevant given that the movement of China's foreign debt in the recent years is far from comparable to the unprecedented magnitude of the impact of the recent global economic crisis on China's trade.

Our dynamic CGE model is an extension of the static CGE model (e.g., Lofgren, Harris, & Robinson, 2001) and is constructed consistently with the neoclassical general equilibrium theory. The early version of this recursive dynamic CGE model can be found in Thurlow (2004), Diao, Hazell, Resnick, and Thurlow (2007), and Breisinger, Diao, and Thurlow (2009).

Similar to other single country CGE models, China is assumed to be a small open economy in our model in the sense that the international price for each tradable good is exogenous. However, in contrast to a theoretical small open economy model (in which prices are exogenous for the domestic economy and imports/exports are the excess demand/supply), in the CGE model, domestic