China's Urban–Rural Disparity under Alternative Financial and Fiscal Policies

Iwan Azis, Wing Thye Woo**, Zhai Fan*** and Chanin Manopiniwes*****

Premier Wen Jibao, when asked about how the Chinese government would deal with the overheating economy as indicated by the expanding money supply, bank credit and fixed investment, in a Reuters interview in April 2004, said: "We need to take effective and very forceful measures to resolve those problems as soon as possible." A year later, the Premier submitted a report to the National People's Congress, emphasizing the need for China to pursue a people-centered development strategy and to promote a comprehensive and coordinated development between the economy and the society, between urban and rural areas, and among all regions. Clearly, the major challenge for the Chinese government is to formulate a set of policies that would slow down the rapid growth of the economy, and at the same time, reduce the urban–rural disparity and income inequality. This paper presents the results of a joint research with China's DRC/State Council on macroeconomic and financial policies that will insure a soft landing and reduce the urban–rural disparity. Due to the economy-wide nature of the issue, a comprehensive 'financial general equilibrium' model is developed and used to simulate a set of policy scenarios. It is found that a standalone policy of capital account liberalization tends to enhance growth but worsen the income disparity, while reducing the growth of bank's credit is likely to generate the opposite effects. By exploring a set of policy mix, it is revealed that there is room for China to tighten credit, and at the same time, liberalize the capital account. This will lead to a soft landing without worsening the income distribution and the rural-urban gap. The short-run increase in the rural-urban migration (among unskilled workers) will gradually decline and eventually cease. The simulation results generally support a gradual liberalization of the capital account.

1. Introduction

Economic management in China, since the beginning of 2003, has come under three heavy pressures: First, external pressures to open up the capital account and to appreciate the Renminbi (RMB) against the US dollar; second, internal demand for continued price stability as the macroeconomy shows increasing signs of overheating; and third, internal pressures to improve

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income distribution, especially by raising rural income and accelerating growth in the Western and Northeastern provinces.

The United States and Japan have been increasing their objections to what they regard as an undervalued Renminbi (RMB) in the face of persistent surpluses in the current account and the capital account of China's balance of payments. But China's leaders are very reluctant to change the present value of the US$-RMB peg. Instead, they prefer to gradually liberalize the capital account so that it would result in private capital outflows that might throw the capital account, if not the balance of payments position, into deficit.

The second pressure stemmed from overheating economy.[1] The increasing signs emerged particularly during the last part of 2003 and the first part of 2004 where the year over year(YOY) GDP growth rate was 9.9% in 2003:4Q, and 9.8% in 2004:1Q, and fixed investment grew to 53% in January 2004, 53.0% in February 2004, and 43.5% in March 2004. The government reacted with a tightening of macroeconomic policies and brought GDP growth down to 9.6% in 2004:2Q, and fixed investment growth to 34.7% in April 2004, 18.3% in May 2004, and 22.7% in June 2004. The inflation rate (CPI-based) continued to rise however, reaching 5% in June 2004. The result is continuation of anti-overheating policies.[2]

The third major political pressure on economic management is the worsening of income distribution between the rich and the poor, between urban and rural residents, and between coastal and inland provinces. Li and Yue (2004) report that the Gini coefficient measure of income inequality within the rural sector has risen from 0.31 in 1990 to 0.36 in 2001, and the Gini coefficient of income inequality within the urban sector has risen from 0.23 to 0.32. The gap between per capita rural income and per capita urban income has also widened significantly over the 1990-2001 period.[3] Woo, Li, Yue, Wu and Xu (2004) also show that the proportion of rural residents with income below 50 cents has risen from 1.8% in 1996 to 2.9% in 2002. Furthermore, the average income of the poorest group within the rural poor has fallen over the 1990-2002 period, and the squared poverty gap index shows that the distributions of income for folks below the poverty lines of 50-cent and 75-cent have become more unequal since 1990. Greater inequality has come along with the increase in extreme poverty.

It is instructive to note for later discussion that the rural-urban gap was not always widening during the era of market-oriented reforms. The rural-urban income ratio had narrowed dramatically from 38.9% in 1978 to 54.9% in 1983. The high growth in rural income during the 1979-1984 period was the result of large increases in agricultural productivity generated by the de-collectivization of the agricultural communes, and the partial deregulation of

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[1] The following are the often cited signs: The (real) GDP growth rate of 9.1% and the (nominal) total investment growth rate of 26.7% in 2003 compared to their respective growth rates of 8.0% and 16.9% in 2002, the year-over-year (yoy) CPI growth rate of 3.2% in December 2003 compared to negative 0.4% in December 2002, and, the increasingly severe electric power shortages in coastal China as 2003 progressed.

[2] On August 9, 2004, the People's Bank of China predicted that inflation would go up further in 2004:3Q even though GDP growth is expected to decline further (see "Warning on accelerating inflation". *South China Morning Post*. August 10, 2004).

[3] According to Li and Yue (2004), the actual rural-urban income gap in 2002 was actually much larger than what is officially reported: "In 2001, per capita income in the urban is about three times that of rural area. But we don't think this measure truly represents human well-being. Urban dwellers can get various subsidies, such as public health care, basic education subsidy, pensions, unemployment insurance, minimum living expense guarantee, whereas farmers can't enjoy these benefits. Once these subsidies are accounted, income disparity between the urban and rural area may be as large as 4, 5, or 6 times. If non-monetary factors are included, China's rural-urban income disparity is the largest in the world."

agricultural markets. This 1979-1984 experience therefore suggests that any attempt to reduce the rural-urban gaps should have a strong component that boosts the agricultural sector.

The main purpose of this study is to evaluate the general equilibrium impacts of alternative financial policies on income disparity between urban and rural households, and on the migration trend in China.[4] The alternative financial policies to be evaluated are (1) the opening up of China's capital account as a means to restore balance of payments equilibrium, and (2) the reduction of bank credit growth to prevent overheating of the economy.

Two sets of analysis are made, i.e., one based on a fixed price model of Structural Path Analysis (SPA), and one based on an endogenous price model of Financial Computable General Equilibrium (FCGE).

2. Model Framework

Consider the following SAM multiplier:

$$y_n = A_n\, y_n + x = (I - A_n)^{-1} x = M_n\, x$$

Where, y_n is the vector of endogenous receipts, A_n is the matrix of average expenditure propensities, and x is the vector of exogenous receipts. While useful, this multiplier does not reveal the network of paths through which an injection is transmitted. Decomposing it into individual paths of transmission (SPA), one yields much more useful insights (see Defourny and Thorbecke, 1984).

SPA recognizes three types of 'influences:' (1) Direct Influence *(DI)*; (2) Total Influence *(TI)*; and (3) Global Influence *(GI)*.[5] The Direct Influence $DI_{i,j}$ travels through the elementary path that connects two poles i and j: $DI_{i,j} = a_{ij}$. But $DI_{i,j}$ can also travel along a *path (i, ..., j)* with length greater than one, in which case its magnitude is the product of the intensities of the arcs connecting the path. Total influence $TI_{i,j}$ along the *path (i, ..., j)* is defined as $DI_{i,...,j}$ plus all of the indirect effects of the circuits formed along that path. For example, the direct influence $a_{xi}\, a_{yx}$ is transmitted back from y to x, creating a circuit with the magnitude $(a_{xi}\, a_{yx})\,(a_{xy} + a_{xy} a_{xy})$. which in turn is transmitted back to y. Hence, a series of feedback impulses are generated along that circuit, yielding a new set of multipliers: $a_{xi}\, a_{yx}\,[1 - a_{yx}\,(a_{xy} + a_{xy} a_{xy})]^{-1}$. To compute total influence, the whole term of the equation is multiplied by a_{jy} because an influence has to traverse the *arc (y, j)* before reaching the final destination at pole j. The resulting total influence $TI_{i,j}$ is therefore: $TI_{i,j} = a_{xi} a_{yx} a_{jy}\,[1 - a_{yx}\,(a_{xy} + a_{xy}\, a_{xy})]^{-1}$. The global influence GI is derived by taking the cumulative impact of all total influences (see Figure 1).

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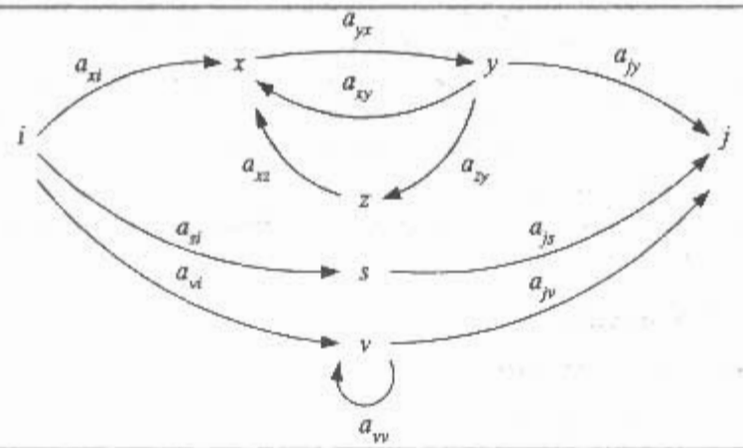
[4] The importance of these two socio-economic phenomena is pointed out clearly in the recently published *OECD Economic Surveys: China*. The report states: ".....policy changes are needed to reduce the disparities between rural and urban incomes and increase the pace of urbanization" (OECD, 2005).

[5] The starting point in an SPA is to equate the intensity of an "influence" traveling from pole i to pole j as the SAM average propensity a_{ij} (an "influence" is the metaphor in the literature for an additional flow of income or output, which can be either positive or negative). Define an *arc (i, j)* as the link between the pole of origin and that of destination. Define a path as a sequence of consecutive arcs—the length of which is the number of arcs between the origin and destination poles. For example, *arc (i, j)* is a path with unit length, whereas *path (i, x, y, j)* has length equal to three. An 'elementary path' is a path that does not pass more than once through the same pole. In contrast, a circuit is a path for which the starting pole of an influence is also its destination pole. For example, the *path (x, y, z, x)* is a circuit.

Figure 1: Global Influence
(All Elementary Paths and Circuits Linking I and j)



While it provides more insights into the mechanisms of a policy shock, SPA suffers from the lack of behavioral equations, the absence of endogenous prices, and the assumption that there is always an excess capacity. Relaxing these factors, while maintaining the consistency and complexity of the interrelations provided by SPA, requires an alternative model involving a set of non-linear equations and optimization systems. In this study we use a dynamic Financial Computable General Equilibrium (FCGE) model, the main structure of which is described below.

While not rigorous yet, market forces have clearly played an increasing role in the Chinese economy. What needs to be analyzed further is whether China's policy choices are in fact leading to institutions harmonized with normal market economies or to more distinctive innovations. The recent policy trend has been towards institutional harmonization rather than institutional innovation, suggesting that the government accepts that the ingredients for a dynamic market economy are already well-known (Sachs and Woo, 1997). Some components of market mechanisms can therefore be introduced legitimately in modeling the Chinese economy.

