ONLINE APPENDIX FOR "BUSINESS CYCLE ACCOUNTING OF THE BRIC ECONOMIES"

The B.E. Journal of Macroeconomics, forthcoming

Suparna Chakraborty
University of San Francisco

Keisuke Otsu
University of Kent

July 30, 2013

1 Parameter Estimation

Given that investment wedges are not directly observable, we employ Bayesian techniques to structurally estimate the parameters governing the stochastic process of wedges using the data on output, consumption, investment and labor in Brazil, Russia, India and China. The parameters estimated are lag parameters in the transition matrix of wedges, the standard deviations and correlation coefficients that define the variance covariance matrix of the error terms and the steady state level of investment wedges along with the subjective discount factor.

The estimation results for the benchmark model are presented in Tables A1 (a)-(d). The left panel of the tables presents the prior distribution shape, mean, standard error and support for each parameter. The right panel reports the posterior mode and its standard error as well as the posterior mean and its 95 percent probability interval for each parameter. We choose to use the posterior mode as our point estimates in the simulations[1].

The estimation gives a range of parameter estimates across countries. For instance, in terms of the persistence parameters Russia has higher P_{kk}, P_{ee} and P_{ll} compared to those in the other countries. This is reflected in the strong trends in the Russian wedges presented in **Figure 2**. In Brazil there are large positive spillovers from investment wedges onto labor wedges, P_{lk}. In Russia, the spillover from government and labor wedges onto efficiency wedges, P_{ge} and P_{le}, are strongly positive

[1] Using the posterior mean for each parameter instead of the mode does not make much difference in the simulation results.

while that of investment wedges onto efficiency wedges, P_{ke}, is strongly negative. In India the spillover from efficiency wedges onto government wedges, P_{ge}, is strongly positive while that of labor wedges onto investment wedges, P_{kl}, is strongly negative. In China, the spillover of labor wedges onto investment wedges are strongly negative. In terms of volatility, the standard deviation of the shocks to government wedges σ_g are larger than those to the other wedges in all countries. In addition, Russia has a much lower σ_k than other countries. Finally, in terms of correlation, government wedges and labor wedges are strongly negatively correlated in Brazil and Russia, i.e. ρ_{gl} is close to -1, while efficiency wedges and labor wedges are strongly negatively correlated in India, i.e. ρ_{el} is close to -1.

2 Simulation

The first step in the simulation process is to solve the model for linear decision rules for linearized endogenous variables $\widetilde{k_{t+1}}$ and $\widetilde{q}_t = (\widetilde{y}_t, \widetilde{c}_t, \widetilde{x}_t, \widetilde{l}_t)'$:

$$\begin{aligned} \widetilde{k_{t+1}} &= A\widetilde{k}_t + B\widetilde{\omega}_t, \\ \widetilde{q}_t &= C\widetilde{k}_t + D\widetilde{\omega}_t. \end{aligned}$$

Note that the entire series of $\widetilde{k}_t$ can be directly generated from the equation (assuming an initial value $\widetilde{k}_0 = 0$):

$$\widetilde{k_{t+1}} = \frac{x}{nak}\widetilde{x}_t + \frac{1-\delta}{na}\widetilde{k}_t,$$

and the observed series of investment. Then the wedges can be computed as

$$\widetilde{\omega}_t = D^{-1}\left(\widetilde{q}_t - C\widetilde{k}_t\right).$$

Once the wedges are computed, they are used for simulation. We compute the endogenous reaction of selected variables to the changes in a chosen wedge $\widetilde{\omega_{j,t}}$ by plugging its time series into the linear decision rules of endogenous variables:

$$\begin{aligned} \widetilde{k_{t+1}^{\omega_j}} &= A\widetilde{k_t^{\omega_j}} + B\widetilde{\omega_{j,t}}, \\ \widetilde{q_t^{\omega_j}} &= C\widetilde{k_t^{\omega_j}} + D\widetilde{\omega_{j,t}}. \end{aligned}$$

By definition, plugging in all wedges into the model will exactly reproduce the observable data:

$$\widetilde{q_t^{\omega}} = C\widetilde{k}_t + D\widetilde{\omega}_t = C\widetilde{k}_t + DD^{-1}\left(\widetilde{q}_t - C\widetilde{k}_t\right) = \widetilde{q}_t.$$

Therefore, we can easily decompose the effects of each wedges on the observables due to linearity of the decision rules:

$$\widetilde{q_t^{\omega_e}} + \widetilde{q_t^{\omega_g}} + \widetilde{q_t^{\omega_k}} + \widetilde{q_t^{\omega_l}} = \widetilde{q_t^{\omega}}.$$

3 Alternative Models

3.1 Factor Hoarding

3.1.1 Household

The household's problem is

$$\max U = \sum \beta^t \left[\Psi \ln c_t + (1-\Psi)\left(\ln(1-l_t) - \alpha l_t u_{l,t}^{\mu}\right)\right]$$

$$sub.to\ \omega_{l,t} w_t l_t u_{l,t} + \omega_{k,t} r_t k_t u_{k,t} + \pi_t + \tau_t = c_t + x_t$$

$$\gamma n k_{t+1} = x_t + \left(1 - \delta u_{k,t}^{\chi}\right) k_t$$

where $u_{l,t}$ and $u_{k,t}$ are labor and capital utilizations.

3.1.2 Firm

The firm's problem is

$$\max \pi_t = y_t - w_t l_t u_{l,t} - r_t k_t u_{k,t}$$

$$sub.to\ y_t = \left(k_t u_{k,t}\right)^{\theta} \left(\omega_{e,t} l_t u_{l,t}\right)^{1-\theta}$$

3.1.3 Equilibrium Conditions

The competitive equilibrium is characterized by the following 7 equations:

$$\begin{aligned}
\frac{\Gamma}{c_t} &= \beta E_t \left[\frac{1}{c_{t+1}}\left(\omega_{k,t+1}\theta\frac{y_{t+1}}{k_{t+1}} + 1 - \delta u_{k,t+1}^{\chi}\right)\right] \\
\frac{1}{1-l_t} &= (\mu-1)\,\alpha u_{l,t}^{\mu} \\
\omega_{l,t}\,(1-\theta)\,\frac{y_t}{l_t} &= \frac{1-\Psi}{\Psi}\frac{\mu}{\mu-1}\frac{c_t}{1-l_t} \\
\omega_{k,t}\theta\frac{y_t}{k_t} &= \chi\delta u_{k,t}^{\chi} \\
y_t &= \left(k_t u_{k,t}\right)^{\theta}\left(\omega_{e,t} l_t u_{l,t}\right)^{1-\theta} \\
\gamma n k_{t+1} &= x_t + \left(1 + \delta u_{k,t}^{\chi}\right) k_t \\
y_t &= c_t + x_t + \omega_{g,t}
\end{aligned}$$

where there are 7 endogenous variables $\{k_{t+1}, y_t, c_t, x_t, l_t, u_{l,t}, u_{k,t}\}$.

