

Competition Policy, Corporate Saving and China's Current Account Surplus* **

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** Appendices 1-3 are available on request from the author at rod.tyers@anu.edu.au

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Abstract

China's industrial reforms have left many key industries dominated by single or small numbers of firms, most of which remain state owned. Until recently, these firms have not been required to pay dividends to the state and the recent surge in China's growth has made them very profitable, with their economic profits adding corporate saving amounting to a fifth of GDP. This bolsters the overall saving-investment gap and hence China's controversial current account surplus. In other countries, oligopolistic industries tend to be taxed more heavily and they are commonly subjected to price regulation. This study offers an economy-wide analysis of approaches to oligopoly rents in China. The results suggest that, while policy changes targeting national saving, including increased corporate taxation, expansionary fiscal policy and SOE privatisation all help to control the external imbalance, they tend also to turn demand inward, inducing higher oligopoly rents and slower growth. Competition policy, embodying both price cap regulation and free entry, proves more effective both in controlling the external imbalance and in fostering continued growth.

1 Introduction

In their analysis of the role of total factor productivity in explaining extraordinary growth rates in East Asia, Fernald and Neiman (2006) find that gaps between primal and dual productivity estimates suggest that significant contributors to the growth have been oligopoly rents accruing to "favoured firms". During the rapid expansion phases of the economies of Singapore, Taiwan, Korea and Hong Kong, these rents are seen as having concentrated income growth, thereby maintaining high saving rates and investment levels. This confluence of growth with oligopoly rents is also recognised by the more generic work of Aghion and Griffith (2005).¹ That such rents have also been present during China's recent growth surge is suggested by the study of profitability of private and state-owned firms by Lu et al. (2008). And with this increased profitability have come very large increases in corporate saving, primarily by state-owned enterprises (SOEs). On the strength primarily of these increases, China's gross national savings have risen to absorb more than half of its GDP, exceeding investment in recent years and providing the underlying cause of its controversial current account surplus.²

¹ The principal concern of Aghion and Griffiths (2005), however, is the relationship between technical change, or innovation, and imperfect competition. They concede that in the phase of development that China might be thought of as emulating, raw factor accumulation is the core driver of growth. Nonetheless, China's sectoral total factor productivity growth rates appear to have been high (see Tyers et al. 2008).

² See Eichengreen (2006) and, for explicit emphasis on China's imbalance, Kuijs (2006).

The “growing pains” that have been associated with China’s high and rising gross saving rate, comparatively slow consumption growth and its rising current account surplus range from the unequal distribution of the fruits of growth³ through protectionist pressures abroad⁴ as well as the recent rises in the rate of inflation. Given the perceived need to retain outward capital controls,⁵ the surplus of saving over investment has required the accumulation of massive official foreign reserves. Sterilisation requirements have both created a currency mismatch on the balance sheet of the Peoples Bank of China (PBC) and, given the extraordinary sums involved, made more difficult the control of China’s monetary base and hence its rate of inflation.⁶

Of course, China’s household saving rate is also high by international standards. It is reasonable to imagine that its urban households might have underestimated changes in their permanent incomes and so saved excessively. Alternatively, such high growth may be considered unlikely in future and so households are smoothing consumption forward. The life cycle hypothesis, on the other hand, relies on China’s low fertility rates to precipitate rises in the dependent dissaving aged and hence suggests a falling household saving rate. The empirical work by Kraay (2000), while it clearly stratifies saving rates by income level, offers no conclusive evidence in support of either hypothesis. Modigliani and Cao (2004), on the other hand, find evidence in support of both. In particular, they identify a strong relationship between saving rates and deviations from trend income, lending support to the permanent income hypothesis. Horioka and Wan (2007) use more recent data and account for the influence of real interest rates. Their results offer mixed support for both hypotheses though they give comparative emphasis to dynamic persistence in saving behaviour, suggesting the likelihood that China’s household saving rate will remain high and stable for some time. Thus, while further ageing and the evolution of China’s health and retirement insurance systems can be expected to influence household saving in the long run, the most tractable component of its saving behaviour in the short to medium run may be saving from SOE profits, which added as much as 20 per cent of GDP to national savings in 2005.⁷

Addressing the undesirable effects of the excess saving problem using macroeconomic policy alone would require politically unpalatable accelerated nominal appreciation, the

³ From an expanding literature on China’s growing inequality and its implications, Xiao (2006) and Lin (2008) are recent examples.