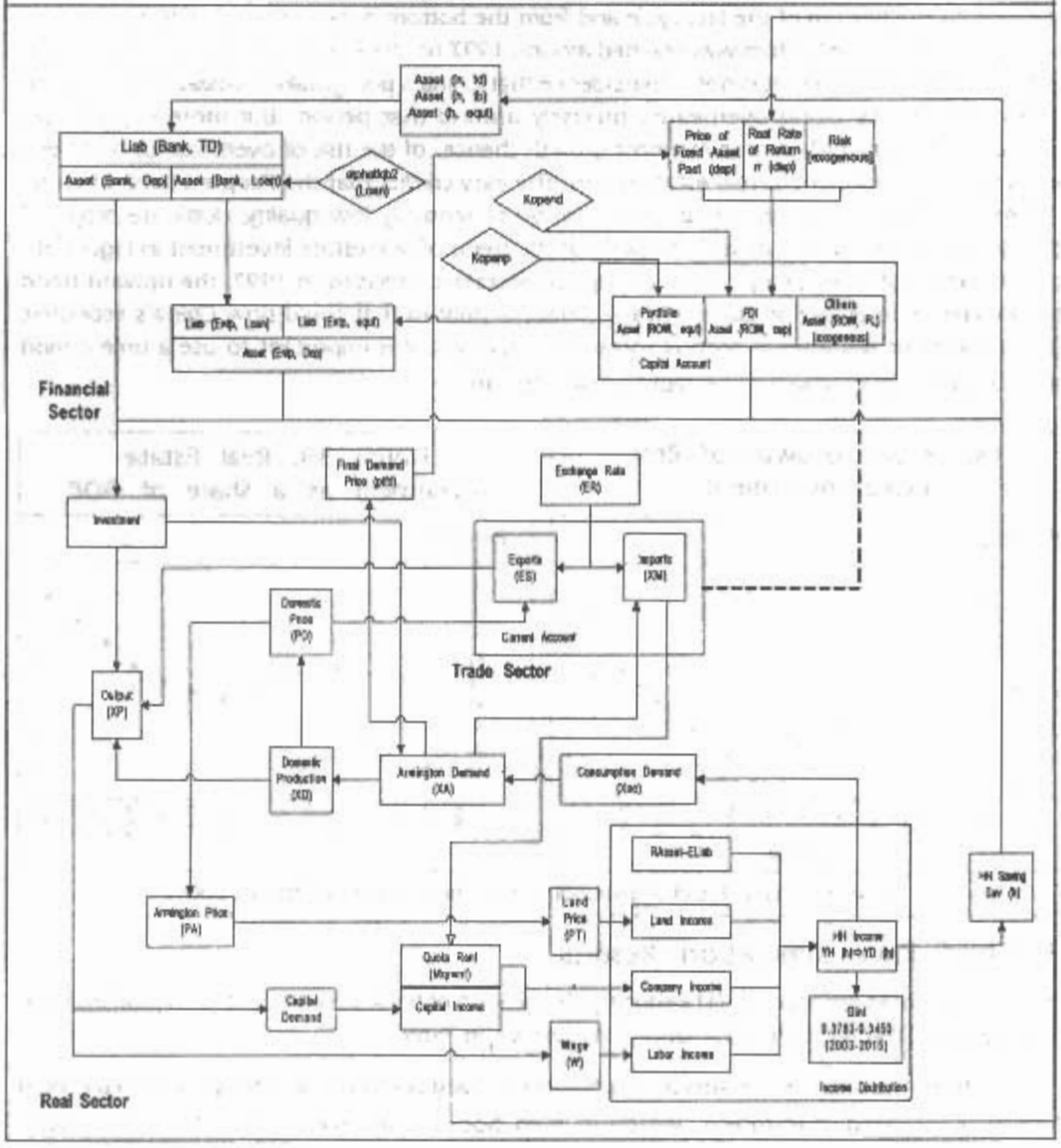
In the FCGE model we incorporate the structural features of China's financial sector such as fixed interest and exchange rates, commercial banks' credit rationing, and Nonperforming Loan (NPL)-related lending risks. There are five blocks in the model: Production, factor, trade, financial, and household income blocks. Brief specifications of the model (in total there are 6,900 equations) are described in the Appendix; the complete list of equations is available upon request.

The interactions among financial, trade and real sector blocks hold the key to the mechanisms of a policy shock. The transmission from the shocks to the variables of interest itself is fairly complex. Consider the case where China's policymakers decide to lower the growth rates of credit due to overheating economy. The main transmission for such a policy shock is through the balance sheets of banks and enterprises (see the upper left hand of the diagram in Figure 2). These changes in the financial sector affect the real sector by reducing the level of investment, output, and factor demand. In turn, this determines the returns of different factors of production

and household incomes (see the lower part of the diagram in Figure 2). The saving channels, including those of the household savings, subsequently close the system loop.

Another example shown in the diagram is the transmission mechanism of financial liberalization. This is conducted by introducing a shock in parameters representing the degree of openness to portfolio investment (Kopenp) and to FDI and other assets (Kopend). As indicated in Figure 2, influenced by changes of these parameters and changes in the price and the real rate of return to assets, the portfolio investment and FDI will increase, resulting in a higher total investment and output (XP). This in turn determines the new equilibrium in the factor

Figure 2: Summarized Flowchart of the FCGE Model: Effects of a Cut in the Growth Rate of Bank's Credit and of Capital Account Liberalization



markets. The resulting wages, along with incomes of other factors (land and enterprises), and also combined with the asset position of households (RAsset–Eliab), will determine households' disposable incomes (YD). Obviously, the transmission mechanism is far more complex than this, but the above description basically summarizes the main part of it.

The main data system used in the model is the 1997 China's financial SAM (FSAM). The original FSAM is a highly detailed 174X174 matrix which includes 38 sectors classified into exporting and non-exporting activities. There are five factors of production, 11 assets/liabilities types, and 17 institutions. The latter includes enterprises (SOEs and non-SOEs), government account, government off-budget account, commercial banks, central bank, foreign sector, and ten household groups differentiated into urban and rural categories.

1997 is selected as the base year for at least two crucial reasons. From the early 1990s, China's economic growth had gone through a major cycle as indicated by the growth rate of real fixed investment shown in Figure 3A. Interestingly, it took around four to six years from the peak to the bottom of the last cycle and from the bottom back to the peak. With the peak occuring in 1993, the bottom was reached around 1997 or 1999, from which point the growth tends to accelerate again. It is not a coincidence that China's policymakers voiced their concern over the economy being overheated precisely around that period. But more importantly, the potential source of rapid investment growth (hence, of the risk of overheating) had been known to be investment in real estate sector. The easy credits that the People's Bank of China (2004) has characterized as "the blind expansion of seriously low quality, duplicate projects" clearly apply to this sector as well. Looking at the trend of real estate investment in Figure 3B, the prediction of many analysts was clearly not mistaken. Precisely in 1997, the upward trend began. Hence, in analyzing counterfactual financial policies that could slow China's economic growth without resulting in serious social repercussions, it is important to use a time period starting in the year at which the rapid growth began.

Figure 3A: Growth of Real Fixed Investment

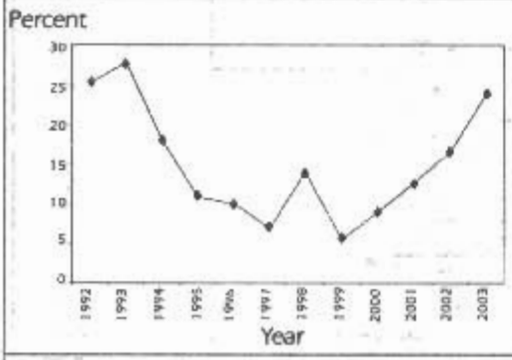
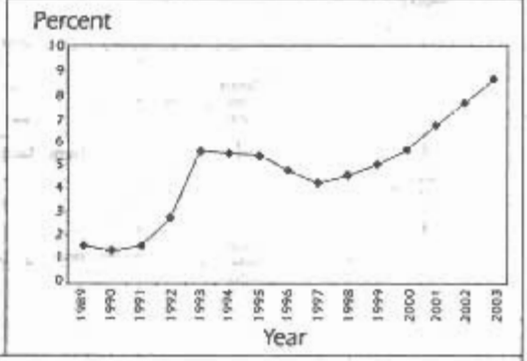


Figure 3B: Real Estate Investment as a Share of GDP



Sources: China Statistical Yearbook 2003; China Statistical Abstract 2004.

3. Fixed Price Simulation Results

Two policy shocks are applied: (1) Reducing the growth of bank's credit; and (2) capital account liberalization. The results of simulations are shown in Table 1.

The three most affected sectors are construction, livestock, and machinery. Increased capital inflows raise fixed investment, which in turn boosts the production of these sectors.

Table 1: Structural Path Analysis: Capital Flows and Credit as the Pole of Origin, Based on 1997 SAM of China

Case	Origin of Shock (i)	Destination (j)	Global Influence (GI)	Elementary Path (i → j)	Direct Influence (DI)	Path Multiplier (Mp)	Total Influence (TI)	TI/GI
1	Kinflow	UrbanLo	0.134	Kinflow → FixInvest → Machinery → ProdWorker → UrbanLo	0.001	2.975	0.003	2.6
				Kinflow → FixInvest → Construct → ProdWorker → UrbanLo	0.01	2.442	0.023	17.4
				Kinflow → FixInvest → Construct → Professional → UrbanLo	0.001	2.24	0.003	2.2
				Kinflow → CAEntp → FixInvest → Construct→ProdWorker → UrbanLo	0.001	3.102	0.004	2.9
				Kinflow → FixInvest → Construct → BuildMat → ProdWorker → UrbanLo	0.002	2.911	0.005	3.9
2	Kinflow	UrbanMedLo	0.178	Kinflow → FixInvest → Machinery → ProdWorker → UrbanMedLo	0.001	2.989	0.004	2.4
				Kinflow → FixInvest→Construct → ProdWorker → UrbanMedLo	0.012	2.454	0.029	16.1
				Kinflow → FixInvest→Construct → Professional → UrbanMedLo	0.002	2.244	0.005	3
				Kinflow → CAEntp→FixInvest→Construct → ProdWorker → UrbanMedLo	0.002	3.116	0.005	2.7
				Kinflow → FixInvest → Construct → BuildMat → ProdWorker → UrbanMedLo	0.002	2.924	0.006	3.6
3	Kinflow	UrbanMed	0.21	Kinflow → FixInvest → Machinery → ProdWorker → UrbanMed	0.002	3	0.005	2.2
				Kinflow → FixInvest → Construct → ProdWorker → UrbanMed	0.013	2.463	0.031	15
				Kinflow → FixInvest → Construct → Professional → UrbanMed	0.003	2.246	0.007	3.5
				Kinflow → CAEntp → FixInvest→Construct → ProdWorker → UrbanMed	0.002	3.127	0.005	2.5
				Kinflow → FixInvest → Construct → BuildMat → ProdWorker → UrbanMed	0.002	2.935	0.007	3.4
4	Kinflow	UrbanMedHi	0.247	Kinflow → FixInvest → Machinery → ProdWorker → UrbanMedHi	0.002	3.016	0.005	2
				Kinflow → FixInvest→Machinery → Professional → UrbanMedHi	0.001	2.75	0.003	1.1
				Kinflow → FixInvest→Construct → ProdWorker → UrbanMedHi	0.014	2.477	0.034	13.7
				Kinflow → FixInvest→Construct → Professional → UrbanMedHi	0.004	2.251	0.01	4
				Kinflow → CAEntp→FixInvest → Construct → ProdWorker → UrbanMedHi	0.002	3.143	0.006	2.3
				Kinflow → FixInvest→Construct → BuildMat → ProdWorker → UrbanMedHi	0.003	2.95	0.008	3.1
				Kinflow → FixInvest→Construct → BuildMat → Professional → UrbanMedHi	0.001	2.702	0.003	1.3

Contd...