3.2 Small Open Economy Model with Stochastic Trends

3.2.1 Household

The household's problem is

$$\max U = \sum \beta^t \left[\Psi \ln c_t + (1-\Psi)\ln(1-l_t)\right]$$
$$sub.to\ \omega_{l,t} w_t l_t + \omega_{k,t} r_t k_t + d_t + \pi_t + \tau_t = c_t + x_t + \gamma n Q_t d_{t+1},$$
$$\gamma n k_{t+1} = x_t + (1-\delta)k_t - \Phi_t k_t,$$

where

$$\Phi_t = \frac{\phi}{2}\left(\frac{x_t}{k_t} - \Omega\right)^2.$$

3.2.2 Firm

The firm's problem is

$$\max \pi_t = y_t - w_t l_t - r_t k_t$$
$$sub.to\ y_t = k_t^{\theta}\left(\omega_{e,t}\gamma_t l_t\right)^{1-\theta}.$$

3.2.3 Equilibrium Conditions

The equilibrium is characterized by the following 8 equations

$$\begin{aligned}
\frac{1-\Psi}{\Psi}\frac{c_t}{1-l_t} &= \omega_{l,t}(1-\theta)\frac{y_t}{l_t}, \\
y_t &= k_t^{\theta}\left(\omega_{e,t}\gamma_t l_t\right)^{1-\theta}, \\
\gamma n k_{t+1} &= x_t + (1-\delta)k_t - \Phi_t k_t, \\
y_t &= c_t + x_t + tb_t + g\omega_{g,t}, \\
tb_t &= \gamma n Q d_{t+1} - d_t, \\
\frac{1}{(1-\Phi_t')}\frac{\Psi}{c_t} &= \widehat{\beta} E_t\left[\frac{\Psi}{c_{t+1}}\left(\omega_{k,t+1}\theta\frac{y_{t+1}}{k_{t+1}} + \frac{1}{\left(1-\Phi_{t+1}'\right)}\left(1-\delta-\Phi_{t+1}+\Phi_{t+1}'\frac{x_{t+1}}{k_{t+1}}\right)\right)\right], \\
Q\frac{\Psi}{c_t} &= \widehat{\beta} E_t\left[\frac{\Psi}{c_{t+1}}\right], \\
\gamma_t &= \omega_{\tau,t}\gamma_{t-1},
\end{aligned}$$

where there are 8 endogenous variables $\{k_{t+1}, d_{t+1}, \gamma_t, y_t, c_t, x_t, l_t, tb_t\}$.

4 More Sensitivity Analysis

4.1 Non-Separable Preferences

In the benchmark model, we considered log preferences. In this section we consider Cobb-Douglas preferences with a higher risk aversion parameter

$$u(c_t, 1-l_t) = \frac{\left(c_t^{\Psi}(1-l_t)^{1-\Psi}\right)^{1-\sigma}}{1-\sigma},$$

where $\sigma = 5$[2].

The alternation does not affect the measurement of efficiency, government and labor wedges. However, since consumption and leisure are non-separable, the leisure term shows up in the capital Euler equation and affects the measurement of investment wedges.

The decomposition results reported in **Table A2** show that the results are very similar to the benchmark model.

4.2 Common Growth Trend

In the benchmark model we focus on the medium term cycles and detrend all variables with the average output growth rate over the period. If we instead consider the implication of wedges on long run growth, we should consider an alternative growth trend. In this section we consider the trend growth rate to be 1.5% which is the average US GDP per capita growth rate over the period.

Changing the trend does not affect the measurement of efficiency, government and labor wedges. However, the alternation of the growth trend will affect the capital Euler equation. Furthermore, for China and India there will be a noticeable growth trend in the detrended data which affects the estimation. Finally, one caveat for this detrending method is that we have to define the level of the long run growth path. We report results for simulations assuming that the economies start at the long run trend level in 1990, however, obviously this may not be the case.

The decomposition results are reported in **Table A3**. The results for Brazil is almost identical to those in the benchmark model. In Russia, the importance of investment wedges significantly increases. In specific, the recovery during the 2000s are captured. In India, the detrended output has a growing trend which can be accounted for by efficiency wedges. The results for China are quite different from the benchmark case. The rapid growth throughout the entire period is fully accounted for by continuous improvements in investment wedges.

[2]The benchmark model can be considered as a special case when $\sigma = 1$.

4.3 The Effect of the Global Recession

In the benchmark results, we consider the 1990-2009 period. From Figure 1 we can see that the global recession of 2008 affected the BRIC economies in different extents. In Brazil, output growth slowed down in 2008 but was still faster than its trend level. In Russia, the recession hit the economy sharply on 2009. In India and China, the impact of the recession was felt in 2008. In this section, we will remove the final two years from the sample in order to focus on the pre-global recession period.

In order to make a comparison to the benchmark case, we maintain the trend levels the same and simply remove the final two entries of the dataset. The calibrated parameters remain the same but the stochastic process is reestimated and the simulation is based on the newly estimated parameters. The contribution of each wedges are computed over the 1990-2007 period.

The decomposition results are reported in **Table A4**. The results for Brazil shows that the overall contribution of efficiency wedges falls while that of labor wedges rises. Nonetheless, the main result that the labor wedges are responsible for the downturn during the 1990s and the efficiency wedges played an important role in the growth during the 2000s holds. In Russia, the results are very similar to those from the benchmark simulation. In India and China, the contribution of efficiency wedges rise while that of investment wedges fall during the 2000s.

5 Institutional & Policy Reforms -BRICs over the decades

While Brazil, Russia, India and China share impressive growth experiences in the $2000s$ leading economists to club them into one group, each has its unique history and time path to present growth. To better understand the "BRIC" patterns of growth, we start by looking deeper into their economic performance and policies that led to their economic resurgence, one country at a time.