⁴ See Woo (2006) and Woo and Xiao (2007).

⁵ See Ma and McCauley (2007).

⁶ See Pettis (2008).

⁷ For a review of China’s corporate profitability see Lu et al. (2008). The issue of SOE dividends is raised by Kuijs et al (2005) and, in China’s policy debates, by the PBC governor (Zhou 2005). See also China Economic Review (2007), Walter and Howie (2006) for insight into China’s “unseen” assets.

relaxation of outward capital controls or an expansionary fiscal policy. Even then, the underlying sources of the high savings will need to be addressed eventually via microeconomic policy reforms. While these will include policies that affect household savings, industrial policy reforms to reduce or tax away and therefore redirect oligopoly rents will eventually be required. Further privatisation and anti-trust policies suggest themselves immediately as first best industrial reforms, both to foster competition and to ensure that capital income is returned to households where it might finance additional consumption. Otherwise, regulatory policies will be required to control oligopoly rents or redirect them to enable consumption to keep pace with China's overall economic growth.

The approach adopted in this paper differs from those of previous studies on these topics in that it employs a model that takes explicit account of oligopoly behaviour.⁸ To this model we have added a complete taxation system, household saving and investment behaviour and industry-specific corporate saving, all on an 18 industry database designed to represent China's 2005 economy. This model makes it possible to examine the effects of better taxation of state owned enterprise profits and the implementation of price regulation and anti-trust policies. Not only can we simulate the effects of these policies on overall economic performance but we can also look at their implications for gross saving, the current account surplus, the rate of reserve accumulation and the underlying determinants of China's current inflation. Indeed, our results suggest that while changes to corporate taxation can reduce excess saving, redistribute income and moderate the current account surplus, privatising or regulating pricing in oligopolistic industries would dramatically improve income distribution while at the same time eliminating China's current account surplus and the real appreciation that is contributing to its inflation.

The following section offers a brief review of China's "growing pains" and their association with its excess saving. Section 3 provides a more formal treatment of the link between corporate saving, domestic saving and the current account surplus and Section 4 gives a short description of the economy-wide model used, the analytical details of which are consigned to appendices. The estimated effects on economic performance and the current account surplus of policies that primarily affect national saving are discussed in Section 5 and those of policies directed at reducing oligopoly rents are presented in Section 6. Conclusions are offered in Section 7.

⁸ The model is a distant descendant of that by Harris (1984).

2. Policy Dilemmas, Oligopoly Pricing and Excess Saving

In a country that is so large and growing so quickly, “growing pains” are only to be expected and should not detract from the success of China’s policy regimes to date. Nonetheless, problems associated with lagging rural incomes and rural services, retirement and other welfare funding, the immaturity of its systems of industrial and financial regulation, and the real appreciation that has fuelled its inflation appear to have become more acute in recent years. One clear indicator of the rising inequality referred to by Lin (2008) has been the declining trend in the consumption share of GDP, indicated in Figure 1.⁹ This and the other growing pains are associated in some way with excess saving and it is possible that a focus on the saving problem could yield solutions that flow on to addressing the other issues.

Imagine, for example, that corporate saving is reduced by a combination of policies on SOE dividend payments, corporate taxation and price cap regulation. This will redistribute income to households, the more so if some of the new corporate tax revenue is allowed to offset taxes on consumption and labour income (or to finance health or retirement schemes), and raise the consumption share of GDP. As shown in the subsequent sections, it could reduce or even eliminate China’s current account surplus and therefore moderate the resistance to Chinese products abroad and, so long as capital controls remain needed, it would greatly reduce the accumulation of official foreign reserves and hence the need to sterilise the monetary implications of their acquisition. Finally, lower prices in oligopoly industries would, if this can be imagined, further improve the performance of the Chinese economy overall and it would do so in a way that affords the greatest benefit to households dependent on labour income.

