7. Short-Run Effects of the Economic Reform Agenda[1]

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Introduction

The 'East Asian' growth model has served both China and its trading partners well during the past three decades. It requires the transformation of lightly trained farmers into factory and service workers. The availability of these workers attracts capital from home and foreign savings to urban areas, raises the productivity of the transitioning workers and attracts further rural-to-urban migration. The snag is that the workers' are not sufficiently well trained to support heavy manufacturing or sophisticated services and so production is highly specialised in light manufactures. The transformation therefore requires considerable trade dependence. Moreover, in the East Asian experience, the resulting income growth has tended to outstrip perceived 'permanent incomes' (Modigliani and Cao 2004), so saving has been very high, causing current account surpluses. The domestic gains from the growth generated speak for themselves but trading partners have also gained, via both the product and the financial terms of trade (Tyers 2014b).

China's size and the slow growth of its trading partners now limit its capacity to continue to grow within this model so the inevitable turn inward is in progress. Thus far, the key elements in this transformation have been fiscal expansion and public investment, though provincial indebtedness will constrain these in future. China's government has therefore undertaken to identify reforms that will unleash further, necessarily inward, sources of growth. These include further reforms of industrial policy, trade policy, landownership laws, the one-child policy, fiscal federalism and taxation, financial market regulation, urbanisation (*hukou*) and capital account liberalisation under the general rubric of 'internationalisation' (State Council 2014). For most of these, change will be gradual and the short-run implications slight. For reforms to industrial policy and the capital account, however, short-run effects on overall economic performance are likely to be significant.

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The approach adopted centres on an economy-wide model that takes explicit account of oligopolistic behaviour in 17 industrial and service sectors. This model makes it possible to examine the interactions between industrial reform, regulatory policy and liberalisation of the capital account. The results suggest that industrial reform in heavy manufacturing and services has considerable potential, reducing costs and fostering growth in output, private consumption and modern-sector employment. The effects of capital and financial account liberalisation are less certain and could be negative depending on whether there is demand for foreign assets that has been constrained by outward capital controls.

The next section reviews China's ongoing transition, its causes and effects. In the third section, the special structure of the Chinese economy is detailed along with a discussion of the special sensitivity of its employment performance to real exchange rate changes. The fourth section describes the model used and the fifth offers estimates of the effects of further inward growth-generating industrial reforms. The sixth section draws out the implications of the relaxation of capital controls and the associated changes in external flows. Conclusions are offered in the final section.

China's transition: a motive for key reforms

Although China's rate of expansion during its three decades of reform has been spectacular, and in the past decade its economic size has approached and then surpassed Japan and soon the United States and the European Union. China's exports have grown especially rapidly since the turn of the century and now dominate world trade in light manufactures.[2] As of 2011 its unadjusted share of global GDP on a national accounts basis at current exchange rates was greater than Japan's and its shares of global exports, saving and investment were larger than those of the United States and close to those of the European Union (Table 7.1). Looking forward, notwithstanding China's modest per capita income, there is not the scope for the rest of the world to absorb export growth from China at historical rates. Moreover, there has been an accelerated

2 According to trade data from <http://data.worldbank.org>, Chinese manufactured exports now sum to more than one-third of the collective manufactured imports of the United States, the European Union and Japan, to which level growth has been extraordinary since 2001, when China's share was only 7 per cent.

rise in Chinese labour costs, foreshadowing a Lewis 'turning point',[3] which is associated with the depletion of mobile labour in rural areas and a nationwide demographic contraction stemming from China's one-child policy.

Table 7.1 Relative Economic Sizes of China and Other Large Regions, National Accounts at Current Exchange Rates, 2011

Percentage of world	China	US	EU (26)	Japan
GDP	11	22	26	9
Consumption, *C*	8	27	26	9
Investment, *I*	20	15	22	8
Government spending, *G*	7	20	30	10
Exports, *X*	17	17	25	7
Imports, *M*	15	21	23	8
Total domestic saving, S^D	19	13	20	9

Sources: The IMF *International Financial Statistics* database (IMF n.d.) is the major source but there is frequent resort to national statistical databases.

Superficially, it would seem that a switch from export-oriented to inward-focused growth is simply a matter of sustaining high investment and substituting consumption for exports. This has, however, been problematic because the growth to date has emphasised light manufacturing while China's growing middle class demands quality products and services that are as yet poorly represented in its production basket. To diversify China's output towards these products requires major reform of its heavy manufacturing and services sectors, and investment in associated human capital.[4] This requires the extension of industrial reforms into hitherto protected heavy manufacturing and service industries, where reductions in costs and prices could have major stimulatory effects on the economy as a whole.

A key element of the global imbalance to which China has contributed is associated with its high saving. It has tended to produce more than it has consumed as its rapid growth has run ahead of its citizens' permanent incomes. The effect of this has been to confer on the rest of the world gains via both the product and the financial terms of trade, but also losses due to wage rigidity and labour displacement as well as distributional stress and structural-adjustment costs (Tyers 2014b). A political backlash from the advanced economies has therefore also contributed to China's need for reforms that foster more inward-oriented

3 The timing of China's Lewis turning point is a subject of controversy, as suggested by the contrasts between the views expressed by Cai (2010), Garnaut (2010) and Golley and Meng (2011). There is, however, little doubt that the turning point is on its way, even if there is no agreement as to whether recent real wage rises suggest its presence.

4 For a discussion of the institutional and industrial reform agenda and its difficulty, see, for example, Riedel (2011) and Deer and Song (2012).

growth. The proposed financial reforms, combined with the internationalisation of the renminbi, are directed not only at improving the efficiency with which the large stock of savings is directed into investment, but also to the restoration of balance. For this reason, the pattern and trends in China's saving and in its current account are indicators of its transition and of the need for its reforms.

Saving

National saving includes that by households, corporations and government. Savings that exceed the value of domestic private and public investment ('excess savings') result in the net acquisition of foreign assets and they are measured by the current account surplus (Equation 7.1).

Equation 7.1

$$CA = S_{HH} + S_C + (T - G) - I = S_D - I = \Delta R - FI_{Inward} + FI_{Outward} = X - M + N$$

In Equation 7.1, S_{HH} is household saving, S_C is corporate saving, $(T - G)$ is government saving or the fiscal surplus, S_D is total domestic saving, I is investment (including public investment), ΔR is official foreign reserve accumulation, CA is the current account balance and N is net foreign factor income.[5] FI signifies foreign investment, inflows or outflows. In China's case these terms have traditionally been dominated by foreign direct investment (FDI) since cross-border portfolio investments have been restricted by its capital controls (Ma and McCauley 2007). Investment financing and the extent of imbalance therefore depend on household saving, corporate saving and government saving.

Household saving

China's households save between one-quarter and one-third of their disposable incomes. The pattern and time trend are analysed by Horioka and Wan (2007) and Horioka and Terada-Hagiwara (2012). They suggest China's saving is in a declining phase—a point with which Yang (2012) agrees, citing a range of mainly social and trade policy reforms that will see reduced incentives for household saving, many of which are stated priorities in the official reform

5 This identity is readily obtained by combining the expenditure identity, $Y = C + I + G + X - M$, with the disposal identity for GNP, $Y + N = C + T + S$, where $S = S_{HH} + S_C$.

agenda. Moreover, recent studies suggest that the household saving rate is falling faster than official statistics indicate (Ma and Yi 2010).[6] Thus, there is much to suggest a declining path for China's household saving rate.[7]

Corporate saving

National accounts 'flow of funds' data show corporate saving to have been fairly stable at about one-fifth of GDP through 2009. In the period since, and looking forward, changes in total corporate saving might be anticipated for three reasons. First, to the extent that slower global growth since the GFC and China's growth since 2011 has affected profitability in the state sector, corporate savings might be expected to have also declined in recent years. Second, ongoing industrial policy reforms, which have allowed substantial expansion in the share of private firms in the economy, are likely to have reduced oligopoly rents. Finally, financial development and the integration of formal and informal financial markets across the country have been proceeding apace, which can be expected to put downward pressure on the trend of corporate saving.