5.1 Brazil

Brazil has experienced turbulent periods of boom and bust since the early $20th$ century. During the late $1930s$ well into the $1940s$, external shocks like the Great Depression and World War II as well as internal focus on protectionism isolated Brazilian economy from much of the developed world. However, the proactive role of the Alliance for Progress and the Inter-American Development Bank ensured the growth of trade and a period of economic recovery during the later $1950s$ and $1960s$. The government and the private sector borrowed heavily from abroad to generate this high economic growth, which was proved unsustainable as the accumulated foreign

debt caused a debt crisis when oil prices increased in both 1974 and 1979 and the interest rates rose in 1980 (Cardoso and Teles, 2010)[3]. The 1980s came to be known as the lost decade of Brazil illustrated with low economic growth accompanied by a decline in productivity (Graminho 2006). As the government tried to finance the fiscal imbalances through seigniorage, it created high inflation over the decade.

In the early 1990s, in order to turn around the stagnant economy and reduce government debt, the government moved towards privatization of inefficient state-owned-enterprises, which increased productivity (Schmitz and Teixeira, 2008), and output started to recover in 1993. Following the East Asian growth model, financial liberalization took place as prohibition on FDI into certain sectors was lifted and bureaucratic obstacles were reduced ('de Paula 2007). In order to contain the inflation, the government instituted the "Real Plan" in 1994 pegging its currency to the US dollar. However, the fixed exchange rate regime collapsed in 1999. After the currency crisis, as a condition on the $41 billion loan received in 1998, the government accepted the IMF Article $VIII$ obligations which precludes members from imposing foreign exchange restrictions. To further improve the investment climate, "2000 Fiscal Responsibility Act" was put in place, imposing severe penalties on administrators who exceed budget limits. Federal debt was restructured, eliminating currency-indexed bonds, reducing inflation-indexed debt and increasing fixed-rate proportion. These measures upgraded Brazil's investment grade status (BNY Mellon). While net inflows of FDI slowed down after the crisis, their percentage to GDP averaged 2.7% during the 2000s, almost doubling over the previous decades.

A virtuous cycle of BRIC emergence helped Brazil during the 2000s as growing China increased its demand for commodities, of which Brazil had a comparative advantage. As reported by ISI Emerging Markets "Brazil's exports to China grew by a Compound Annual Growth Rate (CAGR) of 46.9% annually while imports from China grew by a CAGR of 37.8% annually from 1999 to 2010. The growth rates are high compared to its aggregate exports and imports which saw a CAGR of 12.7% and 11.5% respectively. By 2009, growth in Brazil-China trade catapulted China as Brazil's largest trade partner, overtaking the United States. China presently accounts for 14.7% of Brazil's total trade flows". Overall average annual growth rate of exports increased to 7.13% almost catching up with the pre-1980s numbers.

5.2 Russia

The political disintegration of the erstwhile Soviet Block in 1991 and formation of the Russian Federation makes Russia a unique country for our analysis. Since the economic and political movements of the earlier Soviet Union are too vast to concisely

[3]While average annual growth rate of exports of goods and services stood at 10.5% during the later 1970s and early 1980s, the growth rate dropped to 5.3% in mid to late 1980s and early 1990s.

summarize in our paper, we begin our discussion by an analysis of the newly found Russian Federation. After the break-up of the Soviet Union in 1991, the world saw a transition of yet another socialistic economy to a more market based economic structure. President Boris Yelstin, who took the reins of the new country, vowed radical, market-oriented reforms, referred to as a "shock therapy" for its abrupt nature.

Russia's initial experience with market economy did not go smoothly as hyperinflation coupled with unsustainable government budget deficits prevailed during the $1990s$. In addition, political unrest due to the emergence of oligarchs who now came to control the vast earlier state-owned enterprises bred discontent while the war in Chechnya did not help matters. The failure of exchange rate-based stabilization in 1995 and disappointing macroeconomic performance eventually led to the Russian Financial Crisis in 1998 (Merlevede, Schoors and Van Aarle 2009). When the Asian Financial Crisis led to a decline in the demand for crude oil (one of Russia's biggest exports), the economy was further hit and growth numbers turned negative. Annual growth rate of exports fell to the tune of 1.8%, while aggregate GDP growth fell by 4.8% (per capita GDP fell by 4.9%), requiring a $22.6 billion bailout from IMF and World Bank. To stabilize Russia, leaders of the $G-8$ also agreed to explore ways to write-off the old Soviet debt that Russia had assumed. Government of Russia also took pro-active steps to curtail the effects of a sudden decline in oil prices- a hard lesson learned during the East Asian Crisis- with the set-up of the Oil Stabilization Fund of Russian Federation in 2004.

After surviving the political turmoil of early $1990s$ and the 1998 crisis, Russia too instituted strong reforms outlined in two resolutions: (a) Measures Planned by the Government of the Russian Federation and the Central Bank of the Russian Federation to Stabilize Socioeconomic Conditions in Russia (Nov 16, 1998) and (b) Letter of Development Policy for the Third Structural Adjustment Loan ($July$ 19, 1999). While the first plan was more consistent with Russian system of state control, the second plan was formulated after consultations with international financial institutions. In a move towards privatization, 15 companies were identified to be privatized by early $2000s$. The government also lifted the January 1999 moratorium on insolvency claims of companies, encouraging private investment. However, on the trade front, government re-introduced export tariffs and quotas in a bid to reign in Russian over-dependence on international trade.

President Vladimir Putin, who succeeded Boris Yelstin, spearheaded a concerted effort to revamp infrastructure and increase production, both industrial and agrarian. The Oil Stabilization Fund played a crucial role in maintaining the fiscal surplus through the oil revenue. According to 'de Paula (2007), "some flexibility in the fiscal policy was introduced in 2006 with the creation of an Investment Fund in the federal budget. The aim of the fund is to finance infrastructure investment and innovation

related projects in joint public-private partnerships". The recent 2008 global crisis hit Russia comparatively harder than its BRIC peers due to Russian dependence on crude oil and commodities trade for its economy[4]. However, the recovery was also swift as output growth turned positive in mid-2009, and by 2010, GDP growth rate reached 4.0%, after a negative growth of -7.8% in 2009 (GDP per capita growth rates are comparable).

5.3 India

After emerging from its colonial era in 1947, India embarked on a socialistic development path by successive formulation of the "Five Year Plans" of economic growth. The central tenets of the growth plans were an emphasis on the public sector, strong move towards licensing and import restrictions and agrarian development. After a relative slowdown in the $1970s$, reform measures in India started in the $1980s$, with a move towards de-licensing and infrastructural investment accompanied by a pro-business attitude (Bosworth and Collins, 2008 ; Rodrik and Subramanian, 2005).