Table 1: Structural Path Analysis: Capital Flows and Credit as the Pole of Origin, Based on 1997 SAM of China *(Contd...)*

Case	Origin of Shock (i)	Destination (j)	Global Influence (GI)	Elementary Path (i→j)	Direct Influence (DI)	Path Multiplier (Mp)	Total Influence (TI)	TI/GI
5	K inflow	UrbanHi	0.32	K inflow → FixInvest → Machinery → ProdWorker → UrbanHi	0.002	3.049	0.005	1.7
				K inflow → FixInvest → Machinery → Professional → UrbanHi	0.001	2.763	0.004	1.3
				K inflow → FixInvest → Construct → ProdWorker → UrbanHi	0.015	2.505	0.037	11.4
				K inflow → FixInvest → Construct → Professional → UrbanHi	0.006	2.262	0.014	4.5
				K inflow → CAEntp → FixInvest → Construct → ProdWorker → UrbanHi	0.002	3.175	0.006	1.9
				K inflow → FixInvest → Construct → BuildMat → ProdWorker → UrbanHi	0.003	2.981	0.008	2.6
				K inflow → FixInvest → Construct → BuildMat → Professional → UrbanHi	0.002	2.714	0.005	1.4
				K inflow → FixInvest → Construct → OthServ → Professional → UrbanHi	0.001	2.686	0.003	0.9
				K inflow → FixInvest → Construct → Capital → Enterprise → UrbanHi	0.001	2.469	0.003	0.9
6	K inflow	RuralLo	0.078	K inflow → FixInvest → Construct → ProdWorker → RuralLo	0.002	2.567	0.004	5.2
7	K inflow	RuralMedLo	0.115	K inflow → FixInvest → Construct → ProdWorker → RuralMedLo	0.003	2.605	0.008	6.7
8	K inflow	RuralMed	0.126	K inflow → FixInvest → Construct → ProdWorker → RuralMed	0.004	2.593	0.01	7.6
9	K inflow	RuralMedHi	0.179	K inflow → FixInvest → Livestock → AgriLab → RuralMedHi	0.001	3.14	0.004	2.2
				K inflow → FixInvest → Construct → ProdWorker → RuralMedHi	0.006	2.628	0.015	8.6
				K inflow → FixInvest → Construct → BuildMat → ProdWorker → RuralMedHi	0.001	3.131	0.003	1.9
10	K inflow	RuralHi	0.339	K inflow → FixInvest → Livestock → AgriLab → RuralHi	0.002	3.21	0.006	1.9
				K inflow → FixInvest → Machinery → ProdWorker → RuralHi	0.002	3.296	0.005	1.5
				K inflow → FixInvest → Construct → ProdWorker → RuralHi	0.013	2.707	0.035	10.2
				K inflow → CAEntp → FixInvest → Construct → ProdWorker → RuralHi	0.002	3.432	0.006	1.7
				K inflow → FixInvest → Construct → BuildMat → ProdWorker → RuralHi	0.002	3.223	0.008	2.3
				K inflow → FixInvest → Construct → Capital → Enterprise → RuralHi	0.001	2.682	0.003	0.8

Contd...

Table 1: Structural Path Analysis: Capital Flows and Credit as the Pole of Origin, Based on 1997 SAM of China *(Contd...)*

Case	Origin of Shock (I)	Destination (J)	Global Influence (GI)	Elementary Path (I→J)	Direct Influence (DI)	Path Multiplier (Mp)	Total Influence (TI)	TI/GI
11	K inflow	Enterprise	0.757	K inflow → FixInvest → Machinery → Capital→Enterprise	0.012	2.86	0.034	4.5
				K inflow → FixInvest → Automobile → Capital → Enterprise	0.002	3.414	0.007	1
				K inflow → FixInvest → OthTrEq → Capital → Enterprise	0.002	2.797	0.007	0.9
				K inflow → FixInvest → ElecMach → Capital → Enterprise	0.001	2.689	0.003	0.4
				K inflow → FixInvest → Electronic → Capital → Enterprise	0.002	3.289	0.006	0.7
				K inflow → FixInvest → Construct → Capital → Enterprise	0.029	2.344	0.068	8.9
				K inflow → FixInvest → Commerce → Capital → Enterprise	0.001	2.852	0.003	0.4
12	Credit	UrbanLo	0.127	Credit → CAEntp → FixInvest → Construct → ProdWorker → UrbanLo	0.007	3.115	0.023	17.8
				Credit → CAEntp → FixInvest → Construct → Professional → UrbanLo	0.001	2.871	0.003	2.3
13	Credit	UrbanMedLo	0.169	Credit → CAEntp → FixInvest → Machinery → ProdWorker → UrbanMedLo	0.001	3.807	0.004	2.4
				Credit → CAEntp → FixInvest → Construct → ProdWorker → UrbanMedLo	0.009	3.129	0.028	16.4
				Credit → CAEntp → FixInvest → Construct → Professional → UrbanMedLo	0.002	2.875	0.005	3.1
14	Credit	UrbanMed	0.198	Credit → CAEntp → FixInvest → Machinery → ProdWorker → UrbanMed	0.001	3.82	0.005	2.3
				Credit → CAEntp → FixInvest → Construct → ProdWorker → UrbanMed	0.01	3.14	0.03	15.3
				Credit → CAEntp → FixInvest → Construct → Professional → UrbanMed	0.002	2.877	0.007	3.6
15	Credit	UrbanMedHi	0.233	Credit → CAEntp → FixInvest → Machinery → ProdWorker → UrbanMedHi	0.001	3.839	0.005	2.1
				Credit → CAEntp → FixInvest → Construct → ProdWorker → UrbanMedHi	0.01	3.157	0.033	14
				Credit → CAEntp → FixInvest → Construct → Professional → UrbanMedHi	0.003	2.882	0.009	4.1
16	Credit	UrbanHi	0.302	Credit → CAEntp → FixInvest → Machinery → ProdWorker → UrbanHi	0.001	3.877	0.005	1.7
				Credit → CAEntp → FixInvest → Machinery → Professional → UrbanHi	0.001	3.529	0.004	1.3
				Credit → CAEntp → FixInvest → Construct → ProdWorker → UrbanHi	0.011	3.189	0.035	11.6
				Credit → CAEntp → FixInvest → Construct → Professional → UrbanHi	0.005	2.894	0.014	4.6

Contd...

Table 1: Structural Path Analysis: Capital Flows and Credit as the Pole of Origin, Based on 1997 SAM of China

Case	Origin of Shock (i)	Destination (j)	Global Influence (GI)	Elementary Path (i→j)	Direct Influence (DI)	Path Multiplier (Mp)	Total Influence (TI)	TI/GI
17	Credit	RuralLo	0.075	. . . . . → CAEntp → FixInvest → Construct → ProdWorker → RuralLo	0.001	3.273	0.004	5.2
18	Credit	RuralMedLo	0.111	Credit→CAEntp→FixInvest→ Construct→ ProdWorker → RuralMedLo	0.002	3.321	0.007	6.7
19	Credit	RuralMed	0.122	Credit→CAEntp→FixInvest → Construct → ProdWorker → RuralMed	0.003	3.306	0.009	7.6
20	Credit	RuralMedHi	0.172	Credit→CAEntp→FixInvest→ Construct → ProdWorker → RuralMedHi	0.004	3.348	0.015	8.6
21	Credit	RuralHi	0.325	Credit → CAEntp → FixInvest → Livestock → AgriLab → RuralHi	0.001	4.098	0.006	1.9
				Credit → CAEntp → FixInvest → Machineryv ProdWorker ? RuralHi	0.001	4.19	0.005	1.5
				Credit → CAEntp →FixInvest → Construct → ProdWorker ? RuralHi	0.01	3.446	0.033	10.3
22	Credit	Enterprise	0.72	Credit → CAEntp → StkChange → Food → Capital → Enterprise	0.001	3.614	0.004	0.6
				Credit → CAEntp → FixInvest → Machinery → Capital → Enterprise	0.009	3.609	0.033	4.5
				Credit → CAEntp → FixInvest → Automobile → Capital → Enterprise	0.002	4.309	0.007	1
				Credit→CAEntp→ FixInvest →OthTrEq → Capital → Enterprise	0.002	3.531	0.006	0.9
				Credit → CAEntp → FixInvest → Electronic → Capital → Enterprise	0.001	4.153	0.005	0.7
				Credit → CAEntp → FixInvest → Construct→Capital → Enterprise	0.022	2.959	0.065	9

The increase in the livestock production benefits agricultural labor, which in turn raises the incomes of rural households, particularly those of the high and medium-high category. Production increase in the construction sector creates multiplier effects to two other sectors, i.e., other services and building materials, all of which increase the wages of professional workers. The latter are also benefited by the increase in machinery production. This translates into higher incomes of most households in the urban area. Production workers also gain, and this affects the incomes of both urban and rural households.

It is clear that in the case of the path originating in the increased capital inflows due to liberalization, the top three largest Global Influences (GI) are those that end in the following household categories: Rural high (0.34), urban high (0.32), and urban medium-high (0.25). A large part (10.2%) of the GI affecting the incomes of rural high households is exercised 'indirectly' through increased fixed investment, construction sector, and production workers. For the effect of the shock on incomes of urban high and urban medium-high households, a large part (11.4 and 13.7%, respectively) of GI is also exercised indirectly through the same path.

Based on the size of GI, it is rather surprising that the largest beneficiary of capital account liberalization is the rural high income households by way of increased capital. Presumably SOEs and TVEs operate in activities that benefit the rural high income households. However, evaluating the income distribution effect by focusing on this household category alone is deceiving. Ranking all households by the size of the income increase (hence GI too) shows that among the four largest beneficiaries, three are urban households among which those with high incomes gain the most (see Figure 4A).[6] Thus, in both rural and urban areas the largest gain goes to the high income households, implying that the overall income disparity gets worse, and so does the urban–rural income disparity.

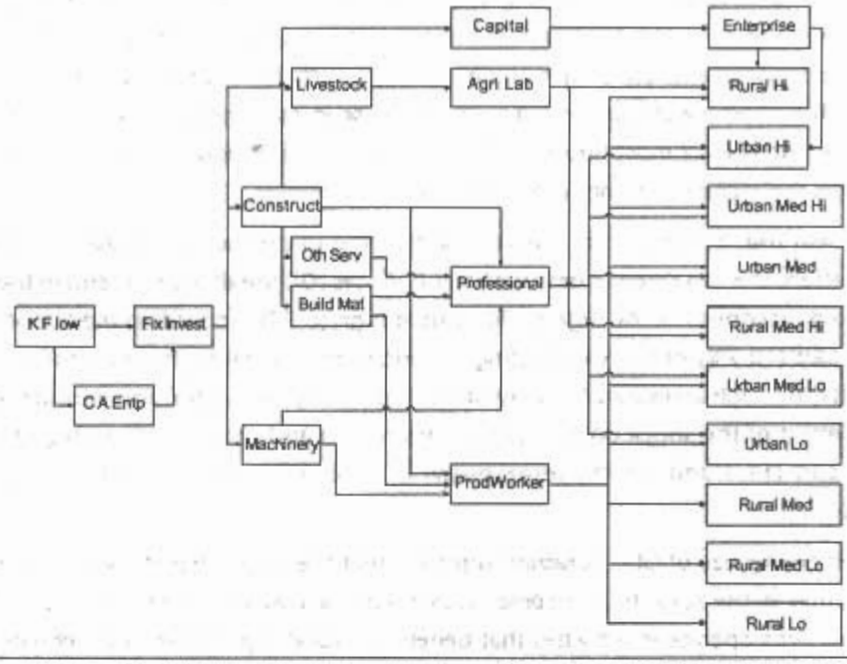
The effect of reducing credit in order to cope with the overheating economy affects the same three sectors, although unlike in the previous case the construction, not the livestock, is the most affected sector. With same order of the effects in the factors market as in the previous shock, the overall ranking of households category is essentially also the same (see Figure 4B). Thus, while capital account liberalization worsens the income distribution and urban–rural disparity, reducing the growth of bank's credit is likely to generate the opposite effects.