The scale of China’s excess saving is indicated in Figure 2, which shows that more than half of GDP is saved and that there has been an expanding gap between domestic saving and investment expenditure. Some light is shed on the sources of the excess saving by the consumption survey evidence shown in Figure 3, which shows that China’s households save less than a third of their disposable income. The national accounts “flow of funds” data, illustrated in Figure 4, indicate that corporate saving has become the dominant component of China’s total saving since 2004.¹⁰

⁹ This is also noted by Azziz and Cui (2007).

¹⁰ As noted by by Kuijs and He (2007), the upturn in corporate saving in 2004 emerged from data published following the 2005 census. This suggests the trend indicated in the figure may be suspect but the 2004 shares are relatively robust.

Saving from corporate profits

China's growth surge since 2000 has been extremely profitable for "traditional" industries like mining, petroleum refining and steel manufacture (Lu et al. 2008). Service industries like transport and communications have also proved very profitable in this period. What these industries have in common is that they are all dominated by state owned enterprises. Industries whose expansion has been primarily in the private sector, such as textiles, footwear and processed agricultural products have, by contrast, yielded little more than what for them, given comparatively high costs of credit, are market rates of return.

Although there is no detailed evidence, it seems very likely that the recorded corporate saving is coming from the profitable firms in the state-owned industries. Moreover, it stems at least in part from the failure through 2007 of the government to require these firms to pay dividends to their state owners, even though private owners who have purchased equity in these firms through China's stock markets do receive dividends (Kuijs et al. 2005). This omission on the government's part has recently been corrected - since 2008 dividend requirements have been added to corporate taxes. From gross profits, SOEs will be expected to pay to the government 10% (petrochemicals, coal, electricity and telecommunications) or 5% (steel, transport, electronics and retail trade). Defence and R&D industries will continue to be forgiven for at least another several years.¹¹ Because SOE corporate savings bypass the Chinese households that are their ultimate owners, they add to the national saving rate. If more of this corporate income was paid to households, as it tends to be in the industrialised West, the national saving rate would fall from around 50 per cent toward that of households, at around 30 per cent. Superficially, this suggests a possible reversal of China's controversial current account surplus, which Figure 2 indicates is about a tenth of GDP.

3. Corporate Saving and the Current Account

That the current account surplus is the same, by definition, as the surplus of domestic saving over investment is clear from the standard identities. Crudely, expenditure on GDP is $Y=C+I+G+X-M$, GNP is $Y+N$, where N is net factor income from abroad and the disposal of GNP is $Y+N=C+T+S$, where $S=S_H+S_C$ is total *private* saving (the sum of that by households and corporations). From these it follows that

$$(1) \quad X - M + N = S_H + S_C + (T - G) - I = S_H + S_C + S_G - I = S_D - I ,$$

¹¹ See Chinastakes.com, (December, 2007).

where S_G is government saving and S_D is total domestic saving. The LHS of (1) is the current account surplus and the RHS is the capital account deficit.¹²

For a preliminary idea about the relationships between the current account and the various forms of saving, imagine that the level of investment depends on expected future rates of return and current financing costs in China compared with other regions, while Chinese saving behaviour is driven primarily by structural factors like large undistributed SOE profits on the one hand and market failures in retirement and health insurance on the other. Under these assumptions, even though alterations to the regulatory environment of China's SOEs might see their corporate saving disappear, so long as capital account flows can adjust (say, through changes in the rate of foreign reserve accumulation) there need be little effect on domestic financing costs, and hence the overall level of investment, or on the household saving rate. The following therefore relies on the assumption (to be relaxed in subsequent sections) that the level of investment expenditure and the household saving rate are indeed constant. Then there is a unique interdependence between total domestic saving, S_D , and the current account surplus.¹³ The question addressed is the effect on S_D of a reduced corporate saving rate, or of alterations to the taxes that affect the distribution between corporate and household disposable income.

Assume further that the economy has two primary factors, where labour and capital incomes carry flat rates of income tax, τ_L and τ_K , that the before-tax factor rewards, W and R are negligibly affected by saving or tax changes,¹⁴ that indirect taxes and subsidies net out at zero and that there are no direct transfers between government and households or corporations.^{15,16} Then the level of GDP is:

$$(2) \quad Y = WL + RK ,$$

where W is the money wage, R is the money rental rate on capital, L is total employment and K is the capital stock. Corporate and household disposable incomes are then

$$(3) \quad Y_{DC} = RK(1 - \tau_K), \quad Y_{DH} = WL(1 - \tau_L) + Y_{DC}(1 - s_C) ,$$

where s_C is the corporate saving rate. Total domestic saving is then the sum of saving by households, corporations and the government:

¹² Here net outflows associated with asset acquisition are referred to as "capital account" net outflows. This is intended to encompass the capital, financial and official components of the balance of payments.