India faced a serious crisis in 1991 during the first gulf war and was at the verge of defaulting on its domestic loans reaching a crisis point in terms of foreign exchange reserves. India asked for a $1.8 billion bailout loan from the IMF, which in return demanded reforms. The reforms since then, initiated by the then Finance Minister (current Prime Minister) of India, Dr. Manmohan Singh, was a complete reversal of the earlier era of socialistic growth. Following the East Asian model, India initiated a two-pronged reform approach: major macroeconomic management reforms and structural and sector specific economic reforms. India started widespread privatization and financial liberalization, de-licensing the "License Raj" and encouraging foreign direct investment in many major industries. Subsidies to agriculture (particularly fertilizer and food) was reduced to narrow the budget deficit. Taxes were lowered, export subsidies were abolished and import tariffs were reduced. India initiated the formation of special economic zones, with a gradual liberalizing of organized manufacturing sector. India continues its liberalization effort initiating a move towards foreign direct investment in retail sector (which is still to pass muster with all political parties) and setting up of agro-economic zones to encourage agricultural exports.

These moves catapulted India in the last decade into the elite group of top ten nations, primarily aided by a strong service sector and information technology industry. According to Bollard, Klenow and Sharma (2012), manufacturing TFP growth in India saw substantial speedup at over 5 percentage points per year during $1993-2007$ as opposed to the previous decade. While its economic transition was threatened

[4]The ruble fell 35% against the dollar from the onset of the crisis to January 2009, as the foreign exchange reserves fell by $210 billion.

during the current global crisis, India weathered the 2008 crisis well, as seems to be true of most BRIC nations. While average output growth did slow down to 7.0% during $2008 - 2009$, since then it has recovered to 9.0% , with a per capita GDP growth of 7.4%[5]. For the first time in decades, average annual growth rate of Indian exports crossed the double digit mark, reaching 14.4% during the last decade, as opposed to an average increase of 7.6% during the previous decades. The same trend was evident in inflows of foreign direct investment that totaled 1.6% of GDP during the $2000s$ as compared to an average of 0.15% of GDP during the previous decade[6].

5.4 China

China is one of the classical growth stories of development economics. Primarily formed as a communist country after the 1949 revolution by its patriarch, Mao Zedong, China yielded minimal economic power till the late $1970s$ and was known as a slow growth, tightly reined communist nation. During this period, the Chinese trade policy was focused on import substitution. The government protected the steel and machinery industries from foreign competition by controlling imports and foreign exchange transactions. Trade was limited to the Central Foreign Trade Ministry and its twelve trade corporations. These trade corporations exported agricultural and primary goods in order to finance the controlled imports of industrial equipment.

In late $1970s$ Deng Xiaoping introduced the *Gaige Kaifang* (Reform and Opening-up) policy. Since then the Government of China has pursued aggressively a pro-reform, market-oriented growth agenda, making China one of the most successful examples of state led capitalism today. 1978 marked the year when China started allowing foreign direct investment into "special economic zones" that became conduits for growth while dramatically increasing the number of firms that are allowed to engage in foreign trade. Since 1984, economic reforms picked up in earnest with a decline in government intervention, coupled with increases in decentralization and privatization of the state sector. Gradually through the $1980s$, China started adopting an export-oriented growth model.

While the $1990s$ was a period of political volatility and the East Asian Crisis that affected Chinese growth to some extent, China continued on the reform process. "In 1996 China accepted the IMF Article VII, that resulted in the liberalization of foreign exchange controls related to current account transactions" ('de Paula 2007). China entered a new era in December 2001 by joining the World Trade Organization (WTO) and agreeing to a host of globalization measures. Import quotas were

[5] As reported by the World Development Indicators, at its worst in 2008, output growth declined to 4.9% before recovering.

[6] The growth in exports started in the $1990s$ in response to privatization and liberalization and exports grew by almost 12% in the mid to late $1990s$. However, inflows of FDI did not pick up till the $2000s$.

removed and tariffs were gradually reduced. Production and exports shifted toward labor-intensive goods while imports of consumer durables and investment goods increased dramatically. Institutional changes were also apparent since the Chinese Communist Party's meeting in 2003 that encouraged protection of property rights and massive public investment in infrastructure development that would further encourage foreign investment. The liberalization policies were successful and by 2005, domestic private sector accounted for more than 50% of Chinese GDP. The efforts have borne fruit and during the first half of the last decade, the average growth rate of GDP has averaged roughly 10%- the highest in the world.

The Chinese government, as its BRIC counterparts, was also well equipped to deal with the global crisis. China announced a stimulus package to the tune of RMB 4 trillion (approximately US $586 billion) that would be used for public investment. In addition, China is turning from export dependence to home market to keep up growth. Given China's success in stemming the crisis from affecting its economy, World Bank revised its estimate of Chinese growth forecast from 6.5% to 7.3% in 2010. China was successful in attaining an actual GDP growth rate of 10.4% (per capita GDP growth rate of 9.83% - World Bank estimates). For its part, exports still played a very important role in Chinese growth with average annual exports growing by almost 20% during the 2000s, ably aided by an equally robust growth in FDI inflows that reached almost 4% of Chinese GDP, and was the largest amongst the BRIC nations[7].

6 Data Appendix

6.1 Sources of Macro Level Data

"Output (Y)" includes GDP and the imputed service flow from consumer durables. It is decomposed into "Consumption (C)" that consists of household consumption of non-durables and services (where the imputed service flow from consumer durables are included) and "Investment (X)" that includes gross domestic capital formation and household expenditures on consumer durables while the residual is defined as "Government Consumption (G)" so that $Y = C + X + G$[8]. "Labor (L)" represents total hours worked which consists of total employment and hours worked per

[7] Chinese dominance in terms of its export growth and ability to lure FDI preceded that of India and in terms of timing was closer to Brazil's resurgence. Both China and Brazil saw an uptick in export growth and inflows of FDI in the 1990s. It took another decade for India to follow in the same path. As for Russia, we only have numbers for the last two decades, and it certainly seems to be the case that the Russian resurgence also happened in the last decade, following a time-line similar to India.

[8] Therefore, G includes government purchases of goods and services as well as net exports. The inclusion of net exports in government consumption follows the tradition of a closed economy BCA

workers. All variables are divided by the adult population[9]. Output, consumption and investment are linearly detrended by the average per adult output growth rate over the $1990-2009$ period setting 1990 at the trend level[10]. The data is primarily collected from the Penn World Tables edition 7.0 (and its update 7.1 published in November, 2012) and its extension made by Duncan Foley[11]. **Table A5** presents the original sources of our dataset. PWT stands for Penn World Tables edition 7.0 (and updates in version 7.1) and the extensions made by Duncan Foley. EM stands for the Eurominotor Global Market Information Database. ILO stands for the International Labor Organization LABORSTA database.