Government saving

Since the implementation of China's national tax law in 1994, an increasing share of economic activity has been taking place in the 'formal sector'. This has meant that Central Government tax revenue has grown at a rate that is notably faster than GDP.[8] Along with this, *Central* Government financial surpluses have expanded continuously. At the provincial level, however, borrowing from domestic commercial banks by SOEs and local governments has been extensive and deficits have expanded dramatically.[9] After 2007, the sum of provincial

6 If the weighted average of consumption-related retail and services sales growth is used to project the consumption share of GDP (Huang et al. 2013), the results suggest the consumption share of GDP *climbed* from 49 to 54 per cent during 2008–10, while China's National Bureau of Statistics (NBS) has it falling from 48 to 47 per cent. Huang et al. start with the official consumption share in 2000 and derive the GDP shares in remaining years using real GDP growth and their estimated consumption growth rates. Using similar data, Garner and Qiao (2013) suggest Chinese consumption expenditure is officially underestimated by US$1.6 trillion, also concluding that its GDP share is expanding.

7 Opposing voices include Wei and Zhang (2011) and Wen (2011). Wei and Zhang (2011) identify a link between saving and entrepreneurship effort on the one hand and China's increasingly inflated sex ratio on the other. The coincidence of son preference and sexual selection technology has seen a rise in the number of unmatched men and increasingly competitive behaviour by families with sons. Debate continues about the strength of this force for higher saving against those associated with policy reforms in the education, health and retirement insurance industries. Wen (2011), on the other hand, employs a model of rapid growth with constant proportional idiosyncratic risk, following Modigliani and Cao (2004), to conclude that saving will continue to rise with income per capita. The assumption of constant proportional risk is a strong one, however, in the face of social reforms to health and retirement systems.

8 According to China's *Statistical Yearbook* (NBS 2012), Central Government revenue has expanded its share of nominal GDP from 10 per cent in 1994 to 23 per cent in 2012.

9 See Zhang and Barnett (2014). This is notwithstanding the Central Government sharing national revenue with the provinces at a 50–50 rate in 2011.

deficits exceeded the central surplus, leading to a return to overall deficits with magnitudes expanding to unprecedented levels (Figure 7.1). Thus, government saving is also shifting in the negative direction in the post-GFC years and, as a consequence, there is diminishing scope for the further use of government spending to balance the economy.

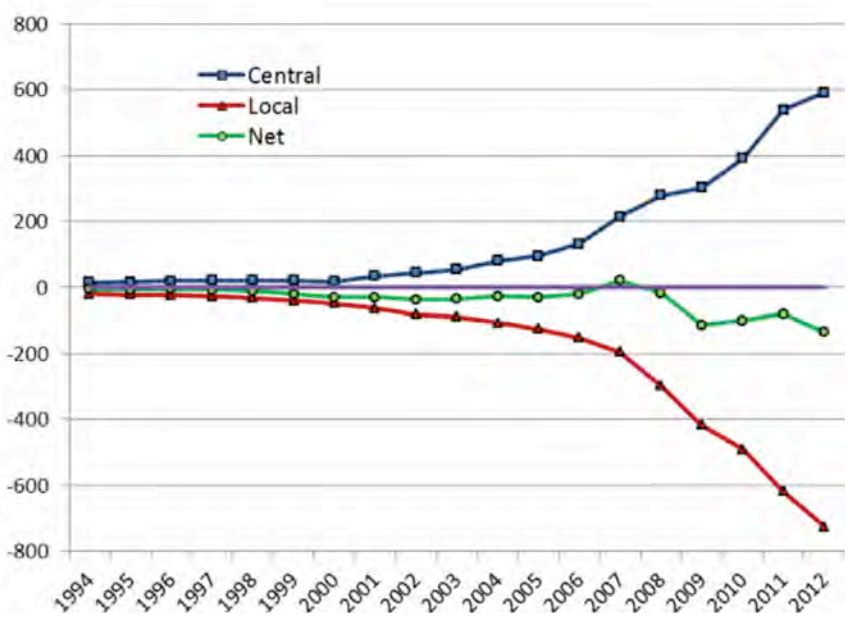

Figure 7.1 China's Governments' Net Surpluses (US$ billion)

Sources: Government debt and general government gross debt position: IMF Fiscal Monitor (2013); external debt outstanding: NBS (2012).

Current account balance

The above discussions lead us to expect a declining trend in China's total domestic saving rate even where this is not yet fully represented in the official statistics, which thus far show only a modest decline since 2010. Since then, however, total (private and public) investment has risen to nearly half of GDP.[10] The investment change has therefore been the primary driver of the declining trend in China's *official* current account surplus since 2010. Looking ahead, it is difficult to imagine a higher rate of both public and private investment without the prospect of increasingly wasteful projects (Singh et al. 2013). Declines in

10 In the medium term, at least, this has confirmed the prediction by Lee and McKibbin (2007) that investment would contribute substantially to China's 'rebalancing'.

household and corporate saving rates stemming from the combination of the proposed financial and industrial reforms are the least uncertain of the many likely consequences, suggesting further declines in the current account surplus.

Internationalisation and new roles for private financial flows

The reforms on international capital account will make private flows (the inward and outward private foreign investment terms in Equation 7.1) more influential. Eventually, it is expected that these will raise private holdings of foreign financial assets in both directions. This has not happened yet, however, as Figure 7.2 confirms. Since the GFC, gross flows on China's balance of payments have fallen relative to its GDP and the most recent trends continue to be negative. At the same time, official statistics suggest that at least three-quarters of the inflows and 90 per cent of the outflows are not in the FDI or portfolio investment categories, which include property investment. Since no long-term trends are yet evident in these shares, the traditional dominance of these flows by debt instruments can be expected to continue.

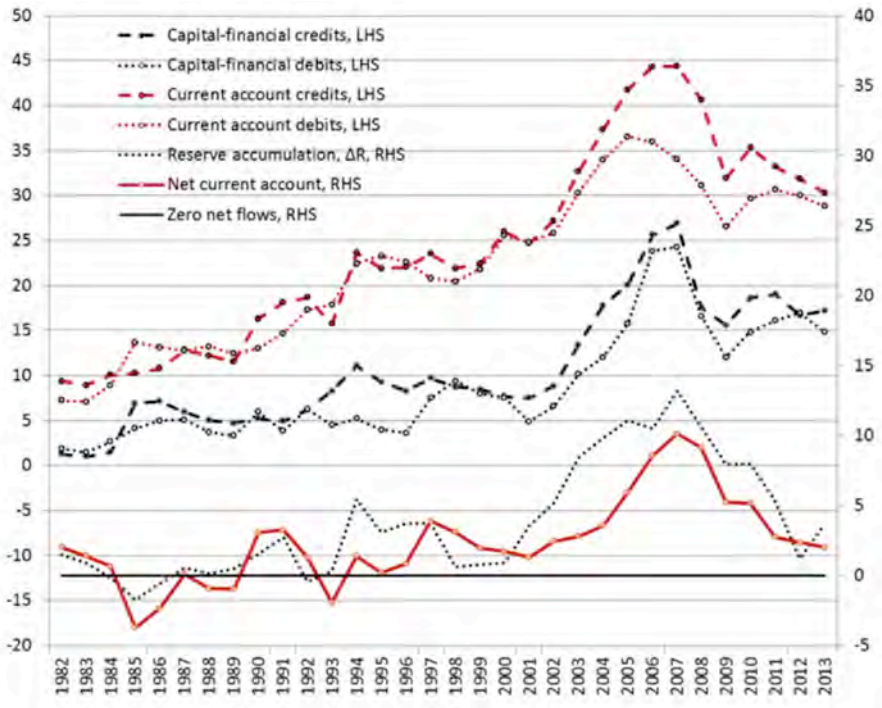

Figure 7.2 Gross and Net Flows on China's Balance of Payments (percentage of GDP)

Source: China SAFE, 'The Balance of Payments Table'. Available from <http://www.safe.gov.cn/>.