4. Endogenous Price Simulation Results

The validity of the above conclusion obviously depends on the strict assumptions of SPA described earlier. We therefore proceed with the analysis using the FCGE model. The first stage is to generate a baseline scenario spanning from 2003 to 2015, in which the annual growth of China's GDP is estimated between 8.4 and 9.3%. Among other endogenous variables generated in the baseline are wages, unemployment, migration, and eventually household incomes. It is against these baseline values that the simulation results of policy shocks are to be compared with.

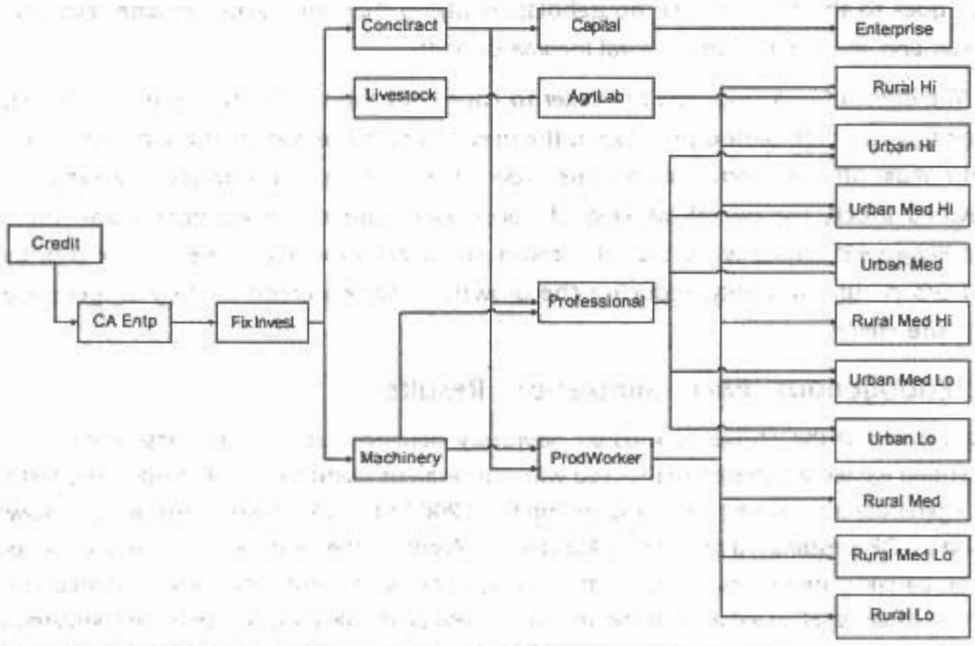
[6] Urban Hi, Urban Med Hi, Urban Med, Urban Med Lo and Urban Lo are for Urban households, whereas Rural Hi, Rural Med Hi, Rural Med, Rural Med Lo and Rural Lo stand for Rural households.

Figure 4A: SPA under the Capital Account Liberalization



Note: Urban Hi, Urban Med Hi, Urban Med, Urban Med Lo and Urban Lo are for Urban households, whereas Rural Hi, Rural Med Hi, Rural Med, Rural Med Lo and Rural Lo stand for Rural households.

Figure 4B: SPA under a Cut in the Growth Rate of Bank's Credit



Note: Urban Hi, Urban Med Hi, Urban Med, Urban Med Lo and Urban Lo are for Urban households, whereas Rural Hi, Rural Med Hi, Rural Med, Rural Med Lo and Rural Lo stand for Rural households.

The dynamic nature of the impact of a shock involves not only an intricate mechanism of transmissions but also non-monotonic changes of variables of interest over time. Thus, we need to trace these changes over some periods. Furthermore, the direct, indirect and feedback effects of a shock may take place with certain time-lags: Some are more immediate than others. Also, a reversed trend (e.g., from increasing to declining) may only occur in the medium or long run as later shown to be the case of rural-urban migration under a policy-mix scenario. In this study, we use a forecast period of 12 years, spanning from 2003 to 2015. Another advantage of using a relatively longer period is that it allows us to measure the trade-offs involved in the process of policy evaluation.

The cut in the bank's credit is such that the credit growth rates decline gradually from 10% in 2004 to 3.8% in 2015, compared to 14.7% to 6.2% in the baseline, respectively (see Figure 5). As expected, trying to cope with overheating economy by cutting the growth of bank's credit would make the price index and the growth rates of the economy lower than in the baseline. Consequently, the unemployment rates would be higher. In fact, the rates continue to increase during the forecast period (see Figures 6 and 7). Per-labor wages in all categories are lower than in the baseline, and the per-capita urban–rural income gaps also tend to be narrower. As a result, the rural-urban migrations are lower than in the baseline (Figures 8 to 10; note that negative migration index means less rural-to-urban migration). Overall, this policy tends to generate lower Equivalent-Variations (EV) for all household categories.