6.2 Constructing Data Series

6.2.1 Labor and Demographic Data

Employment E is computed from the PWT data of GDP per capita ($rgdpl2$) and GDP per person counted in total employment ($rgdpl2te$) and population (POP):

$$E = \frac{rgdpl2}{rgdpl2te} \times POP.$$

Labor L, which is defined as total hours worked, is the product of hours worked per worker h and employment.

The adult population N is computed using the data from ILO of the adult share in total population and the population data from PWT:

$$N = adult\ share \times POP.$$

6.2.2 Consumption and Investment Data

Consumption expenditure C_x is defined as

$$C_x = C_{nd} + C_s + X_d,$$

where C_{nd}, C_s and X_d stand for the household expenditures on non-durables, services and durables. However, total consumption in the model C is defined as

$$C = C_{nd} + C_s + C_d,$$

model (Chari, Kehoe and McGrattan (2007)).

[9] We use total population for China due to data availability.

[10] Therefore, the output series will start at the trend level in 1990 and end at the trend level in 2009.

[11] Source: https://sites.google.com/a/newschool.edu/duncan-foley-homepage/home/EPWT

where C_d stands for the services flow generated from durable stocks. Therefore, there is a need to disentangle X_d from C_x and replace it with C_d.

The service flow from consumer durables C_d is imputed as

$$C_d = K_d(R_k + \delta_d).$$

where K_d is the stock of consumer durables, R_k is the net return on capital stock and δ_d is the depreciation rate of consumer durables assumed to be equal to 0.2.

The stock of consumer durables follows a law of motion:

$$K_{d,t+1} = (1 - \delta_d)K_{d,t} + X_{d,t},$$

where the stock of consumer durables in 1990 is set equal to

$$K_{d,1990} = \frac{X_{d,1990}}{\delta_d}.$$

In order to compute the household expenditure on durables X_d, we use the consumer expenditure data of EM and the data of PWT for consumption share of GDP (kc), GDP per capita ($rgdpch$) and population (POP):

$$X_d = \frac{\text{consumer expenditure on durables}}{\text{consumer expenditure}} \times kc \times rgdpl2 \times POP.$$

The net return on capital is defined as

$$R_k = \theta_f \frac{GDP}{K_f} - \delta_f,$$

where K_f is net fixed capital stock while θ_f and δ_f are the income share and depreciation rate of K_f respectively. The income share θ_f is computed following Gollin (2002). The depreciation rate δ_f is computed as

$$\delta_f = \frac{\Delta}{K_f},$$

where Δ is the consumption of net fixed capital stock.

Total investment X is defined as

$$X = X_f + X_d$$

where X_f is gross domestic capital formation. Therefore, total output Y is defined as

$$\begin{aligned} Y &= C + X + G \\ &= (C_x - X_d + C_d) + (X_f + X_d) + G \\ &= GDP + C_d. \end{aligned}$$

Finally, total capital stock K is defined as

$$K = K_d + K_f.$$

and the income share of total capital stock θ can be computed as

$$\theta = \frac{rK}{Y} = \frac{Y_f + C_d}{Y},$$

where Y_f is the income from net fixed capital income

$$Y_f = \theta_f \times GDP,$$

and C_d is considered as the flow income from consumer durables.

6.3 Institutional and Governance Indicators of WDI- Definitions and measurement details

World Bank collects data on a set of institutional and governance indicators from 212 nations and we have the time series since 1996. In each instance, measures range from -2.5 to $+2.5$ with standard errors reflecting variability around the point estimate. The indicators are based on 30 aggregate data sources, survey and expert assessments. The details can be found in:

Daniel Kaufmann, Aart Kraay and Massimo Mastruzzi (2010). "The Worldwide Governance Indicators : A Summary of Methodology, Data and Analytical Issues", World Bank Policy Research Working Paper No. 5430:

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1682130

(1) Voice and Accountability - reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media

(2) Political Stability and Absence of Violence/Terrorism - reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism

(3) Government Effectiveness - reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies

(4) Regulatory Quality - reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development

(5) Rule of Law - reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract

enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence

(6) Control of Corruption - reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

References

[1] Bollard, A., P. Klenow and G. Sharma (2012), "India's Mysterious Manufacturing Miracle," *Review of Economic Dynamics*, forthcoming.

[2] Bosworth, B. and S. Collins (2008), "Accounting for growth: comparing China and India," *Journal of Economic Perspectives*, Vol. 22(1), pages 45–66.

[3] Chari, V.V., E.R. McGrattan and P.J. Kehoe (2007), "Business Cycle Accounting,"Econometrica, Vol. 75 (3), pages 781–836

[4] Foley, D., website: https://sites.google.com/a/newschool.edu/duncan-foley-homepage/home/EPWT

[5] Global Market Information Database, Euromonitor: http://www.euromonitor.com/

[6] Gollin, D. (2002), "Getting Income Shares Right," *Journal of Political Economy*, Vol. 110 (2), pages 458–474.

[7] Graminho, F. (2006), "A neoclassical analysis of the Brazilian lost-decades," Bank of Brazil Working Paper Series 123.

[8] Heston, A., R. Summers and B. Aten, Penn World Table Version 7.1, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, Nov 2012.

[9] Heston, A., R. Summers and B. Aten, Penn World Table Version 7.0, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, June 2011

[10] Izyumov, A. and J. Vahalay (2008), "Old Capital vs. New Investment in Post-Soviet Economies: Conceptual Issues and Estimates," *Comparative Economic Studies*, Vol. 50, pages 79-110

[11] International Labor Organization LABORSTA database: http://laborsta.ilo.org/

[12] Merlevede, B., K. Schoors and B. Van Aarle (2009), "Russia from Bust to Boom and Back: Oil Price, Dutch Disease and Stabilisation Fund," *Comparative Economic Studies*, Vol. 51(2), pages 213–241

[13] Rodrik, D. and A. Subramanian (2008), "From "Hindu Growth"to Productivity Surge: The Mystery of the Indian Growth Transition", IMF Staff Papers,Vol. 52 (2), pages 193 –228

[14] Schmitz, J. and A. Teixeira (2008), "Privatization's Impact on Private Productivity: The Case of Brazilian Iron Ore", Review of Economic Dynamics, Vol.11(4), pages 745-760