Yet expanded gross flows would seem inevitable. This raises the possibility that these flows could become unbalanced, favouring either inflows or outflows, due, for example, to pent-up demand for foreign assets that has been constrained by capital controls. The work of He and Luk (2013) does not foreshadow such unbalanced flows, nor does that of He et al. (2012), which envisions a trend towards trade balance, offset in the current account by higher yields on foreign (newly private) holdings. Indeed, reasons pent-up demand might not be a concern include that capital controls have been leaky enough for the wealthy to acquire the foreign assets they have wanted and that China's reserves are so large that they can be repatriated if private demand for foreign assets were to rise, so balance could be maintained for some years at levels desired by the Government. Moreover, with widespread expectation that Balassa–Samuelson appreciations will continue as China grows relative to the advanced economies, it is possible there will be aversion to foreign assets along the lines seen in Japan, where private portfolio holders tolerate very low rates of return on home assets. A trend decline in China's saving rates and the absence of pent-up demand are therefore the circumstances under which capital account liberalisation might be expected to proceed.

It remains possible, however, that liberalisation could see a surge in outflows reflecting yet unobserved pent-up demand. Indeed, this prospect has come sharply into focus recently as private financial flows out of China have accelerated with the winding down of unconventional monetary policy in the United States. The renminbi's appreciating trend has stalled and there is a temporary bolstering of Asian current accounts (Burns et al. 2014). The possibility of a substantial renminbi depreciation as a consequence is considered by Eichengreen (2014). The economic implications for China of these circumstances are therefore considered in section six.

Special sensitivity to the real exchange rate

The special sensitivity of China's economic performance to its real exchange rate stems from its economic structure, as summarised in Table 7.2. Note that: 1) the great majority of non-agricultural employment is in the export-oriented light manufacturing sector—indeed, employment in this sector exceeds that in agriculture; 2) this sector is relatively competitive—price mark-ups are low and therefore pure or economic profits make up only a small share of total revenue; and 3) the SOE-dominated energy, metals and services sectors are less labour intensive and at the same time they are oligopolistic, generating substantial rents that form a buffer against downturns. These facts clearly suggest that

total labour demand in China's modern sector is comparatively sensitive to the relativities between home wages and export prices, and hence to its real exchange rate.

Table 7.2 Structure of the Chinese Economy[a]

Percentage	Value-added share of GDP	Share of total production employment	Share of total exports	Pure profit share of gross revenue
Agriculture	13	24	2	0
Petroleum, coal, metals	16	11	10	20
Light manufacturing	29	33	82	5
Services	42	32	6	20
Total	100	100	100	12

[a] Pure profits are calculated from national statistical estimates of accounting profits, deducting required returns to service industry-specific prime rates. Here they are presented gross of tax and corporate saving and as shares of total revenue.

Source: Model database (social accounting matrix) derived from Dimaranan and McDougall (2002) and an updating of the national data to 2005, as described in Tyers (2014a).

The key sensitivities explored here are between China's real exchange rate and pricing behaviour in its oligopolistic heavy manufacturing and services industries on the one hand, and the openness of its capital account on the other. As indicated in the previous section, financial and industrial reforms are likely to continue the trend towards declining private saving. This will reduce the leakage of income into foreign reserve accumulation. The result is that more Chinese expenditure falls on the home economy relative to the foreign economy, hence appreciating the real exchange rate. This has the effect of inducing either a home inflation or nominal appreciation of the renminbi. Either way, the trend will foster a shifting of economic activity from the export light manufacturing sector into heavy manufacturing and services.

The scale of this effect, however, will be sensitive to changes in oligopoly rents in a manner not commonly recognised. In essence, since the excess profits are achieved by supplying less output than would occur in competitive markets, they reduce productivity in the largely non-traded sectors of the economy. Again employing the abstraction that goods and services are either tradable or not, the effect of this productivity contraction on relative prices is illustrated in Figure 7.3. It raises the prices of non-traded goods relative to traded goods and hence China's real exchange rate. Further reforms to competition policy and regulatory practice that reduce these oligopoly rents would have the opposite effect and spur Chinese employment by sustaining the expansion in the labour-intensive and real exchange rate-sensitive light manufacturing sector.

To quantify the effects of these changes on the real exchange rate and hence on China's economic performance, a more complete model of the Chinese economy is now introduced.

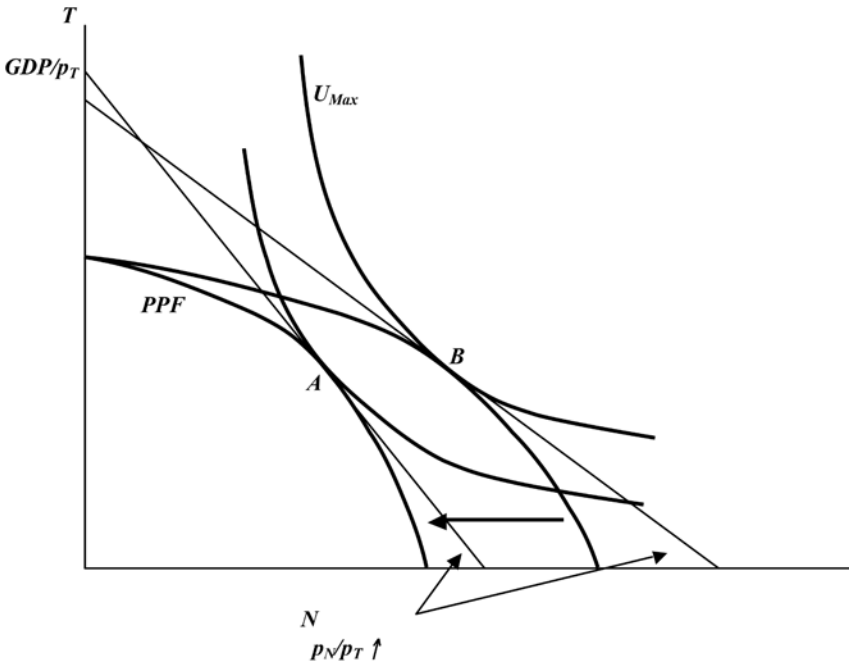

Figure 7.3 Service Oligopoly Rents and the Real Exchange Rate

An oligopoly model of the Chinese economy

We use a comparative static macro-economic model of the Chinese economy that embodies a multi-industry structure in which all industries are treated as oligopolies, with firms in each industry supplying differentiated products and interacting on prices.[11] Government expenditure creates demand for goods and services via nested constant elasticity of substitution (CES) preferences and government revenue stems from a tax system that includes both direct (income) taxes levied separately on labour and capital income and indirect taxes including those on consumption, imports and exports.[12] A capital goods sector is included, which translates investment expenditure into product and service demands, again using a nested CES preference structure. The level of

11 It is a distant descendant of that by Tyers (2005), though it is considerably generalised to include interaction on prices and short-run macro-economic behaviour.