Figure 5: Growth Rates of Bank's Credit

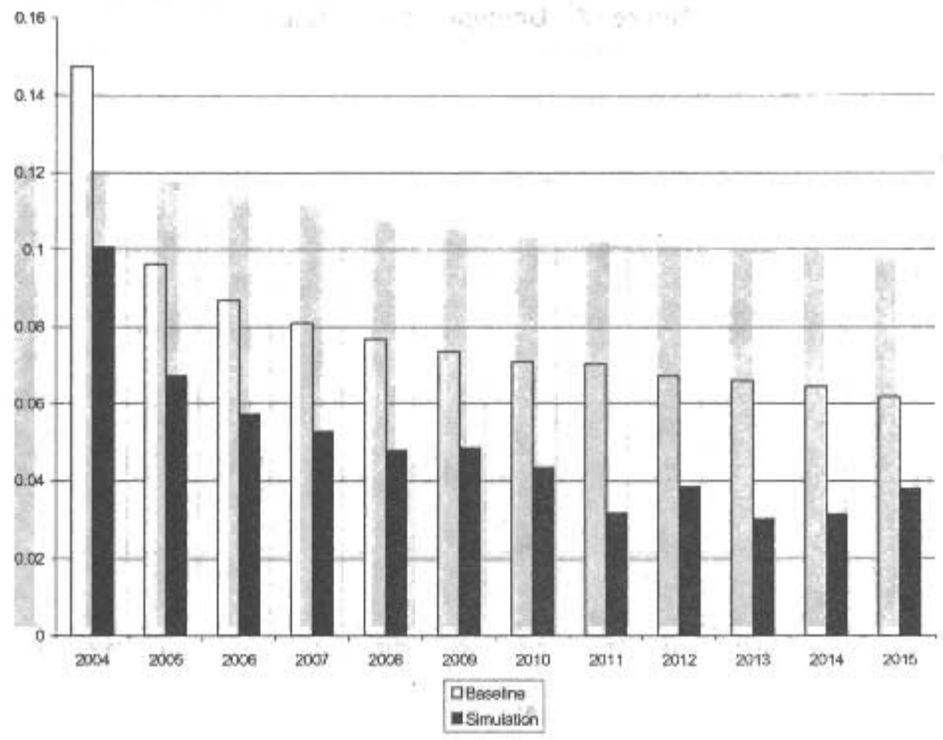


Figure 6: Growth Rate of Real GDP

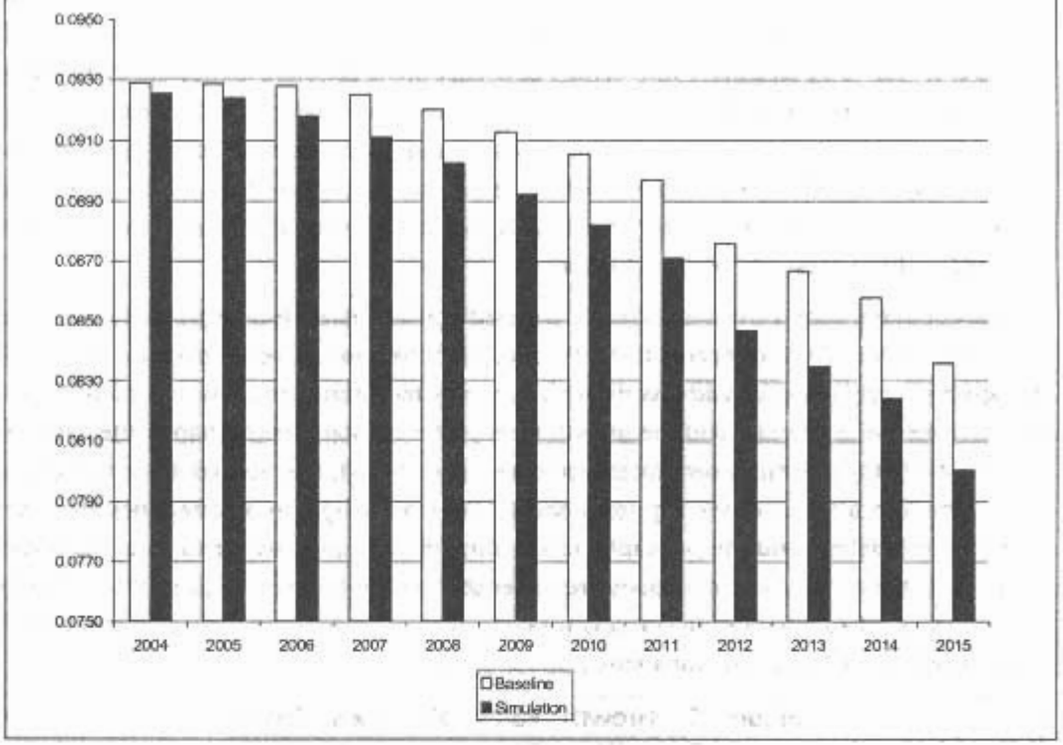


Figure 7: Unemployment Rate

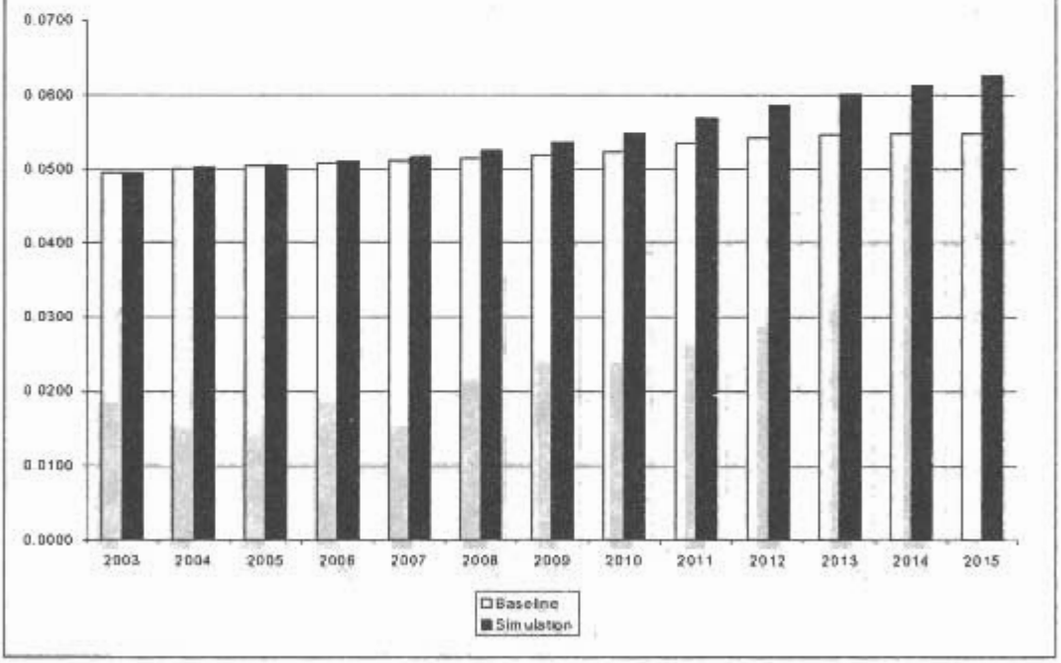


Figure 8: Urban–Rural Per Capita Income Gap

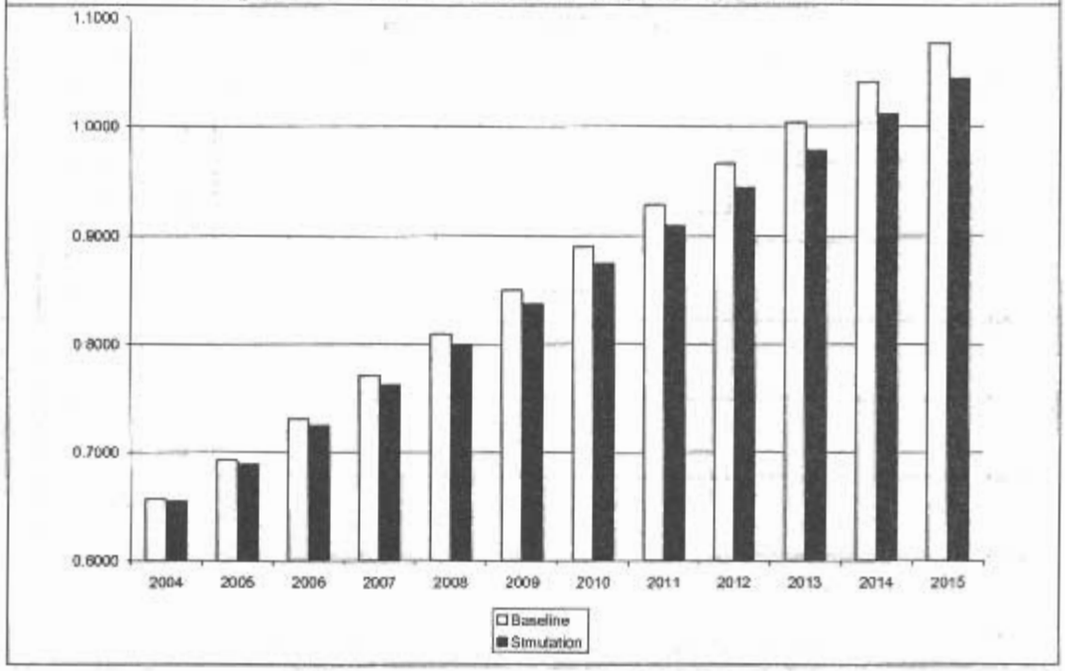
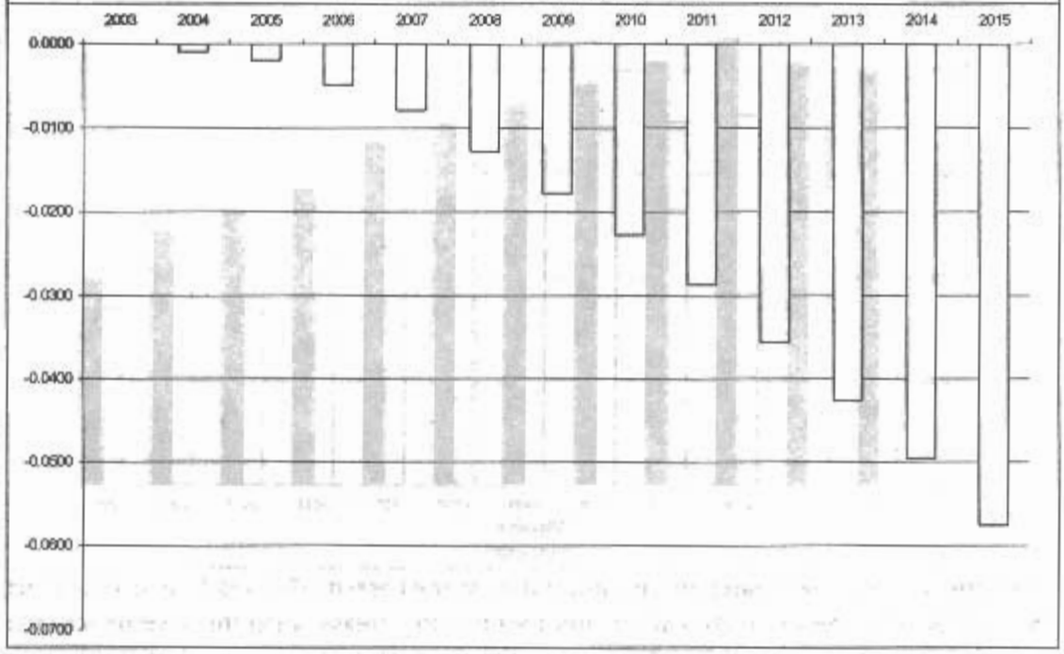


Figure 9: Percentage Change in Rural-to-Urban Migration Index of Unskilled Labor



Capital account liberalization, on the other hand, causes the GDP growth rates higher, albeit at the declining rates. Interestingly enough, increased capital inflows also raise the growth rates of domestic credit, a sign that the Chinese monetary authority's sterilized intervention is either limited or, its effectiveness is less-than expected. With lower GDP growth

Figure 10: Percentage Change in Agricultural-to-Unskilled Labor Migration Index

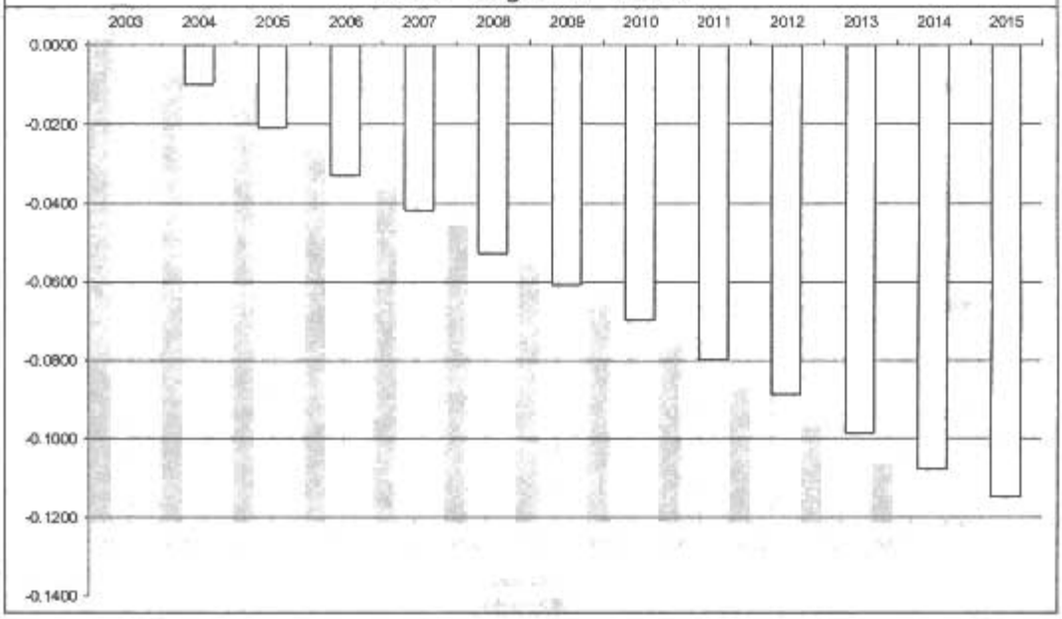
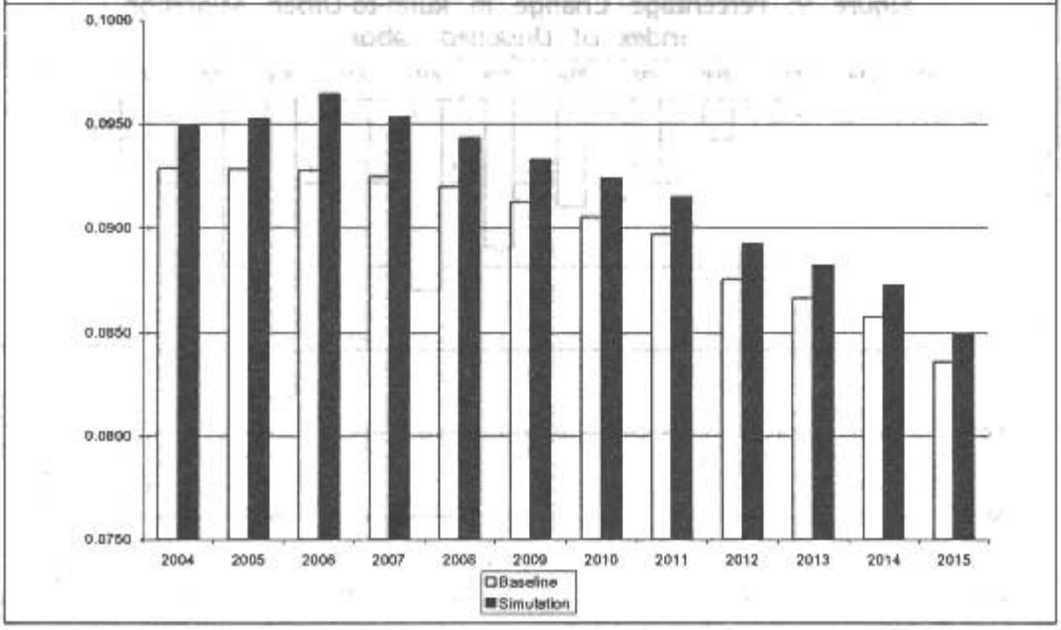


Figure 11: Growth of Real GDP



rates, the unemployment rates are also lower than in the baseline (Figures 11 and 12). In fact, the rates begin to decline in 2012 while they continue to increase under the baseline scenario. However, the urban sector is benefited more than the rural sector as the urban–rural gap in per-capita incomes is not only increasing but also persistently wider than in the baseline scenario. This causes rural-urban migration to increase persistently over the forecast period. This trend of migration applies to both among unskilled workers and from the farm to non-farm unskilled labor-intensive sector (Figures 13 to 14).