Table A1(a). The Bayesian Estimation Priors and Posteriors for Brazil

Name	Prior				Posterior				
	Dist.	Mean	S.E.	Support	Mode	S.E.	Mean	Prob. Interval	
P_{ee}	norm	0.8	0.2	$\boldsymbol{R}$	0.7613	0.1059	0.7302	[0.5403,	0.9081]
P_{gg}	norm	0.8	0.2	$\boldsymbol{R}$	0.7836	0.0958	0.7470	[0.5905,	0.8907]
P_{kk}	norm	0.8	0.2	$\boldsymbol{R}$	0.6724	0.1445	0.6766	[0.4673,	0.8560]
P_{ll}	norm	0.8	0.2	$\boldsymbol{R}$	0.8148	0.0960	0.7794	[0.6201,	0.9304]
P_{eg}	norm	0	0.3	$\boldsymbol{R}$	0.1864	0.0761	0.1765	[0.0310,	0.3193]
P_{ek}	norm	0	0.3	$\boldsymbol{R}$	-0.2272	0.1583	-0.2156	[-0.4690,	0.0646]
P_{el}	norm	0	0.3	$\boldsymbol{R}$	-0.1784	0.1065	-0.1586	[-0.3386,	0.0247]
P_{ge}	norm	0	0.3	$\boldsymbol{R}$	-0.2360	0.1522	-0.2082	[-0.4941,	0.0923]
P_{gk}	norm	0	0.3	$\boldsymbol{R}$	0.1632	0.2041	0.1707	[-0.1405,	0.5264]
P_{gl}	norm	0	0.3	$\boldsymbol{R}$	-0.1580	0.1433	-0.1448	[-0.3948,	0.1568]
P_{ke}	norm	0	0.3	$\boldsymbol{R}$	-0.0860	0.0693	-0.1071	[-0.2820,	0.0188]
P_{kg}	norm	0	0.3	$\boldsymbol{R}$	0.0511	0.0511	0.0495	[-0.0783,	0.1796]
P_{kl}	norm	0	0.3	$\boldsymbol{R}$	0.0741	0.0741	-0.0216	[-0.1568,	0.1178]
P_{le}	norm	0	0.3	$\boldsymbol{R}$	0.1033	0.1033	0.0047	[-0.2086,	0.1781]
P_{lg}	norm	0	0.3	$\boldsymbol{R}$	0.0734	0.0734	0.0115	[-0.1457,	0.1734]
P_{lk}	norm	0	0.3	$\boldsymbol{R}$	0.1489	0.1489	0.5064	[0.2718,	0.7255]
σ_e	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0269	0.0039	0.0325	[0.0235,	0.0416]
σ_g	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0425	0.0061	0.0483	[0.0346,	0.0613]
σ_k	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0282	0.0095	0.0384	[0.0219,	0.0587]
σ_l	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0131	0.0019	0.0152	[0.0119,	0.0181]
ρ_{eg}	norm	0	0.3	$\boldsymbol{R}$	0.0322	0.1622	-0.0142	[-0.2732,	0.2896]
ρ_{ek}	norm	0	0.3	$\boldsymbol{R}$	0.2104	0.1978	0.1580	[-0.1732,	0.4430]
ρ_{el}	norm	0	0.3	$\boldsymbol{R}$	-0.1852	0.1614	-0.1623	[-0.4778,	0.0902]
ρ_{gk}	norm	0	0.3	$\boldsymbol{R}$	-0.0033	0.2124	-0.0074	[-0.3147,	0.2969]
ρ_{gl}	norm	0	0.3	$\boldsymbol{R}$	-0.3713	0.1645	-0.3216	[-0.5615,	-0.0793]
ρ_{kl}	norm	0	0.3	$\boldsymbol{R}$	0.0912	0.1904	0.1090	[-0.2131,	0.4503]
$\widehat{\beta}$	beta	0.9	0.05	[0,1]	0.9227	0.0465	0.9015	[0.8090,	0.9731]
ω_k	beta	0.9	0.05	[0,1]	0.9227	0.0465	0.8915	[0.8161,	0.9742]

Table A1(b). The Bayesian Estimation Priors and Posteriors for Russia

Name	Prior				Posterior				
	Dist.	Mean	S.E.	Support	Mode	S.E.	Mean	Prob. Interval	
P_{ee}	norm	0.8	0.2	$\boldsymbol{R}$	0.8867	0.0481	0.8628	[0.7809,	0.9417]
P_{gg}	norm	0.8	0.2	$\boldsymbol{R}$	0.6816	0.1169	0.6777	[0.5151,	0.8821]
P_{kk}	norm	0.8	0.2	$\boldsymbol{R}$	1.0756	0.0337	1.0509	[0.9796,	1.1125]
P_{ll}	norm	0.8	0.2	$\boldsymbol{R}$	0.8943	0.0798	0.8093	[0.6979,	0.9316]
P_{eg}	norm	0	0.3	$\boldsymbol{R}$	0.4713	0.1381	0.4821	[0.2421,	0.6794]
P_{ek}	norm	0	0.3	$\boldsymbol{R}$	-0.4172	0.1918	-0.4119	[-0.6786,	-0.1288]
P_{el}	norm	0	0.3	$\boldsymbol{R}$	0.3160	0.1680	0.3267	[0.0387,	0.6241]
P_{ge}	norm	0	0.3	$\boldsymbol{R}$	-0.0613	0.0448	-0.0696	[-0.1761,	0.0257]
P_{gk}	norm	0	0.3	$\boldsymbol{R}$	-0.0722	0.1114	-0.1128	[-0.4180,	0.1441]
P_{gl}	norm	0	0.3	$\boldsymbol{R}$	-0.0872	0.1364	-0.0659	[-0.3882,	0.2461]
P_{ke}	norm	0	0.3	$\boldsymbol{R}$	0.0477	0.0097	0.0565	[0.0324,	0.0797]
P_{kg}	norm	0	0.3	$\boldsymbol{R}$	-0.0133	0.0222	-0.0196	[-0.0617,	0.0299]
P_{kl}	norm	0	0.3	$\boldsymbol{R}$	-0.0479	0.0375	-0.0945	[-0.1996,	0.0017]
P_{le}	norm	0	0.3	$\boldsymbol{R}$	0.0506	0.0168	0.0528	[0.0256,	0.0829]
P_{lg}	norm	0	0.3	$\boldsymbol{R}$	-0.0869	0.0490	-0.1316	[-0.2062,	-0.0398]
P_{lk}	norm	0	0.3	$\boldsymbol{R}$	-0.0429	0.0735	-0.0456	[-0.1711,	0.0770]
σ_e	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0747	0.0144	0.0813	[0.0546,	0.1053]
σ_g	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0921	0.0131	0.1077	[0.0748,	0.1389]
σ_k	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0048	0.0013	0.0100	[0.0058,	0.0157]
σ_l	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0344	0.0057	0.0411	[0.0263,	0.0529]
ρ_{eg}	norm	0	0.3	$\boldsymbol{R}$	-0.0440	0.1691	-0.0643	[-0.3869,	0.1803]
ρ_{ek}	norm	0	0.3	$\boldsymbol{R}$	-0.1020	0.3074	-0.0669	[-0.4770,	0.3248]
ρ_{el}	norm	0	0.3	$\boldsymbol{R}$	-0.2907	0.1696	-0.2657	[-0.5497,	0.0173]
ρ_{gk}	norm	0	0.3	$\boldsymbol{R}$	-0.0971	0.3177	-0.0653	[-0.5025,	0.3819]
ρ_{gl}	norm	0	0.3	$\boldsymbol{R}$	-0.5086	0.1557	-0.4689	[-0.7077,	-0.2076]
ρ_{kl}	norm	0	0.3	$\boldsymbol{R}$	-0.1913	0.3146	-0.1562	[-0.4988,	0.2204]
$\widehat{\beta}$	beta	0.9	0.05	[0,1]	0.9247	0.0452	0.8973	[0.8290,	0.9734]
ω_k	beta	0.9	0.05	[0,1]	0.9247	0.0452	0.8952	[0.8236,	0.9801]