12 Income taxes are approximated by flat rates deduced as the quotient of revenue and the tax base in each case.

total investment expenditure has Q-like behaviour, being influenced positively by expected home rates of return on installed capital (which drive the market values of firms' assets) and negatively by a financing rate obtainable from an open 'bond market' in which home and foreign bonds are differentiated to represent China's capital controls (the rates of which drive capital replacement costs).[13] Savings are sourced from the collective household at a constant rate and from corporations at industry-specific rates depending upon the magnitudes of pure (economic) profits earned. Foreign direct investment and official foreign reserve accumulation are both represented as per Equation 7.1 ($S_D - I = \Delta R - FI_{Inward} + FI_{Outward}$), to complete China's external financial accounts.

Model structure

The scope of the model is detailed in Table 7.3. Firms in all industries are oligopolistic in their product pricing behaviour, with the degree of price-setting collusion between them represented by conjectural variation parameters that are set to account for the level of regulatory surveillance. Each firm bears fixed capital and labour costs, enabling the representation of unrealised economies of scale. Home products in each industry are differentiated by variety, and output is Cobb-Douglas in variable factors and intermediate inputs. While firms are oligopolists in their product markets they have no oligopsony power as purchasers of primary factors or intermediate inputs.[14] The economy modelled is 'almost small', implying that it has no power to influence border prices of its imports but its exports are differentiated from competing products abroad and hence face finite elastic demand.[15] The consumer price index (CPI) is constructed as a composite Cobb-Douglas–CES index of post-consumption tax home product and post-tariff import prices, derived from the aggregate household's expenditure function. This formulation of the CPI aids in the analysis of welfare impacts. Because collective utility is also defined as a Cobb-Douglas combination of the volumes of consumption by generic product, proportional changes in overall economic welfare correspond with those in real gross national product (GNP).[16]

13 In the lengths of run considered there is no steady state that would equate expected net rates of return with current bond yields.

14 Imports in each industrial category are seen as homogeneous, differentiated from home products as a group, so that import varietal diversity never changes. Since all home varieties are exported there is no movement on the 'extensive margin' of the type that is evident in the models of non-homogeneous export industries by Melitz (2003) and Balistreri et al. (2007).

15 The effective numeraire is the import product bundle. Consumer and GDP price indices are constructed for real aggregations, following the practice in national modelling since Dixon et al. (1982) and Harris (1984).

16 When the utility function is Cobb–Douglas in consumption volumes, the expenditure function is Cobb–Douglas in prices. If the consumer price level, P^C, is defined as a Cobb–Douglas index of prices, the equivalent variation in income can be expressed in terms of the proportional change in this index. Thus, following any shock, the income equivalent of the resulting changes to income and prices is, approximately, the proportional change in real GNP.

Table 7.3 Model Scope

Regions	China
	Rest of world
Primary factors	Land
	Natural resources (minerals, energy deposits)
	Skilled (professional) labour
	Unskilled (production) labour
	Physical capital
Industries	Agriculture
	Metals, including steel, minerals and (non-coal) mining
	Coalmining and production
	Petroleum production and refining
	Processed agricultural products
	Electronic equipment
	Motor vehicles
	Chemical, rubber, plastic products
	Textiles
	Other manufactures
	Electricity supply and distribution
	Gas supply and distribution
	Telecommunications
	Insurance and finance
	Transport
	Construction
	Other services

Source: Aggregates of the 57-industry GTAP Version 6 database from Dimaranan and McDougall (2002).

The quantity of domestically owned physical capital is fixed in the short run, so that changes in the total capital stock affect the foreign ownership share and hence the level of income repatriated abroad. Long and short-run closures can be adopted but the analysis presented herein is focused on the short run: physical capital is fixed in supply and immobile between industries. Production labour is mobile between industries but at a fixed real (CPI-deflated) wage, so employment is endogenous, and the remaining factors, while also mobile between industries, are fixed in endowment and flexibly priced. There is no entry or exit of firms but the magnitudes of pure profits earned are endogenous. Consistent with China's fiscal conservatism, the base fiscal position is held constant so that changes in endogenous revenue lead to corresponding changes in government expenditure.

Macro-economic behaviour

As befits a comparative static analysis, the macro-economics embodied is elemental. The short-run closure fixes productive capital use in all industries but allows investment that would affect production in the future. Central is the open-economy capital market that is built around the market clearing identity—a version of Equation 7.1—in which inward and outward private financial flows are consolidated into 'net foreign saving': $S_{NF} = FI_{Inward} - FI_{Outward}$. Thus Equation 7.2.

Equation 7.2

$$I(r^{ce}, r) = S_D\left(Y_{DH}, \pi, G\right) + S_{NF}\left(r, r^*, \hat{e}_R^e\right) - \Delta R\left(r\right)$$

In Equation 7.2, r is the home real financing rate (bond yield), r^* is the real yield on bonds abroad (the two being differentiated and so offering different yields), $\hat{e}_R^e$ is the expected rate of appreciation of the real exchange rate and ΔR is the annual addition to official foreign reserves. Total domestic saving is the sum of saving by households, corporations and government: $S_D = S_H\,(Y_{DH}) + S_C(\pi) + (T - G)$, in which Y_{DH} is home household disposable income. The household saving rate is assumed fixed, so that $S_H = S_H\, Y_{DH}$. China's extraordinarily high level of corporate saving, S_C, is assumed to stem only from pure profits, π, with a distinct but fixed saving rate calibrated separately for each industry (Equation 7.3).

Equation 7.3

$$S_C = \sum_i S_{Ci} = \sum_i s_{Ci}\pi_i$$

The rate r^{ce} is the expected average net rate of return on installed capital, which takes the following form at the industry level (Equation 7.4).

Equation 7.4

$$r_i^{ce} = \frac{P_i^{Ye} MP_i^K}{P^K} - \delta_i$$

In Equation 7.4, P^K is the current price of capital goods, P^{Ye} is the product price level expected to prevail upon gestation and δ is the rate of depreciation. An average of the sector-specific rates, r_i^{ce}, is taken, which is weighted by value added in each industry to obtain the economy-wide level r^{ce}. Investment expenditure, I, is then determined by Equation 7.5.

Equation 7.5

$$I = P^K I_0 \left(\frac{r^{ce}}{r} \right)^{\varepsilon_V}$$

This relationship reflects the *Q* ratio in that r^{ce} determines the current value of firms' capital while r determines its current replacement cost.

In our comparative static analysis net foreign saving, S_{NF}, is motivated by changes in the level of an interest parity function that incorporates the difference between the home and foreign real bond yields and real exchange rate expectations. A linear relationship is used to allow for reversals of the direction of net flow in response to shocks (Equation 7.6).

Equation 7.6

$$S_{NF} = a_{SF} + b_{SF} \left(r - r^* + \hat{e}_R^e \right), \quad b_{SF} > 0.$$

With tight capital controls there is a low level of responsiveness, so b_{SF} is small (the supply of net foreign private saving is inelastic). Correspondingly, the combination of China's high saving rate with outward capital controls necessitates that the surplus of saving over investment, which has ranged up to one-tenth of GDP, be directed abroad by the People's Bank of China (PBC) as official foreign reserves. This behaviour depends on a relationship that is linear, for the same reason as in Equation 7.6 (Equation 7.7).

Equation 7.7

$$\Delta R = a_{DR} - b_{DR} r$$

In Equation 7.7, under capital controls, the movement of reserves is much more elastic to the home real interest rate than that of private financial capital, so that $b_{DR} > b_{SF}$. The effect of this is to stabilise the home real rate in response to shocks, which cause, instead, elastic movements in the rate of reserve accumulation.[17] The liberalisation of China's capital and financial accounts is then readily represented as a lessening of the gap between the parameters b_{DR} and b_{SF} .

17 It is argued elsewhere (Tyers and Zhang 2011, for example) that, under China's capital controls and given the high saving rate, the PBC had little residual discretion over annual increments to reserves. This is because there was no incentive for China's commercial banks to do other than relinquish unused foreign currency to the PBC. The scale of reserve accumulations was therefore not an instrument in the PBC's monetary policy. Equation 7.7 is intended merely as a reduced-form description of this process.