Figure 12: Unemployment Rate

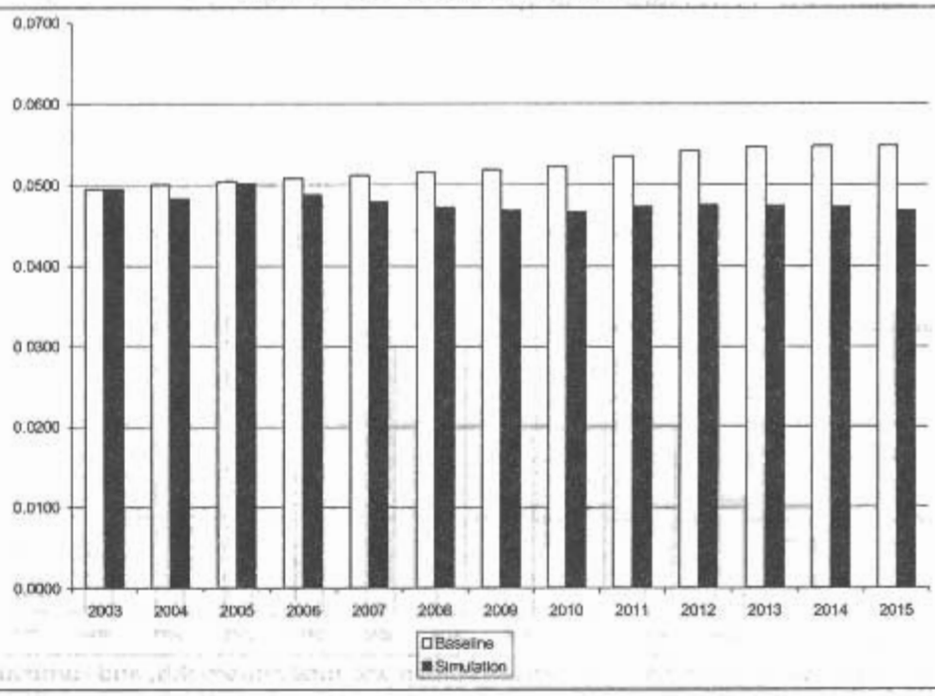
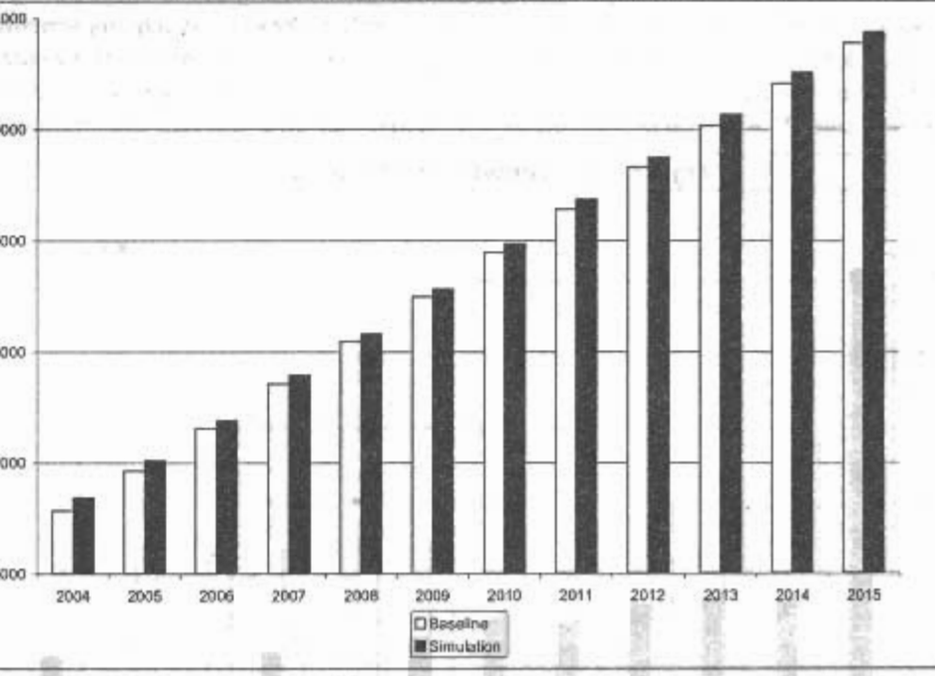


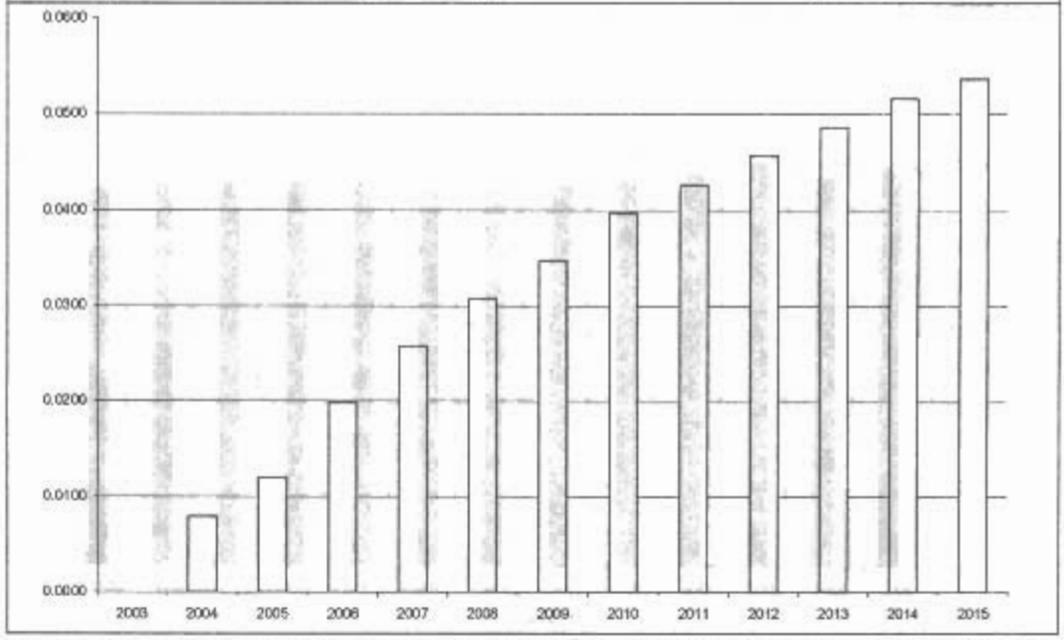
Figure 13: Urban-Rural Per Capita Income Gap



5. Simultaneous Implementation of Cutback in Bank Credit Growth and Open the Capital Account

From the simulations above, it is clear that while cutting the growth of credit makes the unemployment rates higher due to a lower GDP growth, it produces a more favorable outcome

Figure 14: Percentage Change in Rural-to-Urban Migration Index



in terms of narrowing the income gap between urban and rural households, and consequently reduces the rural-urban migration. On the contrary, opening the capital account will improve China's labor market condition but widens the income gap, causing the rural-urban migration to increase. Given the fact that the two policies are either already partially implemented or currently under serious considerations by China's policymakers, it is of interest to evaluate the implications of the two policies combined. The results of simulating such a policy-mix are shown in Table 2. As depicted in Figure 15, when the two policies are implemented