Table A1(c). The Bayesian Estimation Priors and Posteriors for India

Name	Prior				Posterior				
	Dist.	Mean	S.E.	Support	Mode	S.E.	Mean	Prob. Interval	
P_{ee}	norm	0.8	0.2	$\boldsymbol{R}$	0.8347	0.1087	0.7496	[0.5541,	0.9354]
P_{gg}	norm	0.8	0.2	$\boldsymbol{R}$	0.7579	0.0926	0.7150	[0.5335,	0.8752]
P_{kk}	norm	0.8	0.2	$\boldsymbol{R}$	0.9449	0.0374	0.8893	[0.8096,	0.9870]
P_{ll}	norm	0.8	0.2	$\boldsymbol{R}$	0.7862	0.0914	0.7334	[0.5576,	0.9225]
P_{eg}	norm	0	0.3	$\boldsymbol{R}$	0.0153	0.0404	0.0255	[-0.0360,	0.0894]
P_{ek}	norm	0	0.3	$\boldsymbol{R}$	-0.0055	0.0950	0.1106	[-0.0527,	0.2957]
P_{el}	norm	0	0.3	$\boldsymbol{R}$	0.1187	0.1394	0.2384	[-0.0422,	0.4973]
P_{ge}	norm	0	0.3	$\boldsymbol{R}$	0.4071	0.2453	0.3089	[-0.1405,	0.8007]
P_{gk}	norm	0	0.3	$\boldsymbol{R}$	0.0139	0.2309	-0.0105	[-0.4658,	0.3294]
P_{gl}	norm	0	0.3	$\boldsymbol{R}$	-0.0659	0.2675	-0.1229	[-0.6010,	0.3341]
P_{ke}	norm	0	0.3	$\boldsymbol{R}$	-0.0600	0.0432	-0.1103	[-0.2029,	-0.0263]
P_{kg}	norm	0	0.3	$\boldsymbol{R}$	0.0234	0.0185	0.0484	[0.0008,	0.1052]
P_{kl}	norm	0	0.3	$\boldsymbol{R}$	-0.3375	0.0976	-0.4529	[-0.7232,	-0.2152]
P_{le}	norm	0	0.3	$\boldsymbol{R}$	0.0483	0.0705	0.1076	[-0.0133,	0.2309]
P_{lg}	norm	0	0.3	$\boldsymbol{R}$	0.0356	0.0260	0.0279	[-0.0145,	0.0632]
P_{lk}	norm	0	0.3	$\boldsymbol{R}$	0.0055	0.0620	-0.0383	[-0.1593,	0.0673]
σ_e	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0444	0.0061	0.0485	[0.0360,	0.0612]
σ_g	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.1470	0.0222	0.1706	[0.1264,	0.2207]
σ_k	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0116	0.0033	0.0294	[0.0146,	0.0504]
σ_l	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0264	0.0036	0.0274	[0.0216,	0.0327]
ρ_{eg}	norm	0	0.3	$\boldsymbol{R}$	0.0812	0.1537	0.0704	[-0.1952,	0.3467]
ρ_{ek}	norm	0	0.3	$\boldsymbol{R}$	-0.1652	0.2205	-0.1809	[-0.5866,	0.2201]
ρ_{el}	norm	0	0.3	$\boldsymbol{R}$	-0.7917	0.0802	-0.6383	[-0.8328,	-0.4260]
ρ_{gk}	norm	0	0.3	$\boldsymbol{R}$	-0.0589	0.2775	-0.0716	[-0.5309,	0.3676]
ρ_{gl}	norm	0	0.3	$\boldsymbol{R}$	-0.1203	0.1537	-0.1522	[-0.3960,	0.1027]
ρ_{kl}	norm	0	0.3	$\boldsymbol{R}$	-0.2428	0.2188	-0.1002	[-0.4810,	0.3016]
$\widehat{\beta}$	beta	0.9	0.05	[0,1]	0.9268	0.0443	0.9003	[0.8166,	0.9740]
ω_k	beta	0.9	0.05	[0,1]	0.9268	0.0443	0.8933	[0.8007,	0.9763]