The capital market clearing identity (Equation 7.2) then determines the home real interest rate and the magnitude of the external financial deficit ($\Delta R - S_{NF} = S_D - I$)). This is equal in magnitude to the current account surplus, $X - M + N(r, r^*)$, in which N is net factor income from abroad.[18] The model is essentially Walrasian in that shocks originating in saving and investment, and hence in external flows, cause home (relative to foreign) product prices (and hence the *real* exchange rate) to adjust sufficiently to clear home markets and preserve the balance of payments.

Short-run effects in a real model

In the short run, nominal wage rigidity is important and this is not readily represented in real models such as this one. We can contrast two extreme monetary targeting regimes: the fixed nominal exchange rate and the float with a GDP price deflator target. With the fixed exchange rate regime, any change in the real exchange rate takes the form of a corresponding change in the domestic price level. If the nominal exchange rate, E, is defined as the number of units of foreign exchange obtained for a unit of the domestic currency, the real exchange rate, e_R, can be defined correspondingly as the rate of exchange between the home product bundle and corresponding bundles produced abroad. It follows that the real exchange rate can be approximated as the common currency ratio of the GDP prices of the two countries, P^Y and P_F^Y / E (Equation 7.8).

Equation 7.8

$$e_R = \frac{P^Y}{P_F^Y / E} = E\frac{P^Y}{P_F^Y}$$

And so, when E is targeted and there is no indirect effect on the foreign currency price level in the rest of the world, a real appreciation must take the form of an inflation: $e^R \uparrow = \bar{E}\ P^Y \uparrow / \bar{P}_F^Y$.

If we then assume that our short run is sufficiently tight to render the nominal wage of production workers rigid then the short-run real wage movement mirrors the real appreciation: $\bar{W} / \left(P^Y \uparrow\right) = w \downarrow$, so that $\hat{w} = -\hat{e}_R$. By contrast, a flexible exchange rate regime with a price-level target would see no change in the price level or real wage but a nominal appreciation of magnitude equal to the proportional change in the real exchange rate.

18 As modelled, N comprises a fixed net private inflow of income from assets abroad and fixed aid to the Government, less endogenous repatriated earnings from foreign-owned physical capital in China.

The liberalisation of capital controls requires increased nominal exchange rate flexibility, as the 'impossible trinity' dictates. While we always retain the real exchange rate as endogenous, both closures linking it to the price level and real wage rate are used in our experiments.

Oligopoly in supply

Firms in each industry supply differentiated products. They carry product variety-specific fixed costs and interact on prices. Cobb-Douglas production drives variable costs so that average variable costs are constant if factor and intermediate product prices do not change but average total cost declines with output. Firms charge a mark-up over average variable cost, which they choose strategically. Their capacity to push their price beyond their average variable costs without being undercut by existing competitors then determines the level of any pure profits and, in the long run, the potential for entry by new firms.

Thus, each firm in industry i is regarded as producing a unique variety of its product and it faces a downward-sloping demand curve with elasticity ε_i (< 0). The optimal mark-up is then Equation 7.9.

Equation 7.9

$$m_i = \frac{p_i}{v_i} = \frac{1}{1 + \frac{1}{\varepsilon_i}} \qquad \forall i$$

In Equation 7.9, p_i is the firm's product price, V_i is its average variable cost and ε_i is the elasticity of demand it faces. Individual firms choose their optimal price on observation of the elasticity of demand they face and this depends on the price-setting behaviour of other firms, which we represent via a conjectural variations parameter. In industry i this is defined as the influence of any individual firm, k, on the price of firm j: $\mu_i = \partial p_{ij} / \partial p_{ik}$. These parameters are exogenous, reflecting industry-specific free-rider behaviour and the power of price surveillance by regulatory agencies. The Nash equilibrium case is a non-collusive differentiated Bertrand oligopoly in which each firm chooses its price, taking the prices of all other firms as given. In this case the conjectural variations parameter, μ, is zero. When firms behave as a perfect cartel, it has the value unity. This parameter enters the analysis through the varietal demand elasticity.

Critical to the implications of imperfect competition in the model is that the product of each industry has exposure to five different sources of demand. The elasticity of demand faced by firms in industry i, ε_i, is therefore dependent on the elasticities of demand in these five markets, as well as the shares of the home

product in each. They are final demand (*F*), investment demand (*V*), intermediate demand (*I*), export demand (*X*) and government demand (*G*). For industry *i*, the elasticity that applies to Equation 7.9 is a composite of the elasticities of all five sources of demand (Equation 7.10).[19]

Equation 7.10

$$\varepsilon_i = s_i^F \varepsilon_i^F + s_i^V \varepsilon_i^V + s_i^I \varepsilon_i^I + s_i^X \varepsilon_i^X + s_i^G \varepsilon_,^G \qquad \forall i$$

In Equation 7.10, s_i^j denotes the volume share of the home product in market *i* for each source of demand *j*. These share parameters are fully endogenous in the model.

Thus, the strategic behaviour of firms, and hence the economic cost of oligopolies, is affected by collusive behaviour on the one hand and the composition of the demands faced by firms on the other, both of which act through the average elasticity of varietal demand. The collusive behaviour enters through conjectural variation parameters and composition through the demand shares, s_i^j. Each component demand elasticity depends on elasticities of substitution between firm varieties and between home and imported varieties, as well as on the conjectural variations parameters. The relationships are complex and differ as to source of demand.[20] Critically, export demand is more elastic than the others and final demand is more elastic than intermediate, government and investment demand. Thus, when shocks alter the distribution of the demand facing firms, the average elasticity faced is altered and so firms change their mark-ups.

To study the effects of price-cap regulation on oligopoly pricing, a Ramsey mark-up, m_i^R is formulated, as Equation 7.11.

Equation 7.11

$$m_i^R = \frac{afc_i + v_i}{v_i}$$

19 The expressions for these elasticities are messy and voluminous. They are derived in the technical appendix.

20 The relationships between the component demand elasticities facing firms and their underlying parameters are detailed in an appendix available from the authors.

In Equation 7.11, afc_i is average fixed cost and V_i is average variable cost in industry *i*. Compromise mark-ups can be simulated by altering the parameter φ_i in an equation for the 'chosen' mark-up: $m_i^C = (\varphi_i - 1)m_i^R + (2 - \varphi_i)m_i \quad \forall i$. Thus, when $\varphi_i = 1$, $m_i^C = m_i$, thus maximising oligopoly profits, and when $\varphi_i = 2$, $m_i^C = m_i^R$, eliminating pure economic profits altogether.

The database and its representation of China's economic structure

The flow data for the current model originate from the GTAP Version 6 global database for 2001.[21] It combines detailed bilateral trade, transport and protection data characterising economic linkages among regions, together with individual-country national accounts, government accounts, balance-of-payments data and input–output tables that enable the quantification of intersectoral flows within and between regions. Factor shares and input–output coefficients from these 2001 data are combined with Chinese national accounts and balance-of-payments data for 2005, inflating the database to that year and readjusting it for balance. Key structural elements are evident from Table 7.2, which shows that China's measured GDP is dominated by light manufacturing and services. The major contributors to exports are also those that export the largest shares of their output. The traded industries in general and the exporting light manufacturing industries in particular are intensive in production labour. This is most notably true of processed agricultural products and textiles.