¹³ Flexible prices are implied, so that changes to S_D bring about adjustments in the trade surplus because they alter domestic aggregate demand and the underlying real exchange rate.

¹⁴ As, for example, in a Heckscher-Ohlin-Samuelson economy.

¹⁵ The latter two assumptions ensure that, for the purpose of this illustration, GDP is the same as GDP at factor cost and that government expenditure comprises only purchases of goods and services.

¹⁶ These restrictive assumptions, too, are relaxed in applications of the model introduced in the next section.

$$(4) \quad S_D = S_H + S_C + S_G ,$$

where from (3) the components are

$$(5) \quad S_H = s_H Y_{DH} , S_C = s_C RK(1 - \tau_K) , S_G = \tau_L WL + \tau_K RK - G ,$$

and where s_H is the household saving rate and G is government expenditure, which is set as constant initially, $G = \bar{G}$.

From this can be derived the dependence of the overall level of domestic saving on the two saving rates and the two tax rates. While ever government expenditure is fixed, that on the level of government spending is obvious - an extra unit of government spending constitutes a unit reduction in government saving and therefore in S_D . The partial derivatives of the other terms in (5) are:

$$(6) \quad \frac{\partial S_D}{\partial s_H} = Y_{DH} , \frac{\partial S_D}{\partial s_C} = RK(1 - \tau_K)(1 - s_H) , \frac{\partial S_D}{\partial \tau_L} = WL(1 - s_H) , \frac{\partial S_D}{\partial \tau_K} = RK(1 - s_C)(1 - s_H) .$$

The partial to the household saving rate is positive for obvious reasons. That to the corporate saving rate warrants some discussion, however. If the saving rate from corporate disposable income [$RK(1 - \tau_K)$] rises, say by enough to increase corporate saving by one Yuan, this is the sum by which household disposable income is reduced. The associated reduction in household saving is s_H Yuan, hence the net positive effect of corporate saving on total saving. Turned around, this indicates that a decline in the corporate saving rate reduces overall saving unambiguously.

The tax rates are of interest because they represent a mechanism for the government to influence overall saving and hence to reduce the current account surplus. Their partials in (6), above are positive because, holding government expenditure constant, tax rises add more to government saving than they detract from private saving. Under these conditions a rise in the corporate tax rate increases domestic saving. More realistically in the case of China, substantial departures from fiscal balance are unlikely. Imagine first that G is endogenous so that $S_G \equiv 0$ and, again, that the impacts on R and W remain small. Increases in revenue from tax rate rises are then spent by the government. The partials to the saving rates are the same as in (6) but those to the tax rates are rendered negative, since tax rises now become transfers to a non-saving government:

$$(7) \quad \frac{\partial S_D}{\partial \tau_L} = -s_H WL , \frac{\partial S_D}{\partial \tau_K} = -s_H (1 - s_C) RK .$$

Because labour income is larger than other factor income, if all new revenue were spent by the government, a rise in the rate of taxation on labour income would be the more effective tax measure for reducing private saving.

A more relevant option for China might be to consider the case in which the reaping of additional tax revenue from corporations provides the opportunity to redistribute income to (principally labour income dependent) households. In this case consider the case of a balanced budget, $S_G \equiv 0$, in combination with fixed government expenditure, $G = \bar{G}$. Then the labour income tax rate is endogenous at:

$$(8) \quad \tau_L = \frac{\bar{G}}{WL} - \frac{RK}{WL} \tau_K .$$

In this case the partial derivative of domestic saving with respect to the capital income tax rate is:

