

# National model - CHINAGEM

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As a national model, [CHINAGEM](#) has been used by our clients to analyse current economic, social, and environmental issues in China. This research has been used to facilitate major policy-making decisions by identifying potential sources of economic growth. The topics covered so far include:



- the effects of labour market reform, including changes to the *hukou* system,
- the impacts of climate change policy,
- the effects of increasing labour costs,
- the effects of RMB appreciation,
- the effects of property tax,
- the effects of social housing projects,
- the supply and demand conditions for wheat,
- the economic impact of rising oil price,
- China's GFC stimulus package involving subsidies on purchases of household appliances and cars;
- transportation development and related energy demand; and
- the contribution of consumption to economic growth.

There are many potential future applications of CHINAGEM. Examples include analysis of the macroeconomic trends initiated by the new development strategy motivated by slower growth rates, or the need for balancing the economy (for example, to stimulate consumption and encourage service sector growth).

## Model Features

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CHINAGEM is a dynamic CGE model of the Chinese economy that includes 137 sectors. It can be readily modified and expanded to meet specific research requirements. The standard version of CHINAGEM has the following key features:

- Core CGE structure based on the ORANI model;
- Dynamic features in the [MONASH](#) modelling tradition capturing capital accumulation, wage lagged adjustment in labour markets and the accumulation of net foreign assets;
- More than a hundred commodities/industries with more detailed classification for agricultural products than provided in the official input-output tables of China;
- A broad range of economic agencies including producers, investors, consumers, exporters, importers and the government; and
- Two extra modules depicting the labour market and climate change.

## Labour market module

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This module captures the significant distortion in China's labour market caused by the household registration system and other fragmented institutional arrangements. The module has the following equation blocks:

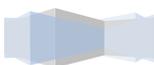
- Supply of labour by category: total labour supply is disaggregated into ten categories to capture the different labour supply behaviour and different mobility between categories (four urban and six rural labour force categories). For example, to capture the floating status of the large volume of rural-urban migrants (145 million in 2009), we distinguish rural-urban migrant workers from other rural workers;
- Demand for labour by activity;
- Wage adjustment in response to the gap between demand and supply;
- Determination of employment outcomes in each activity in each year; and
- Inter-temporal linkages between activity and category.



Rural migrant workers in China

With the labour market module, CHINAGEM has been used to analyse various labour market issues which include:

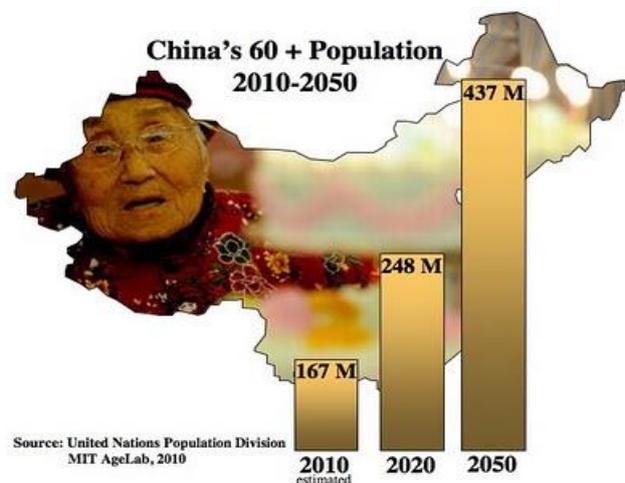
- [Economic impact of rural migration](#);
- [Estimation of the size of rural surplus labour](#);
- [Impact of rural migration on rural urban household income inequality](#);
- Social security coverage for rural migrant workers;



- Economic impact of further *hukou* system reform and
- [Economic impact of increasing retirement age in China.](#)

Future applications of the labour market module may address issues such as

- growth potential triggered by increasing investment in human capital to improve labour productivity against the background of increasing labour cost driven by the shrinking rural labour surplus, lower and eventually (from 2015) negative expansion of the working age population and rapid ageing;
- social security reform such as the establishment of a well-functioning and financially sustainable pension system which should cover not only urban but also rural workers and rural migrant workers to prepare for the expected fast increase in the aging population;
- labour market forecasting with high levels of industry and occupation disaggregation to provide a useful guide for the allocation of training resources so that the skills provided by the formal education and training sector conform to the needs of industry. The rapid economic growth and technology development in China imply a relatively fast evolution of economic structure which generates fast change in labour demand. Regularly updated labour market forecasting will address the mismatch between labour demand and supply and help to avoid wastage of training resources and human resources (for example, millions of college graduates have been forced to work in the informal sectors or become self-employed, and have had to live in the fringe of big cities as “ant tribes” in China).



## Climate change module

This module was developed to meet the Chinese government’s green development strategy. “Green development” is a pattern of development that decouples growth from heavy dependence on resource use, carbon emissions, and environmental damage. In its 12<sup>th</sup> Five Year Plan, the Chinese government emphasized continued rapid growth together with ambitious targets for energy efficiency, natural resource management, and environmental sustainability. To facilitate the decision making on energy policy, carbon tax and related environmental policies, CoPS developed the climate change module to incorporate into CHINAGEM. This module is based on CoPS’s high profile MMRF model which was used in Australia Garnaut Climate Change Review and Treasury. The module has the following equation blocks:

- CO<sub>2</sub> emission accounting;
- Carbon tax;
- Substitution of electricity generated from different types of fuels;
- Demand for motor vehicle and petrol as a compound commodity group; and
- Carbon price and emission trading.

Since it was introduced, the module has been used to analyse the effects of carbon taxation, coal efficiency in power generation and renewable energy in power generation. For the details please see the [collection of research papers](#).

The climate change module can be modified to be applied to various environmental policy applications in China including water pollution management, energy efficiency, or the effect of green development strategies on carbon emissions.