Calibration of pure profits and oligopoly parameters

The flows represented in the database do not reveal details of intra-sectoral industrial structure. To represent oligopolistic behaviour, additional information is required on effective firm numbers, pure profits, fixed costs and minimum efficient scale for each industry. With the support of China's official statistics, these variables are calibrated in the following manner. First, pure profits are required as a share of total revenue in each industry. This is needed to finalise the flow database by splitting capital payments between market and over-market returns.[22] It is also a starting point for calibrating industry competitive structure. Second, rough estimates are required of strategically interacting

21 Documentation on the GTAP 6 Data package may be viewed at: <http://www.gtap.agecon.purdue.edu/databases/>.

22 Pure profit shares of total revenue in 2005 were high in 'metals and minerals', 'petroleum and energy', 'telecommunications', 'insurance and finance', and 'transport'. Data on accounting profits in the last three sectors are comparatively weak and the estimates are partly judgmental, accounting for such determinants as low borrowing rates for these SOE-dominated sectors and hence low capital service costs. See the appendices to Tyers and Lu (2008).

firm numbers in each industry and their corresponding conjectural variations parameters. Again, official statistics provide firm numbers and sizes and the proportions that are private and state owned.[23]

Third, to complete the formulation of industry demand elasticities, values of elasticities of substitution between home product varieties on the one hand, and between generic home and foreign products on the other, are required for each industry. These are initially drawn from the estimation literature.[24] Preliminary industry demand elasticities are then calculated for each source of demand (final, intermediate, investment, government and export). Initial shares of the demand facing each industry are then drawn from the database to enable the calculation of weighted average demand elasticities for each industry. Preliminary mark-up ratios are deduced from these via Equation 7.9. The initial equilibrium industry shares, elasticities and mark-up ratios for each industry are given in Table 7.4.[25] This completes the initial demand-side calibration. Work on the supply side begins with the application of mark-up ratios to deduce the initial level of average variable cost in each industry. Then the proportion of pure profits in total revenue is deducted from the mark-up to arrive at fixed-cost revenue shares.[26] Total recurrent fixed cost in each industry then follows. At this point these results are reviewed and, where conflicting information is available on fixed-cost shares of total turnover, the calibration is recommenced with new initial elasticities.[27]

23 *Effective* firm numbers are smaller than totals since a few large firms in each sector frequently dominate pricing. For oligopolistic sectors in China, these tend to be SOEs.

24 Summaries of this literature are offered by Dimaranan and McDougall (2002) and at <http://www.gtap.purdue.edu/databases/>.

25 Note that the reason the elasticities appear large in magnitude at first glance is that they do not represent the slopes of industry demand curves for generic goods. Rather, they are the elasticities faced by suppliers of individual varieties and are made larger by inter-varietal substitution.

26 Fixed costs take the form of both physical and human capital costs using the rule of thumb (based on estimates by Harris and Cox 1983) that physical capital has a fixed cost share of 5/6.

27 The actual calibration process is yet more complex than this because the elasticities of intermediate demand depend on intermediate cost shares, which depend on the variable cost share. It is therefore necessary to calibrate iteratively for consistency of elasticities and shares.

Table 7.4 Initial Demand Shares, Elasticities and Mark-Ups[a]

	Demand shares (%)					Demand elasticities					Average demand elasticity	Industry mark-up[b]
	Inter.[c]	Final	Export	Invest	Govt	Inter.[c]	Final	Export	Invest	Govt		
Agriculture	53	40	4	3	0	−10.2	−28.6	−40.1	−15.6	−16.0	−18.8	1.06
Metals, minerals	84	3	10	2	1	−2.9	−4.4	−8.9	−2.8	−2.8	−3.5	1.39
Coal	61	4	33	0	2	−3.6	−6.1	−11.2	−2.4	−2.5	−6.2	1.19
Petroleum	58	12	5	14	12	−2.1	−2.8	−6.2	−2.3	−2.1	−2.4	1.69
Processed agriculture	50	34	15	0	1	−12.0	−30.8	−26.8	−16.4	−17.0	−20.7	1.05
Electronics	24	4	65	6	0	−2.7	−6.4	−9.8	−2.9	−2.9	−7.5	1.15
Motor vehicles	46	8	15	29	1	−4.8	−10.0	−16.9	−3.4	−3.7	−6.6	1.18
Chemicals	77	6	17	0	0	−3.6	−6.3	−10.4	−2.5	−2.5	−4.9	1.26
Textiles	45	11	44	0	0	−6.5	−16.9	−25.7	−10.4	−10.2	−16.1	1.07
Other manufacturing	43	5	35	16	0	−2.6	−7.1	−9.5	−4.0	−4.0	−5.5	1.22
Electricity	84	13	1	1	1	−6.4	−12.3	−21.0	−7.5	−7.7	−7.3	1.16
Gas manufacturing and distillation	50	10	0	8	32	−4.9	−7.7	−13.4	−4.8	−4.9	−5.2	1.24
Telecommunications	42	24	1	5	27	−1.7	−1.4	−5.1	−1.5	−1.7	−1.7	2.45
Finance	57	29	2	3	8	−1.8	−2.6	−6.6	−2.2	−2.2	−2.2	1.86
Transport	53	18	8	7	14	−1.3	−1.6	−5.9	−1.6	−1.5	−1.8	2.26
Construction	4	2	0	86	8	−2.5	−5.1	−12.3	−4.4	−4.0	−4.3	1.30
Other services	46	21	4	4	25	−3.4	−8.6	−11.7	−3.1	−2.8	−4.7	1.27

[a] All these variables are endogenous in the model. Initial (base) values are provided here. In model simulations, because the elasticities are tied to database flows via mark-ups and hence pure profits, it is difficult to alter them without rebuilding the entire database. In short-run applications, where smaller elasticities are sensible, the export elasticities are shocked down within simulations. The short-run applications presented here have export elasticities shocked down by 70 per cent. For a discussion of elasticities and the length of run in comparative static analysis, see Cooper et al. (1985).

[b] Industry mark-ups are the ratio of producer prices and average variable costs.

[c] Inter = intermediate.

Sources: Model database, derived from Dimaranan and McDougall (2002) and 2005 national statistics.

Importantly for the interpretation of later results, Table 7.4 also shows how different elasticities are across the five sources of demand. Export and final demand are the most elastic and intermediate demand the least.[28] Also from Table 7.4, it is evident that, where exports dominate demand, firms face larger elasticities and charge smaller mark-ups. Consistent with these observations, pure profit shares of total revenue tend to be small or even negative for export-oriented industries and very large for the SOE-dominated industries: petroleum, metals and minerals, telecommunications, finance and transport.

In model simulations, because the elasticities are tied to database flows via mark-ups and hence pure profits, it is difficult to alter them without rebuilding the entire database. In short-run applications, where smaller elasticities are sensible, the export elasticities are shocked down within simulations. The short-run applications presented here have export elasticities (in particular, the foreign elasticity of substitution between home and foreign products) shocked down by 70 per cent.[29] Oligopoly pricing is assumed to focus on a run longer than simulated, so these reductions in the external elasticities do not drive home pricing decisions. They represent only external adjustment at a length of run that is shorter than firms' planning horizons.

Further industrial reform and short-term growth

China's industrial reforms have contributed substantially to its overall economic growth in the past two decades, including its spectacular growth in non-agricultural employment. The extension of these reforms into industries that have tended to be dominated by SOEs and less accessible to FDI is part of the Government's official agenda (State Council 2014). Here two key elements of the industrial reform program are introduced: privatisation and competition policy. Privatisation, by itself, redirects income to households that might previously have gone directly to investment by a state-owned corporation. It is therefore modelled as a reduction in the corporate saving rate.[30] The other industrial reforms include oligopoly pricing surveillance and output price regulation, or price caps, both of which are now common in advanced economies, particularly

28 Export demand is found to be more elastic because of the larger number of substitutable product varieties available abroad while intermediate demand is relatively inelastic because of firms' reluctance to alter arrangements for intermediate input supply, which may depend on location or 'just in time' relationships. Harris and Cox (1983) address these issues empirically.

29 For a discussion of elasticities and the length of run in comparative static analysis, see Cooper et al. (1985). For the analytics of short-run changes to the responsiveness of export demand, see the accompanying appendix.