Figure 15: Growth Rates of Credit

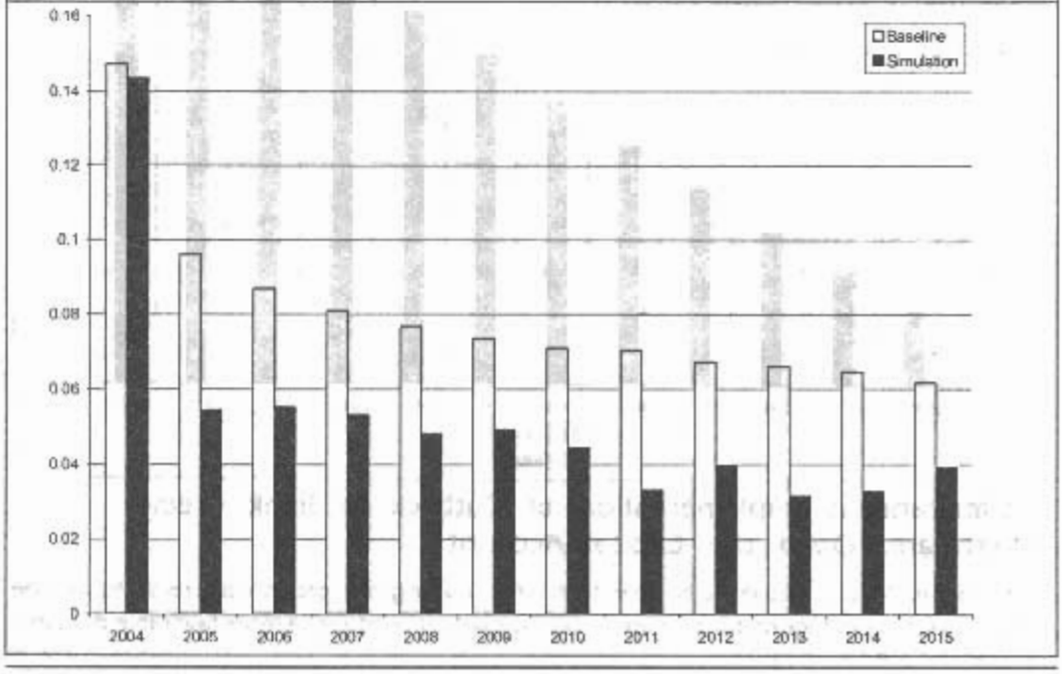


Table 2: Results of the Two Alternative Financial Policies

		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
RGDP (index)	BASE	1.0000	1.0929	1.1944	1.3063	1.4261	1.5673	1.6896	1.8534	2.0193	2.1968	2.3882	2.5917	2.8084
	growth		0.0929	0.0929	0.0929	0.0926	0.0920	0.0913	0.0906	0.0895	0.0875	0.0857	0.0869	[illegible]
	SIM	1.0000	1.0945	1.1963	1.3128	1.4362	1.5692	1.7125	1.8688	2.0323	2.2076	2.3956	2.5967	2.8087
	growth		0.0945	0.0946	0.0965	0.0940	0.0926	0.0913	0.0901	0.0897	0.0863	0.0851	0.0840	0.0816
	diff	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PINDEX (index)	BASE	1.0000	0.9968	0.9990	1.0006	1.0030	1.0052	1.0074	1.0095	1.0115	1.0136	1.0154	1.0173	1.0193
	SIM	1.0000	1.0056	1.0091	1.0018	1.0014	1.0016	1.0026	1.0036	1.0042	1.0054	1.0064	1.0077	1.0094
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
RER (index)	BASE	1.0000	1.0043	1.0020	0.9994	0.9970	0.9947	0.9926	0.9906	0.9886	0.9867	0.9848	0.9830	0.9810
	SIM	1.0000	0.9936	0.9969	0.9994	0.9986	0.9982	0.9974	0.9965	0.9958	0.9946	0.9906	0.9924	0.9907
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CD (index)	BASE	1.0000	1.0981	1.2092	1.3236	1.4445	1.5724	1.7084	1.8631	2.0066	2.1654	2.3376	2.5201	2.7119
	SIM	1.0000	1.1042	1.2090	1.3280	1.4464	1.5759	1.7130	1.8688	2.0077	2.1666	2.3347	2.5136	2.7010
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
IO (index)	BASE	1.0000	1.0693	1.1469	1.2465	1.3506	1.4765	1.6029	1.7372	1.8818	2.0347	2.1964	2.3679	2.5490
	SIM	1.0000	1.1077	1.1877	1.2725	1.3678	1.4709	1.5820	1.6996	1.8215	1.9610	2.0846	2.2254	2.3766
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GD (index)	BASE	1.0000	1.0890	1.1846	1.2879	1.3987	1.5176	1.6450	1.7816	1.9277	2.0819	2.2463	2.4216	2.6066
	SIM	1.0000	1.0890	1.1846	1.2879	1.3987	1.5175	1.6453	1.7816	1.9277	2.0819	2.2463	2.4216	2.6066
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Credit (index)	BASE	1.0000	1.1473	1.2678	1.3671	1.4778	1.5915	1.7066	1.8300	1.9678	2.0891	2.2772	2.3715	2.5192
	SIM	1.0000	1.1434	1.2054	1.2720	1.3397	1.4044	1.4737	1.5391	1.5891	1.6515	1.7033	1.7584	1.8289
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Credit Stock (index)	BASE	1.0000	1.1022	1.2141	1.3358	1.4675	1.6092	1.7613	1.9242	2.0985	2.2846	2.4829	2.6940	2.9183
	SIM	1.0000	1.1018	1.2091	1.3224	1.4417	1.5667	1.6973	1.8360	1.9765	2.1236	2.2752	2.4318	2.5947
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GINI Index	BASE	0.3763	0.3750	0.3717	0.3694	0.3674	0.3649	0.3626	0.3603	0.3576	0.3547	0.3518	0.3488	0.3457
	SIM	0.3763	0.3754	0.3719	0.3692	0.3689	0.3643	0.3619	0.3596	0.3569	0.3540	0.3510	0.3480	0.3449
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Urban-Rural Per-Capita Income Gap	BASE	0.6263	0.6664	0.6904	0.7308	0.7708	0.8089	0.8494	0.8896	0.9263	0.9655	1.0032	1.0409	1.0753
	SIM	0.6263	0.6664	0.6976	0.7321	0.7086	0.8051	0.8434	0.8813	0.9170	0.9520	0.9862	1.0200	1.0534
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wage Aglab	BASE	0.3699	0.3740	0.3916	0.4125	0.4366	0.4614	0.4874	0.5179	0.6566	0.5962	0.6378	0.6833	0.7312
	SIM	0.3699	0.3765	0.3931	0.4127	0.4361	0.4603	0.4858	0.5169	0.6528	0.5921	0.6341	0.6790	0.7266
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wage Unskilled	BASE	1.0164	1.0905	1.0943	1.1444	1.2000	1.2615	1.3222	1.3934	1.4818	1.5740	1.6708	1.7724	1.8773
	SIM	1.0164	1.0815	1.1037	1.1522	1.2063	1.2680	1.3248	1.3995	1.4780	1.5664	1.6581	1.7538	1.8523
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wage Skilled	BASE	2.3018	2.5189	2.7644	3.0179	3.2779	3.5440	3.8244	4.1060	4.3748	4.6492	4.9341	5.2312	5.5368
	SIM	2.3018	2.5494	2.7869	3.0330	3.3068	3.5457	3.8211	4.0960	4.3659	4.6215	4.8958	5.1818	5.4786
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Unemployment Aglab	BASE	0.0512	0.0615	0.0618	0.0619	0.0620	0.0622	0.0625	0.0628	0.0640	0.0548	0.0563	0.0565	0.0566
	SIM	0.0512	0.0618	0.0528	0.0493	0.0471	0.0458	0.0455	0.0458	0.0472	0.0484	0.0497	0.0510	0.0524
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Unemployment Unskilled	BASE	0.0527	0.0505	0.0543	0.0650	0.0656	0.0662	0.0567	0.0672	0.0674	0.0680	0.0687	0.0695	0.0902
	SIM	0.0527	0.0499	0.0524	0.0641	0.0663	0.0666	0.0675	0.0686	0.0692	0.0601	0.0613	0.0674	0.0634
	diff	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Unemployment Skilled	BASE	0.0230	0.0235	0.0241	0.0246	0.0252	0.0256	0.0263	0.0270	0.0277	0.0283	0.0289	0.0294	0.0299
	SIM	0.0236	0.0214	0.0241	0.0248	0.0256	0.0261	0.0267	0.0274	0.0282	0.0288	0.0296	0.0301	0.0306
	diff	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Migration (Unskilled Rural to Urban)	BASE	1.0088	1.0076	1.0080	1.0068	1.0091	1.0093	1.0095	1.0095	1.0093	1.0089	1.0086	1.0082	1.0079
	SIM	1.0066	1.0077	1.0084	1.0069	1.0093	1.0095	1.0097	1.0097	1.0094	1.0090	1.0087	1.0083	1.0076
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Migration (AgriLab to Unskilled)	BASE	1.0022	1.0024	1.0026	1.0030	1.0032	1.0035	1.0036	1.0037	1.0037	1.0037	1.0036	1.0034	1.0032
	SIM	1.0022	1.0026	1.0031	1.0032	1.0033	1.0034	1.0036	1.0034	1.0035	1.0032	1.0030	1.0027	1.0024
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Unemployment Total	BASE	0.0493	0.0496	0.0503	0.0507	0.0511	0.0515	0.0519	0.0524	0.0531	0.0538	0.0544	0.0549	0.0552
	SIM	0.0493	0.0495	0.0502	0.0490	0.0484	0.0483	0.0486	0.0491	0.0502	0.0513	0.0525	0.0536	0.0548
	% Change	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Deposit Rate	BASE	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330
	SIM	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330	0.0330
	diff	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Lending Rate	BASE	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374
	SIM	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374	0.0374
	diff	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Current Account Deficit	BASE	16.9216	7.6200	10.6097	14.9311	19.3305	23.6607	27.8068	31.9664	35.9532	39.8280	43.2116	46.3034	49.6519
	SIM	16.9216	27.7939	23.7774	21.0910	20.2049	19.0709	20.1568	20.2482	18.5898	18.0243	16.8893	13.6296	13.1216
	diff	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Foreign Ownership (Asset Stock Ratio)	BASE	0.0790	0.0770	0.0752	0.0736	0.0721	0.0709	0.0696	0.0686	0.0674	0.0664	0.0665	0.0646	0.0636
	SIM	0.0790	0.0812	0.0819	0.0820	0.0817	0.0812	0.0807	0.0801	0.0794	0.0789	0.0781	0.0774	0.0796
	diff	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Notes: BASE stands for baseline simulation; SIM refers to simulation results of alternative policy; diff denotes the difference between the two, in which positive (negative) numbers indicate that the alternative policy will result in larger (smaller) values of the respective variable than in the baseline.

simultaneously the resulting growth rates of bank's credit are lower than in the baseline, but they are markedly higher than in the credit cut scenario, especially during the first few years of the forecast period. The GDP growth rates will be higher than the baseline up to 2008,

then lower beginning in 2010 (Figure 16). However, the resulting unemployment rates of the policy-mix are persistently lower (Figure 17).

Figure 16: Growth of Real GDP

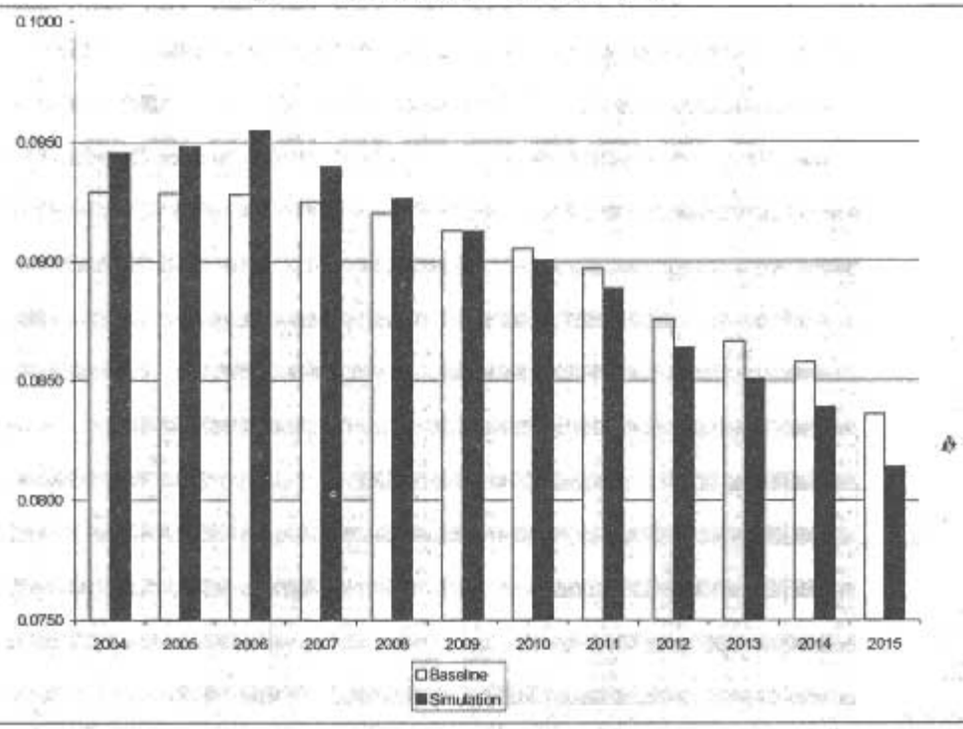
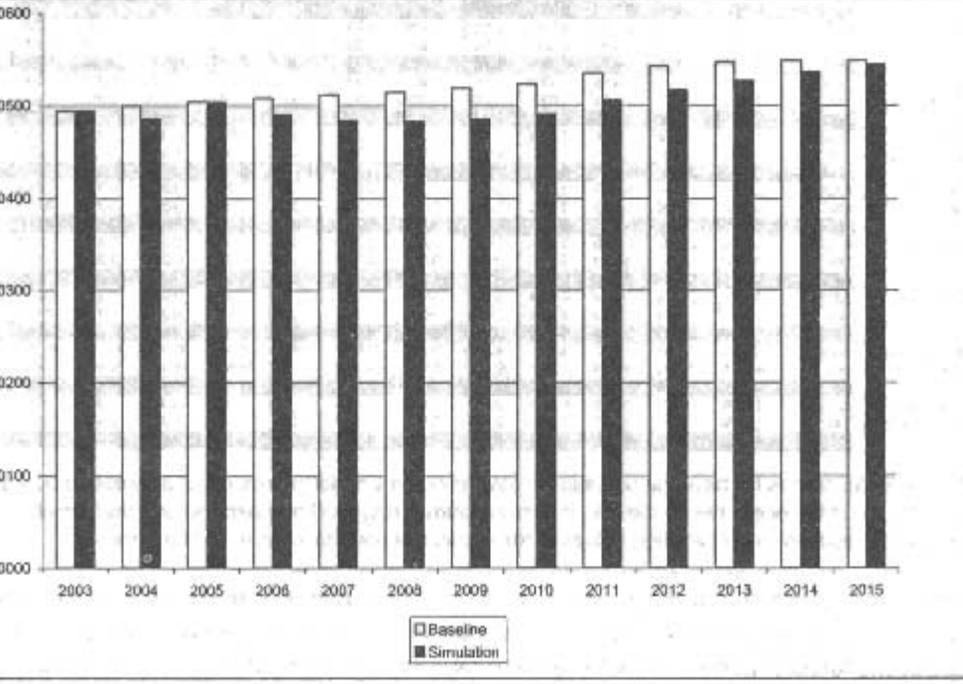


Figure 17: Unemployment Rate



The income gaps between urban and rural households are also lower (Figure 18). The resulting rural-urban migration shows an interesting pattern. The migration among unskilled workers increases in the short and the medium run, but it declines in the long run. But the migration from the farm to urban unskilled sector starts to decline earlier, i.e., in 2008 (compare Figures 19 and 20). To the extent that the vanishing rural-urban migration reflects