$$(9) \quad \frac{\partial S_D}{\partial \tau_K} = -s_C(1-s_H)RK .$$

If the household saving rate exceeds the corporate one the effect of increased capital income taxation on saving is muted. The net reduction in saving occurs despite a one-for-one transfer from corporate disposable income to household disposable income, because unsaved corporate disposable income accrues to households. Again, imagine that the change in τ_K redistributes one Yuan from corporate disposable income to household disposable income. The corporate contribution to domestic saving is then reduced by s_C . The residual income after corporate saving that accrues to households is reduced by $(1-s_C)$, so that the net gain in household disposable income is $1-(1-s_C) = s_C$. The rise in household saving is then $s_H s_C$ and so the net change in S_D is $-s_C(1-s_H)$. If the corporate saving rate were zero the tax transfer effect on domestic saving (9) would also be zero. Of course, if the government spent the additional revenue rather than transferring it, as in (7), the absence of corporate saving would imply that increasing the corporate tax rate would cause a larger reduction in overall saving. Importantly, if the government is fiscally conservative, increasing the tax rate on capital income yields an unambiguous reduction in domestic saving.

In what follows we use a more complete model in which several of the crude assumptions of this illustration are relaxed. It allows, moreover, consideration not only of policies that change corporate saving and taxation but also that regulate the level of over-market profits and hence the capacity of corporations to save.

4. An Oligopoly Model of the Chinese Economy

The model is a distant descendant of that by Harris (1984) and Gunasekera and Tyers (1990) and Tyers (2005). Key elements that distinguish this from prior applications are, first, that it models all industries as oligopolies in which firms interact on prices with each producing a differentiated product variety. Second, the government is introduced explicitly. Its expenditure is translated into demands for goods and services via nested constant elasticity of substitution (CES) preferences. On the revenue side, a detailed tax system is included with both direct (income) taxes levied separately on labour and capital income and indirect taxes including those on consumption, imports and exports.¹⁷

Third, to capture the demands of investment on the economy, 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 total investment expenditure has Q-like behaviour, being influenced positively by home rates of return on installed capital and negatively by a financing rate obtainable from an open “bond market” in which home and foreign bonds are differentiated. Savings are sourced from the collective household at a constant rate and from corporations at industry-specific rates applying to the magnitudes of pure (economic) profits earned. Foreign direct investment and official foreign reserve accumulation are both represented, to complete China’s external financial accounts.¹⁸ And finally, behavioural equations have been added to represent the effects of regulatory policy over monopolies and oligopolies, including price surveillance and Ramsey price-caps.

Model structure

The scope of the model is defined in Table 1. It divides the economy into 18 industries, of which eight offer services, and five primary factors. Firms in all industries are oligopolistic in their product pricing behaviour with the degree of price-setting collusion between them represented by conjectural variations parameters that are set to account for the degree 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

¹⁷ Income taxes are approximated by flat rates deduced as the quotient of revenue and the tax base in each case.

¹⁸ Hereafter the capital, financial and official sub-accounts of China’s balance of payments will be referred to as the “capital account”.

inputs. Intermediate demands are CES subaggregates of home and imported products.¹⁹ The sophistication with which home product markets are represented notwithstanding, the modelling of a single economy necessitates crudeness in the representation of foreign firms. Thus, imports are seen as homogeneous, differentiated from home products as a group, so that import varietal diversity never changes.²⁰

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.²¹ The effective numeraire is the import product bundle, since import prices are exogenous in all experiments. For presentational purposes, prices and values can be divided by the consumer price or the GDP price index so that the initial home consumption or production bundle becomes the numeraire. The consumer price index is constructed as a composite Cobb-Douglas-CES index of post-consumption-tax home product and post-tariff import prices, derived from the single 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 GNP.²²

The quantity of domestically-owned capital is fixed both in the short and long runs, so that changes in the total capital stock affect the foreign ownership share and hence the level of income repatriated abroad. Several closures are used in the experiments to be presented. The first represents the short run: physical capital is fixed in supply and immobile between industries. Production labour is mobile but at a fixed real (CPI-deflated) wage, so that employment is endogenous, and the remaining factors are fixed in endowment but flexibly

¹⁹ Despite their oligopoly power in product markets, firms have no oligopsony power on the demand sides of the markets for primary factors or intermediate inputs.

²⁰ 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).

²¹ This follows the practice in national modelling since the first significant economy-wide model by Dixon et al. (1982) and the first published economy-wide oligopoly model by Harris (1984).