30 Direct productivity implications associated with take-over risk and access to FDI are ignored here, though they are considered in the long-run analysis by Tyers (2013).

in network services. Collectively, these reduce oligopoly prices, particularly of intermediate inputs, and therefore reduce costs throughout the economy while at the same time raising consumption expenditure as a proportion of GDP. In the experiments presented here these are packaged, modestly, to reflect the potential for reform in an individual year.

The package reduces the corporate saving rate by 10 per cent. This compares with a 70 per cent reduction that would bring the corporate saving level down to that prevailing in Taiwan and in many other advanced economies. The *level* of corporate saving is further reduced by additional reforms affecting the size of economic profits. The first of these is pricing surveillance, which is represented by a reduction in the conjectural variations parameters in all industries by 10 per cent (bearing in mind that, as per section four, values of zero indicate non-collusive oligopoly).[31] By making firms perceive more elastic demand, this reduces their profit-maximising mark-ups via Equation 7.9 in section four. Excess profits are further limited, directly, by imposing regulatory price caps that remove 10 per cent of the gap between the profit-maximising output price and average total cost in all industries (the parameter φ_i is raised by 10 per cent, as per the discussion of Equation 7.11 in section four).

The effects of this packaged shock are summarised in the first column of Table 7.5, which shows them to be substantial, indeed sufficient by themselves to sustain China's historically high growth for several years. The cost reductions that follow from reduced oligopoly rents, particularly in key sectors supplying widely used intermediate goods and services, foster expansions in output and employment throughout the economy. Moreover, they depreciate the real exchange rate, thus fostering long-run growth in exports.[32] Production is, on average, closer to minimum efficient scale and, even though oligopoly rents (pure profits) are reduced, average capital returns rise due to increased market rents on existing capital. The rise in these returns leads to increased investment expenditure that is financed by reduced net financial outflows in the form of reduced foreign reserve accumulation.

31 For the analytics of this, see the mathematical appendix.

32 In these short-run simulations, the export elasticities are smaller than those motivating firms' pricing behaviour (Table 7.4), so export growth is curtailed. It is nonetheless substantial in key sectors: mining, electronics, motor vehicles and other manufacturing, all of which enjoy export volume expansions of between 3 and 10 per cent.

Table 7.5 Short-Run Economic Effects of Further Industrial Reform[a]

	Short-run model simulations[b] with:	
	Capital controls and a fixed exchange rate[c]	A liberal capital account and floating exchange rate[d]
Percentage changes		
Real GNP[e]	5.5	6.7
Real GDP[f]	7.4	8.8
Real investment[g]	10.8	13.4
Real exchange rate	–2.2	–2.2
Production employment[h]	5.5	8.2
Average gross rate of return[i]	7.4	9.4
Production scale[j]	0.5	0.6
Pure profits/GDP[k]	–5.6	–4.4
Changes as percentage of initial GDP		
Investment expenditure, I/Y_0	2.6	3.5
Private financial flows, S_{NF}/Y_0	0.1	2.6
Reserve accumulation, $\Delta R/Y_0$	–2.3	–0.1
Current account, CA/Y_0	–2.2	–2.6

[a] These simulations use a short-run closure in which numbers of firms are fixed and pure profits endogenous, physical capital is fixed at the sectoral level with rates of return endogenous and the real wage of production workers is adjusted opposite to the change in the real exchange rate (consistent with a fixed nominal exchange rate) with all labour mobile between sectors. The fiscal closure has the government deficit exogenous while revenue and expenditure are endogenous. It is assumed that there is no change in expectations over the real exchange rate. There is no Ricardian equivalence, so the household and corporate saving rates are constant.

[b] A combination of reforms is introduced simultaneously: 1) progress on further privatisation is indicated by a 10 per cent reduction in the corporate saving rate; 2) oligopoly pricing is moderated via surveillance, which reduces the conjectural variations parameters in all industries by 10 per cent; and 3) excess profits are limited directly by imposing price caps that remove 10 per cent of the gap between output price and average total cost in all industries.

[c] This is using the standard model with capital controls represented by elasticities of S_{NF} and ΔR to the interest parity value of 0.2 and –10, respectively. The change in the real wage of production workers is equal to and opposite that of the real exchange rate, as discussed in the text.

[d] Here the model is modified to represent a liberalised capital account and floating exchange rate with a GDP price target. The elasticities of S_{NF} and ΔR to the interest parity value are 20 and –0.2, respectively, and the real wage of production workers is constant. Note, however, that these substantial parameter differences apply to marginal changes due to the fiscal policy shock only. The starting level of private inflow remains small and the rate of reserve accumulation is correspondingly large.

[e] To facilitate welfare interpretation, GNP is expressed relative to the consumer price index.

[f] As a measure of collective output volume, GDP is expressed relative to the GDP price.

[g] Measured relative to the home GDP price.

[h] This is the proportional change in the level of total production, or low-skill employment.

[i] The rate of return on physical capital is here gross of depreciation and inclusive of pure economic profits. The percentage change in the rate is shown, rather than the difference in percentage or basis points.

[j] This is the percentage change in the weighted average of the ratio of gross output to minimum efficient scale, measured across all industries.

[k] This is the percentage change in the sum of all pure or economic profits across industries as a proportion of current GDP.

Source: Simulations of the model described in the text.

As to industry-specific effects, mark-ups and pure profits decline in most industries, and particularly in those with high initial rents. There is also a redistribution of the production labour force out of agriculture, processed agricultural products and textiles and into industries that benefit most from cost reductions. These are the less labour-intensive industries and they include metals, motor vehicles, other manufactures, finance and transport. Real wages of production workers are modestly higher and those of skilled workers very substantially higher so the additional output is smaller in those industries with highest labour intensity. Even considering the higher unit factor rewards, most industries enjoy reductions in unit fixed costs as production runs expand. These include metals, petrochemicals, motor vehicles, other manufactures, transport and construction. Finally, the composition of exports changes with increased concentration in metals and motor vehicles and there is an expanded external role for the Chinese transport services industry.

In aggregate, then, even though this package of reforms allows the retention of some potentially distorting oligopolies, it raises modern sector employment and productivity while increasing the prominence of consumption expenditure and further reducing the external imbalance. Moreover, it moves the structure of the economy away from its prior dependence on inexpensive raw labour towards a more mature phase in which China's services industries are larger and more competitive and the composition of its trade is more similar to that of most industrialised economies.

Capital account liberalisation

In section two the empirical evidence to date is seen to suggest a trend decline in China's overall saving rate and it is noted that the studies available thus far do not suggest any significant pent-up demand for rebalancing of private portfolios in favour of foreign assets. This implies a smooth transition to balanced growth irrespective of the extent of capital account liberalisation. Here such a scenario is compared with one in which there is pent-up demand for foreign assets that causes an outward rebalancing following capital account liberalisation. Thus, the experiments presented consider modest declines in saving rates on the one hand and a structural shift that reflects the release of pent-up demand for foreign assets on the other. In each case the effects are evaluated assuming either a monetary defence of the nominal exchange rate or a float. The results are summarised in Table 7.6.