Figure 18: Urban-Rural Per Capita Income Gap

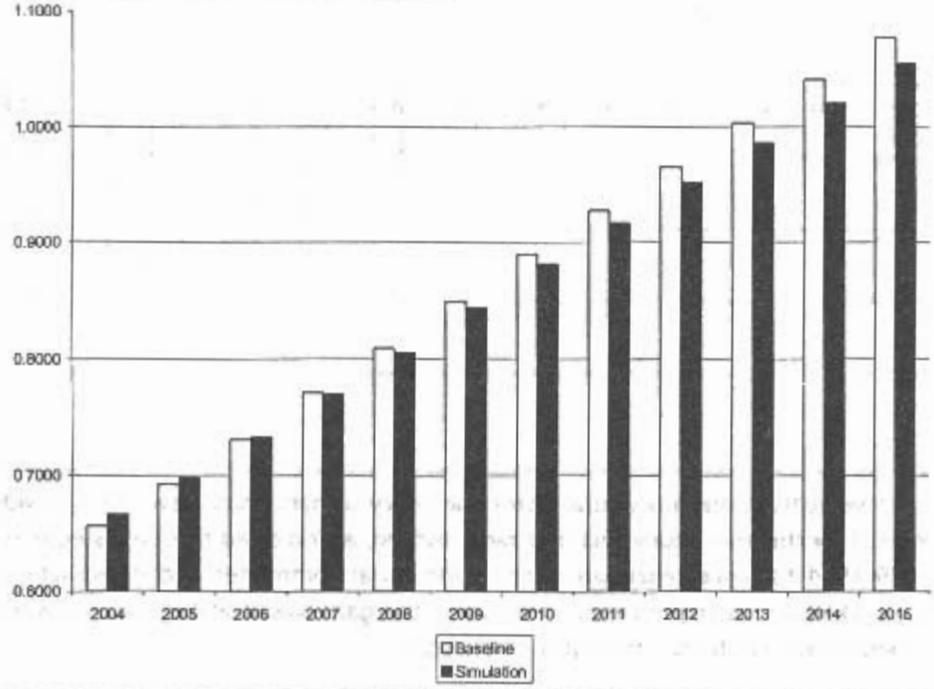


Figure 19: Percentage Change in Rural-to-Urban Migration Index

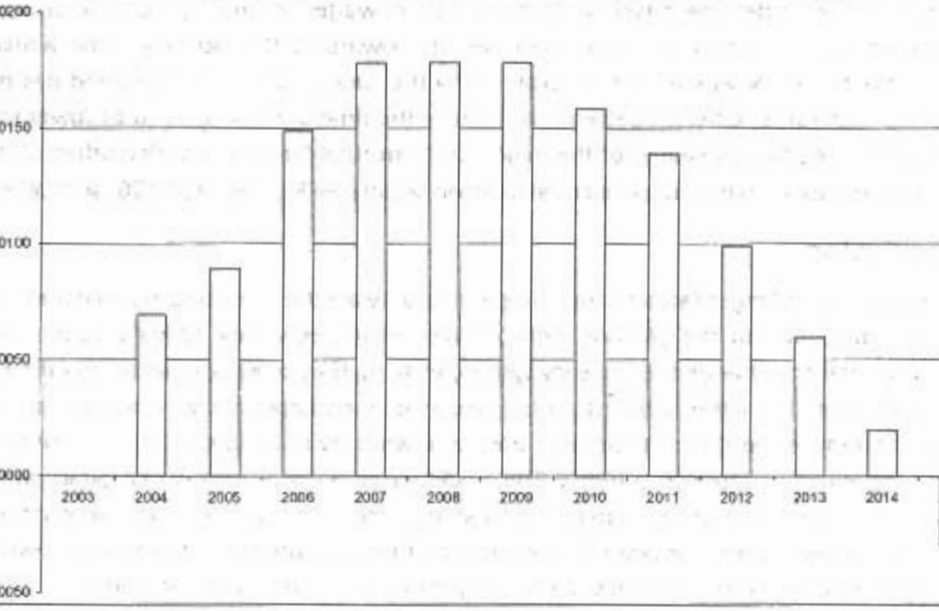
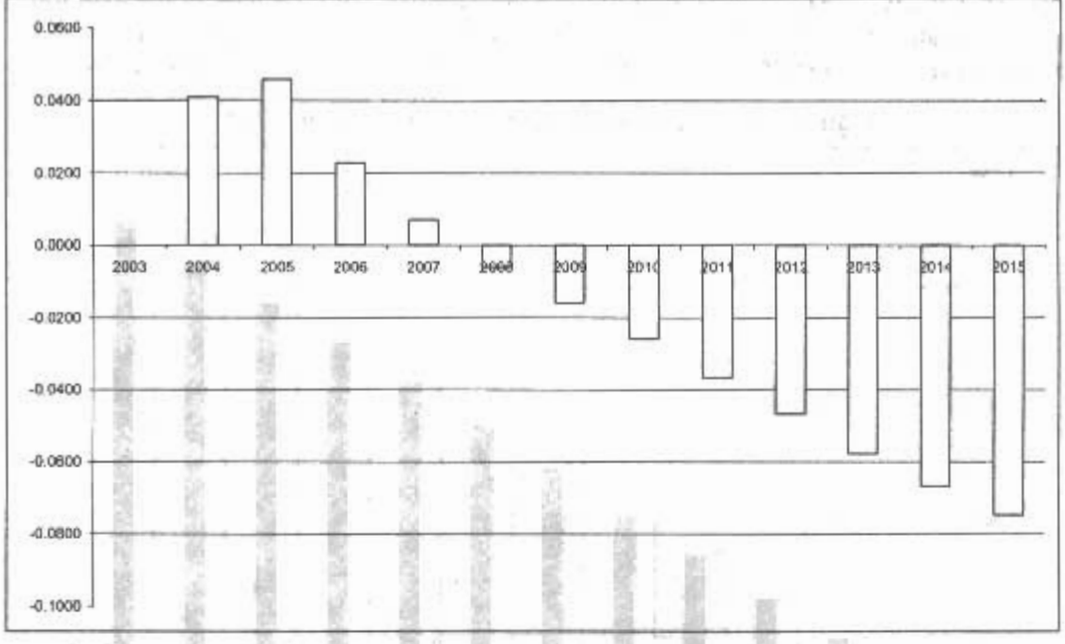


Figure 20: Percentage Change in Agricultural-to-Unskilled Labor Migration Index



growth improvements in the agricultural sector, the policy scenario must have been providing strong impetus for the agricultural sector growth. Indeed, as indicated by China's experience during 1979-1984 (de-collectivization of the agricultural communes and deregulation of agricultural market), any attempt to reduce the rural-urban gaps would unlikely succeed without a strong component that boosts the agricultural sector.

Looking at the numbers in more details, the output growth in the agricultural sector appears to outpace the growth in the non-farm rural sector. As wages in the latter continues to be lower than those under the baseline—more so than wages in the agricultural sector—out-migration from non-farm to urban area persists towards 2015 (actually some workers migrate to the far sector as well). This explains why the rural-urban migration trend has two components with rather different patterns in terms of the time that it begins to be lower than in the baseline, i.e., begins earlier for the migration from rural farm to unskilled urban sector, and later for the migration from unskilled rural to urban sector (see Figures 19 and 20, and Table 2).

6. Conclusion

Two recent policy challenges faced by the Chinese authority are the mounting external pressures to float the currency and the growing signs of overheating economy. China's leaders have been very reluctant to change the currency system; instead, they prefer a gradual liberalization of capital account. The latter is based on the reasonable assumption that Chinese residents would like to reduce the risk on their large pool of savings by holding part of their portfolios in assets denominated in foreign currency. The prediction is that the removal of capital controls would result in significant private capital outflows that might throw the capital account into deficit. On overcoming the overheated economy, the Chinese authorities have reacted with a tightening of macroeconomic policies, particularly by cutting the growth of credit.

While facing those challenges, at the same time, China's stability is also susceptible to the growing income disparity between the rich and the poor, between urban and rural residents, and between coastal and inland provinces. The per capita rural consumption continued to drop; the urban resident's consumption in 2002 was three to five times higher than that of the rural resident. As demonstrated by the episode during 1979-1984, large increases in agricultural productivity hold the key to the goal of reducing the disparity. Any attempt to reduce the rural-urban gaps should have a strong component that boosts the agricultural sector.

The policy scenarios developed in this paper reflect the above policy challenges. The fixed-price simulations show that capital account liberalization tends to worsen the distribution of income and the urban–rural disparity. On the contrary, reducing the growth of bank's credit is likely to generate the opposite effects. Since the net-effects of the two policies cannot be analyzed without allowing prices to change (endogenous prices), subsequent simulations are conducted by using a comprehensive financial computable general equilibrium model. From the model simulations it is shown that there is indeed a room for China to tighten the macroeconomic policy by reducing the growth of credit and at the same time liberalizing capital account. The resulting pattern of aggregate demand growth indicates a soft landing path (gradual decline) and more importantly, the policy will not result in a worsening income distribution and rural-urban income gap.[7]

Although in the short run a tighter credit policy and capital account liberalization will increase the rural-urban migration among unskilled workers, the long-run path shows that such a migration will gradually decline.❖

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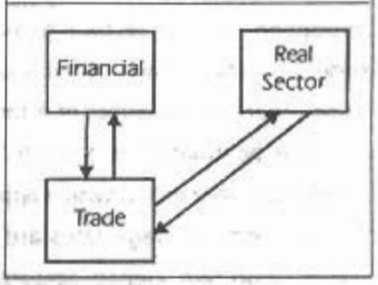
Appendix

Brief Descriptions of FCGE

The FCGE used in the study is based on Azis and Fan (2002b), the main ingredients of which are drawn from Azis (2000, 2002a) and Fargeix and Sadoulet (1994). The model combines financial markets, trade sector, production markets, and labor markets in a fairly tight manner:

In the production function, the use of non-zero or non-unity elasticity of substitution is needed to detect the possible changes in production technology under the new (post-liberalization) regime. To the extent that the financial block plays a pivotal role, capital flows are clearly specified, based not only on the prevailing policy regime but also on the alternative policy scenarios.

Interdependence of Financial-Trade-Real Sector



The portfolio behavior of institutions is based on Tobin (1970). Firms finance their investment through retained earnings, loans, and equity. The portfolio behavior of commercial banks determines the supply of loanable funds, while the portfolio behavior of firms determines the demand for loanable funds. Since interest rates are fixed, the actual quantity of loans is the minimum of the two. It is also assumed that the quantity of NPLs affects the loan interest rate. The loanable funds market is cleared by the official rate adjusted for an interest rate premium. In the government sector the deficit is financed by bonds and foreign borrowing. Government bonds are assumed to be risk-free, implying that banks and households are always willing to meet the government's financing requirement. Two key expectational factors embodied in the model are inflation expectations affecting the household savings rates, and exchange rate (depreciation) expectations affecting the composition of foreign and domestic assets.

The specification of the real sector is fairly common as in standard CGE models. The structure of production and trade is such that a considerable amount of intermediate inputs are imported, modeled as a CES function of fuel and non-fuel inputs. Import is specified as a function of aggregate Armington demand which includes intermediate and final demands. Domestic output is specified as a CES function of value-added (broken down into labor, energy, capital and land) and composite intermediate inputs. Exports are assumed to be differentiated from domestically sold products in each sector. Domestic output is allocated between exports and domestic sales using a Constant Elasticity of Transformation (CET). This suggests that substituting exports with domestic goods is not costless; a lower elasticity implies a greater cost (more obstacles). Further, the domestic market price is different from the export price (determined by the world price and the exchange rate). Thus, producers' behavior

is captured through equations expressing the ratio of exports to domestic sales as a function of relative prices.

Following Armington (1969), aggregate demand is a CES composite of imports and domestically produced products. Minimizing the cost of acquiring composite goods yields the first-order condition where the ratio of imports to domestic sales is determined by their price ratio. The demand for imports is assumed to be infinitely elastic with fixed world prices (small country assumption). Along with the exchange rate, the import tax and the trade and transport margin, the world price is assumed to determine the domestic price of imports.

In the labor market, wages are partly rigid, implying that unemployment is determined endogenously. The sectoral demand for the different labor categories is derived from the first-order condition. Each sector's labor demand depends on a set of variables such as product prices, wages, and prices of intermediate inputs. A composite labor demand function for each sector is postulated as a Cobb-Douglas function of the various labor categories. This is the composite labor input, which appears as an argument in the sectoral domestic output functions. In turn, sectoral wage rates are determined by value-added, labor productivity growth, and the inflation rate. Hence, sectoral wage rates are endogenously derived in the present model. A key implication underlying the equation form of wages is the prevalence of labor market segmentation with wages being strongly sector-specific. The average wage rates for each labor category are arrived at based on the sectoral wage rates and the wage shares of each type of labor in each sector. Last, the labor supply is assumed to be affected by the rural-urban migration, which is determined by the differentials in employment opportunity and wages. Thus, migration also affects the resulting unemployment.