²² 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:

$$\Delta W = Y_1 - Y_0 + EV(P_0^C, P_1^C, Y_1) = Y_1 - Y_0 - Y_1 \frac{\Delta P^C}{P_1^C},$$

which can be expressed in proportional change form as:

$$\frac{\Delta W}{W} = \frac{Y_1 \left(1 - \frac{\Delta P^C}{P_1^C}\right) - Y_0}{Y_0} \cong \frac{\Delta Y}{Y_0} - \frac{\Delta P^C}{P_1^C}.$$

This is, approximately, the proportional change in real GNP.

priced. There is no entry or exit of firms but the magnitudes of pure profits earned are endogenous. A medium run closure is also defined which differs from this only in that the production real wage is flexible and production employment is fixed. Finally, a long run closure is employed in which physical capital is homogeneous and fully mobile between industries and internationally at a fixed external rate of return. All real unit factor rewards are flexible, with total supplies fixed, and there is free entry and exit of firms with exogenous rates of pure profit in each industry. Fiscal policy closures vary according to application. In most applications, consistent with China's traditional fiscal conservatism, the base fiscal surplus is held constant so that changes in endogenous revenue lead to corresponding changes in government expenditure.

Macroeconomic behaviour

As befits a comparative static analysis, the macroeconomics 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 which is built around the market clearing identity:

$$(10) \quad I^{EXP}(r^c, r) = S_H(Y_{DH}) + S_C(\pi) + (T - G) + S_{NF}(r, r^*) - \Delta R(r, r^*) ,$$

where 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). S_H is home household saving from household disposable income. As in Section 3, the household saving rate is assumed fixed, so that $S_H = s_H Y_{DH}$. Corporate saving, S_C , is assumed to stem only from pure profits, π , with a fixed saving rate assumed for each industry:²³

$$(11) \quad S_C = \sum_i S_{Ci} = \sum_i s_{Ci} \pi_i .$$

The last two terms of (10) represent net private and public flows on the capital account. S_{NF} is the inflow of private foreign saving to finance investment in China net of Chinese private saving going abroad and ΔR is the annual addition to official foreign reserves. r^c is the average net rate of return on installed capital, which takes the following form at the industry level:

$$(12) \quad r_i^c = \frac{P_i^Y MP_i^K}{P^K} - \delta_i ,$$

²³ Note that the economy wide model retains the assumption that corporate savings stem from pure or economic profits, rather than from all capital income. The rationale for this is that companies earning market rates of return must divide accounting profit between creditors and, China's SOEs notwithstanding, equity holders.

where P^K is the price of capital goods, P^Y is the product price and δ is the rate of depreciation. An average of these rates is taken that is weighted by value added in each industry to obtain r^c . Investment expenditure then is determined by:

$$(13) \quad I^{EXP} = P^K I_0 \left(\frac{r^c}{r} \right)^{\varepsilon_V} .$$

This relationship constrains the investment response to a change in either the rate of return or the financing rate, offering a reduced form representation of either gestation costs or expectations over short run consequences of installation for the rate of return.

The home household saving rate from disposable income is fixed, in keeping with the comparative static nature of the analysis. More controversially, corporations are assumed to save a proportion of their economic profits that differs across industries but is exogenous in model experiments. Rates are calibrated to yield corporate savings volumes consistent with Chinese statistics. These savings are modelled as arising after corporate tax from economic profits and they go directly to the capital market and not to household or government owners.

In most modern macro models of open economies private financial flows are driven by exchange rate expectations. In China's case capital controls are tight and inflows mainly take the form of state-approved FDI. Again, befitting our comparative static analysis net foreign saving, S_{NF} , is motivated by the difference between the home and foreign bond yield. A linear relationship is used to allow for reversals of the direction of net flow in response to shocks.

$$(14) \quad S_{NF} = a_{SF} + b_{SF} (r - r^*) .$$

The tight capital controls a low level of responsiveness and 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 amounts to a tenth of GDP, be directed abroad by the PBC as official foreign reserves. This behaviour depends on a relationship that is linear, for the same reason as in (14):

$$(15) \quad \Delta R = a_{DR} - b_{DR} (r - r^*) ,$$

where the movement of reserves is much more elastic to the home real interest rate than that of private financial capital, so that $b_{DR} \gg b_{SF}$. 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.²⁴

²⁴ It is argued elsewhere (Tyers and Bain 2007, for example) that, given the commitment to outward capital controls and the high saving rate, the PBC has little residual discretion over annual increments to reserves. This is

The capital market clearing identity (10) then determines the home real interest rate and the magnitude of the capital account deficit ($\Delta R - S_{NF}$). This is then equal in magnitude to the current account surplus [$X - M + N(r, r^*)$, where N is net factor income from abroad²⁵]. Trade flows then depend on domestic policy and industry performance and on endogenous home product prices (and hence the real exchange rate), which adjust to clear home markets and balance external payments.