Table 7.6 Short-Run Effects of Capital Account Liberalisation[a]

	Capital account liberalisation in the presence of saving rate decline[b], with:		Capital account liberalisation in the presence of pent-up demand for foreign assets[c], with:	
	Defence of a fixed exchange rate[d]	A liberal capital account and floating exchange rate[e]	Defence of a fixed nominal exchange rate[d]	A liberal capital account and floating exchange rate[e]
Percentage changes				
Real GNP[f]	2.1	1.2	−1.7	−0.7
Real GDP[g]	2.4	1.4	−1.9	−0.7
Real investment[h]	2.1	1.0	−12.7	−11.5
Real exchange rate	1.7	2.0	−2.1	−2.4
Production employment[i]	2.7	0.6	−1.8	0.8
Average gross rate of return[j]	2.9	1.5	−3.5	−1.8
Production scale[k]	0.1	0.04	−0.1	−0.01
Pure profits/GDP[l]	1.1	0.3	−5.0	−3.9
Changes as percentage of initial GDP				
Investment expenditure, I/Y_0	1.2	0.9	−5.3	−5.0
Private financial flows, S_{NF}/Y_0	2.5	2.5	−19.5	−19.6
Reserve accumulation, $\Delta R/Y_0$	−0.9	−1.0	−16.2	−16.1
Current account, CA/Y_0	−3.3	−3.3	3.4	3.4

[a] These simulations use a short-run closure in which numbers of firms are fixed and pure profits endogenous, physical capital is fixed at the sectoral level with rates of return endogenous and the real wage of production workers is adjusted opposite the change in the real exchange rate (consistent with a fixed nominal exchange rate) with all labour mobile between sectors. The fiscal closure has the government deficit exogenous while revenue and expenditure are endogenous. It is assumed there is no change in expectations over the real exchange rate. There is no Ricardian equivalence, so the household and corporate saving rates are constant.

[b] The shock is a reduction by 10 per cent in both the household and the corporate saving rates.

[c] Here the shock is an arbitrary shift in the private net foreign inflow equation to the parameter a_{SF} (Equation 7.6) that creates a large net private financial outflow, in the presence of an enlarged elasticity of private flows to the interest parity term in Equation 7.6. There is no change to household or corporate saving rates.

[d] This assumes a liberalised capital account but a short-run monetary defence of the nominal exchange rate. The elasticities of S_{NF} and ΔR to the interest parity value are 50 and −10, respectively. The defence of the exchange rate requires a change in the real wage equal to that opposite to the change in the real exchange rate, as discussed in the text.

[e] Here the model is modified to represent a liberalised capital account and floating exchange rate with a GDP price target. The elasticities of S_{NF} and ΔR to the interest parity value are 50 and −10, respectively. The price-level target and sticky nominal wage ensure that the real wage of production workers is constant in this case.

[f] To facilitate welfare interpretation, GNP is expressed relative to the consumer price index.

[g] As a measure of collective output volume, GDP is expressed relative to the GDP price.

[h] Measured relative to the home GDP price.

[i] This is the proportional change in the level of total production, or low-skill employment.

[j] The rate of return on physical capital is here gross of depreciation and inclusive of pure economic profits. The percentage change in the rate is shown, rather than the difference in percentage or basis points.

[k] This is the percentage change in the weighted average of the ratio of gross output to minimum efficient scale, measured across all industries.

[l] This is the percentage change in the sum of all pure or economic profits across industries as a proportion of current GDP.

Source: Simulations of the model described in the text.

Consider first the effects of a smooth continuation of China's savings decline. This is represented by reducing the household and corporate saving rates by 10 per cent. This tightens the home financial market and, with liberalised capital and financial accounts, it draws in private foreign investment. The effects of this are partially offset by reduced reserve accumulation. Nonetheless, the private inflow is sufficient to cut the current account surplus by half. Combined with the boost to domestic consumption expenditure that accompanies reduced saving rates, this new inflow raises demand for home relative to foreign products and services and so appreciates the real exchange rate.

If monetary policy targets the nominal exchange rate, as in the first column of Table 7.6, this implies domestic inflation and, with nominal wage rigidity, there is a substantial boost to employment. Combined with new investment that is financed by the inflow and induced in part because greater employment raises capital returns, this leads to a substantial boost to real GDP growth. If the nominal exchange rate is allowed to appreciate the home inflation is avoided and much of the inducement to increase production employment disappears. Nonetheless, aggregate demand is still boosted by greater home consumption and the foreign private inflow, and there is therefore a modest rise in real GDP. In both cases the increases in production runs boost industrial efficiency. The increase in demand is, however, internal and hence it reduces perceived elasticities and raises mark-ups in key industries, thereby raising oligopoly rents. Overall, however, capital account liberalisation might be expected to have marginally positive effects under these circumstances.

Now consider the possibility that there is considerable home demand for foreign assets that is constrained by China's outward capital controls. To represent the effects of this following the liberalisation of the capital and financial accounts an arbitrary shift is introduced in the constant term of Equation 7.6, a_{SF} (which is initially negative), which reduces net private inflow at all levels of the home bond yield. As the third column of Table 7.6 indicates, this shift is sufficient in the experiment to cause a private outflow amounting to about one-fifth of GDP. Partially offset by a repatriation of foreign reserves, this shock also tightens the home financial market. This time, however, less investment is financed, it blows out the current account surplus and its effect on

aggregate demand is therefore negative. The real exchange rate depreciates and, if monetary policy is directed to defend the nominal exchange rate, a deflation exacerbates a significant shedding of production employment and a contraction in real GDP.

If the nominal exchange rate is allowed to float downward the results are less dire, as indicated in the final column of Table 7.6. The private outflow still impairs investment financing and the current account still blows out but there is no deflation, and hence no contraction in employment, and the slide in GDP is much reduced. Clearly, this suggests that any commitment to capital and financial account liberalisation should accompany a preparedness to allow the nominal exchange rate to adjust, particularly downward, so as to avoid deflation. Interestingly, while the pent-up demand story is negative for China's growth, if the exchange rate is allowed to adjust to avoid deflation the costs are borne primarily by the wealthy. Oligopoly rents decline significantly as does the overall rate of return on capital, yet employment of production workers expands and real skilled wages rise, as do rents on land and natural resources. Thus, with flexible monetary policy, even a substantial outpouring of private flows need not impair China's short-term growth very much.

The only caveat to this conclusion is that the simulations ignore the possibility of a banking or wider financial crisis. Home yields rise by about 17 per cent, suggesting a collapse in asset values that could threaten major financial institutions. This would cause the temporary sequestration of existing physical capital and a potentially substantial loss of employment.

Conclusion

China's recent rapid growth and its current size limit its capacity to source further expansion from exports so the inevitable turn inward is in progress, as suggested by the declines in gross flows on its balance of payments relative to its GDP that have been persistent since the GFC. The large current account surpluses of the boom period are closing, thus far primarily due to fiscal expansion and some associated public investment. Unfortunately, this option is being closed off in the short run by the need for reform of fiscal federalism in China, to resolve growing provincial indebtedness. The key reforms with positive short-run implications focus on industrial policy and capital and financial account liberalisation under the general rubric of 'internationalisation'. The short-run effects of these policy shocks are examined using a 17-sector model of the Chinese economy that takes explicit account of oligopolistic behaviour and financial flows in the short run.

The results confirm that further fiscal expansions, even with large public investment components, will not contribute the major share of new growth, but industrial reform in heavy manufacturing and services would reduce costs and foster growth in output, private consumption and modern-sector employment. Moreover, the structural reforms would reduce external imbalance by curtailing corporate saving, cut distortionary oligopoly rents and increase production runs in previously inefficient industries, thus raising the productivity of existing physical capital and labour. At the same time, the anticipated trend towards reduced saving and increased private consumption would be rewarding under capital and financial account liberalisation since expanded home consumption demand would be supplemented by a greater inflow of private foreign investment, raising both employment and real GDP. Were pent-up demand for foreign assets to be revealed following further liberalisation, the resulting financial outflows would only be seriously damaging were monetary policy to attempt to defend the nominal exchange rate, or if declines in asset values were to precipitate a domestic financial crisis. Moreover, in the absence of financial disruption and with the cushioning effect of exchange rate flexibility, such temporary outflows are shown to be beneficial to Chinese employment and labour incomes, with temporary negative impacts falling on capita returns.

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