Table A1(d). The Bayesian Estimation Priors and Posteriors for China

Name	Prior				Posterior				
	Dist.	Mean	S.E.	Support	Mode	S.E.	Mean	Prob. Interval	
P_{ee}	norm	0.8	0.2	$\boldsymbol{R}$	0.8115	0.0739	0.7837	[0.6789,	0.8716]
P_{gg}	norm	0.8	0.2	$\boldsymbol{R}$	0.8771	0.0785	0.8345	[0.6757,	0.9714]
P_{kk}	norm	0.8	0.2	$\boldsymbol{R}$	0.7572	0.1428	0.6638	[0.4699,	0.8355]
P_{ll}	norm	0.8	0.2	$\boldsymbol{R}$	0.8068	0.0961	0.8267	[0.6881,	0.9619]
P_{eg}	norm	0	0.3	$\boldsymbol{R}$	0.0573	0.0404	0.0490	[-0.0083,	0.1041]
P_{ek}	norm	0	0.3	$\boldsymbol{R}$	0.0111	0.2527	0.1315	[-0.1517,	0.4077]
P_{el}	norm	0	0.3	$\boldsymbol{R}$	0.0802	0.1328	0.1743	[0.0147,	0.3611]
P_{ge}	norm	0	0.3	$\boldsymbol{R}$	0.0018	0.1712	-0.0203	[-0.2795,	0.2926]
P_{gk}	norm	0	0.3	$\boldsymbol{R}$	0.2073	0.2631	0.2196	[-0.2108,	0.5496]
P_{gl}	norm	0	0.3	$\boldsymbol{R}$	-0.1053	0.1766	-0.1348	[-0.3848,	0.1271]
P_{ke}	norm	0	0.3	$\boldsymbol{R}$	-0.0163	0.0271	-0.0024	[-0.0684,	0.0657]
P_{kg}	norm	0	0.3	$\boldsymbol{R}$	0.0087	0.0176	0.0383	[0.0042,	0.0719]
P_{kl}	norm	0	0.3	$\boldsymbol{R}$	-0.1521	0.0838	-0.2014	[-0.3386,	-0.1089]
P_{le}	norm	0	0.3	$\boldsymbol{R}$	0.0837	0.0559	0.1181	[0.0094,	0.2132]
P_{lg}	norm	0	0.3	$\boldsymbol{R}$	0.0328	0.0281	0.0478	[-0.0016,	0.0904]
P_{lk}	norm	0	0.3	$\boldsymbol{R}$	-0.3694	0.1856	-0.2889	[-0.5038,	-0.0915]
σ_e	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0471	0.0069	0.0500	[0.0371,	0.0631]
σ_g	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0989	0.0143	0.1059	[0.0814,	0.1345]
σ_k	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0112	0.0045	0.0252	[0.0164,	0.0360]
σ_l	inv_g	0.01	0.1	$\boldsymbol{R}^+$	0.0194	0.0031	0.0214	[0.0158,	0.0261]
ρ_{eg}	norm	0	0.3	$\boldsymbol{R}$	0.2054	0.1617	0.1414	[-0.0995,	0.3688]
ρ_{ek}	norm	0	0.3	$\boldsymbol{R}$	-0.0340	0.2610	0.0182	[-0.3032,	0.3386]
ρ_{el}	norm	0	0.3	$\boldsymbol{R}$	-0.1492	0.1674	-0.1569	[-0.4071,	0.0686]
ρ_{gk}	norm	0	0.3	$\boldsymbol{R}$	0.0524	0.2615	0.09223	[-0.2580,	0.3771]
ρ_{gl}	norm	0	0.3	$\boldsymbol{R}$	0.1527	0.1668	0.1607	[-0.0884,	0.4082]
ρ_{kl}	norm	0	0.3	$\boldsymbol{R}$	-0.0633	0.2401	0.1389	[-0.1875,	0.4155]
$\widehat{\beta}$	beta	0.9	0.05	[0,1]	0.9241	0.0459	0.8980	[0.8215,	0.9732]
ω_k	beta	0.9	0.05	[0,1]	0.9241	0.0459	0.8979	[0.8340,	0.9762]

Table A2. Decomposition of Output

Benchmark model with alternative calibration

Source: Authors' calculations

	Brazil	**Russia**	**India**	**China**
1990:2009				
Efficiency Wedges	0.269	1.698	0.466	0.839
Government Consumption Wedges	−0.258	0.035	0.013	−0.025
Investment Wedges	0.539	−0.281	0.575	0.185
Labor Wedges	0.451	−0.452	−0.054	0.002
1990:1999				
Efficiency Wedges	−0.680	−0.072	0.810	1.341
Government Consumption Wedges	−0.128	−0.537	−0.033	−0.081
Investment Wedges	0.851	1.193	0.185	−0.173
Labor Wedges	0.959	0.416	0.039	−0.086
2000:2009				
Efficiency Wedges	1.108	1.646	0.400	0.105
Government Consumption Wedges	−0.236	0.310	−0.003	0.100
Investment Wedges	0.176	−0.239	0.661	0.646
Labor Wedges	−0.049	−0.716	−0.058	0.150

Table A3. Decomposition of Output

Benchmark model with alternative trend

Source: Authors' calculations

	Brazil	**Russia**	**India**	**China**
1990:2009				
Efficiency Wedges	−0.124	0.188	0.684	0.072
Government Consumption Wedges	−0.214	−0.001	0.133	0.222
Investment Wedges	0.532	0.506	0.488	1.013
Labor Wedges	0.806	0.307	−0.304	−0.307
1990:1999				
Efficiency Wedges	−0.687	−0.199	1.364	0.381
Government Consumption Wedges	−0.147	0.267	−0.557	0.051
Investment Wedges	0.735	1.202	0.841	0.905
Labor Wedges	1.099	−0.270	−0.649	−0.336
2000:2009				
Efficiency Wedges	1.351	−0.134	0.533	0.058
Government Consumption Wedges	−0.299	−0.230	0.161	0.273
Investment Wedges	−0.210	0.841	0.520	0.923
Labor Wedges	0.158	0.523	−0.213	−0.253

Table A4. Decomposition of Output

Benchmark model with alternative period

Source: Authors' calculations

	Brazil	**Russia**	**India**	**China**
1990:2007				
Efficiency Wedges	−0.215	1.711	0.487	0.826
Government Consumption Wedges	−0.137	−0.033	0.013	−0.025
Investment Wedges	0.473	−0.711	0.632	0.190
Labor Wedges	0.879	0.033	−0.131	0.009
1990:1999				
Efficiency Wedges	−0.626	−0.086	0.731	1.237
Government Consumption Wedges	−0.029	−0.159	0.039	−0.056
Investment Wedges	0.579	1.243	0.206	−0.313
Labor Wedges	1.076	0.002	0.024	0.132
2000:2007				
Efficiency Wedges	1.221	1.603	0.432	0.303
Government Consumption Wedges	−0.095	0.032	−0.010	0.052
Investment Wedges	−0.043	−0.716	0.712	0.852
Labor Wedges	−0.083	0.081	−0.135	−0.206

Table A5. Original Sources of the Data

GDP	PWT
Consumption share	PWT
Investment share	PWT
Employment	PWT
Hours worked per worker	EM
Population	PWT
Adult Share in Total Population	ILO
Household Expenditure on Durables	EM
Net fixed Capital Stock	PWT[12]
Depreciation	PWT[13]

[12]For Russian capital stock and depreciation we refer to Izyumov and Vahaly (2008) because the Foley database reports capital stock data only for the 2004-2008 period.

[13]Izyumov and Vahaly (2008) assume a constant 5% annual depreciation.