Oligopoly in supply

Firms in any industry supply differentiated products and interact on price. 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 $\varepsilon_i (< 0)$. The optimal mark-up is then:

$$(16) \quad m_i = \frac{p_i}{v_i} = \frac{1}{1 + \frac{1}{\varepsilon_i}} \quad \forall i ,$$

where 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. Firms choose their optimal price by taking account of the price-setting behaviour of other firms. A conjectural variations parameter in industry i is then defined as the influence of any individual firm k , on the price of firm j :

$$(17) \quad \mu_i = \frac{\partial p_{ij}}{\partial p_{ik}} .$$

These parameters are considered to represent both the private cost of collusion by firms and the power of price surveillance by regulatory agencies. The Nash equilibrium case is a non-

because there is no incentive for China's commercial banks to do other than relinquish unused foreign currency to the PBC. Although the PBC manages the home interest rate as part of its broader monetary policy, the rate of reserve accumulation is therefore not an instrument in this targeting process. Yet, by soaking up domestic saving through the issue of "sterilisation bonds" the PBC's reserve accumulation has the effect of preventing downward pressure on that rate. Equation (14) is intended merely as a reduced form description of this process.

²⁵ As modelled, N comprises a fixed net private inflow of income from assets abroad and fixed aid to the government, less repatriated earnings from foreign-owned physical capital in China.

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 (17) is zero. When firms behave as a perfect cartel, it has the value unity. This parameter enters the analysis through the varietal demand elasticity, which is formulated in Appendix 2.

To study the effects of price-caps a regulated Ramsey mark-up, m_i^R is formulated as:

$$(18) \quad m_i^R = \frac{afc_i + v_i}{v_i} .$$

Firms are permitted to choose compromise mark-ups by altering the parameter φ_i in an equation for the “chosen” mark-up:

$$(19) \quad m_i^C = (\varphi_i - 1)m_i^R + (2 - \varphi_i)m_i \quad \forall i .$$

Thus, when $\varphi_i = 1$, $m_i^C = m_i$, and when $\varphi_i = 2$, $m_i^C = m_i^R$.

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. The five sources of demand for home produced products are final demand (F), investment demand (V), intermediate demand (I), export demand (X) and government demand (G). For industry i , the elasticity sought is a composite of the elasticities of all four sources of demand.

$$(20) \quad \varepsilon_i = s_i^F \varepsilon_i^F + s_i^V \varepsilon_i^V + s_i^I \varepsilon_i^I + s_i^X \varepsilon_i^X + s_i^G \varepsilon_i^G \quad \forall i$$

where 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 conjectural variations parameters as they represent collusive capacity on the one hand and regulatory price surveillance on the other, and by the composition of demand as it influences the elasticities of demand faced by each firm. Of course, the capacity firms have to reduce their prices also depends on their productivity performance, which we do not examine in this paper, and on their numbers.

The database and its representation of broad economic structure

The flow data for the current model originates from the GTAP Version 6 global database for 2001 (Dimaranan and McDougall 2002).²⁶ It combines detailed bilateral trade, transport and protection data characterizing economic linkages among regions, together with individual country national accounts, government accounts, balance of payments data and input-output tables which enable the quantification of inter-sectoral 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 2, which shows that China's measured GDP is dominated by agriculture, mining, metals, textiles, other manufacturing, transport and construction. The major contributors to exports are also those that export the largest shares of their output. They include processed agricultural products, electronics, textiles and "other manufactures". Table 3 confirms that the traded industries in general and the exporting 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 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. It is also a starting point for calibrating industry competitive structure. Details as to sources and methods in arriving at pure profit shares are provided in Appendix 3.

Second, rough estimates of strategically interacting firm numbers in each industry and their corresponding conjectural variations parameters are required. There is considerable diversity of firm size and output in each industry and many firms supply intermediate inputs to other firms in the same classification. Prices of the products that emerge from a particular industry are therefore commonly determined by a small proportion of the firms within it. Again, official statistics provide firm numbers and the proportion that are private and state-owned. From these, along with implied levels of market concentration and other available information concerning the existing extent of price surveillance and regulation, are assigned

²⁶ Documentation on the GTAP 6 Data Package may be viewed at:
<<http://www.gtap.agecon.purdue.edu/databases/>>.

the crude index of firm numbers and the conjectural variations parameters indicated in Table 4.²⁷

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.²⁸ Preliminary industry demand elasticities are then calculated for each source of demand (final, intermediate, government and export), via the equations in the appendices, and the results are also listed in Table 4. 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 (16). The initial equilibrium industry shares, average elasticities and mark-up ratios for each industry are given in Table 5. 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.

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 pure profits make up of total revenue is deducted from the mark-up to arrive at fixed cost revenue shares.²⁹ Total recurrent fixed cost in each industry then follows. The results of this calibration are summarised in the first three columns of Table 6. 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.³⁰

It is now possible to obtain a sense of the scale of production. The combination of homogeneous technology in variable factor use with recurrent firm-specific fixed costs implies that, were industries able to expand indefinitely without changing unit factor rewards (the partial equilibrium assumption that is relaxed here), average fixed cost would approach average variable cost asymptotically from above. Following Harris and Cox (1983) we choose an

²⁷ As noted in Appendix 3, the very high pure profit shares earned in some services are sensitive to judgemental values for accounting profit rates in some undocumented sectors and low borrowing rates for those sectors.

²⁸ Summaries of this literature are offered by Dimaranan and McDougall (2002) and at <http://www.gtap.purdue.edu/databases/>.

²⁹ 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.

³⁰ 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.

arbitrary minimum efficient scale (MES) product volume at the point where average fixed cost would decline to a twentieth of average variable cost. The implied scale parameters are displayed in the final column of Table 6. Fixed cost shares are largest in chemicals, utilities and transport services, due to fixed physical infrastructure and network maintenance costs. The results also suggest, plausibly, that the industries closest to their minimum efficient scale are agriculture, processed agricultural products, electronics, textiles and “other services”.

Importantly for the interpretation of later results, Table 4 also makes clear that the five sources of demand facing firms in each industry are not equally elastic. Export and final demand are the most elastic and intermediate demand the least.³¹ The pattern is confirmed in Table 5, from which it is evident that, where exports dominate demand firms face larger elasticities and charge smaller mark-ups.³² 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.

5 Policies to Moderate the Saving Rate

One approach to China’s large current account surplus is to address its saving rate through policies directed at the proportions of household, corporate and government incomes that are set aside as saving. Three such policies are investigated, none of which directly affect competitive behaviour and the scale of pure profits but each alters the national saving rate. In this section these policies are the focus of comparative static simulation using the model of the Section 4.

Public SOE dividends:

Dividends paid to the state are equivalent to industry-specific increases in corporate tax rates. As shown in Section 3, so long as the government maintains a conservative fiscal stance and uses the new revenue to reduce labour income tax³³, these tax increases reduce the national saving rate. The increments to be required in 2008, and which are imposed as shocks to the

³¹ 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. These issues are addressed empirically by Harris and Cox (1983).

³² Water is a mainly non-traded industry that appears to face an exceptionally high average elasticity of demand. In part this represents the homogeneity of the product, though it stems in the calibration from a low initial mark-up due to state regulations.

³³ The labour income tax reduction is shorthand for transfers to households that could take the form of retirement or health insurance subsidies.

model, are as indicated in Section 2: 10% for mining and minerals, coal, petroleum, chemicals, electricity, and telecommunications, 5% for electronics, motor vehicles and transport, 2% for other manufactures and 1% for other services. The closure adopted is for the short run: the real production wage is fixed and production employment is flexible and physical capital is immobile sectorally and internationally, so that therefore rates of return vary across industries. Finally, the number of home firms (product varieties) is fixed in each industry while pure profits in each can vary. The results are summarised in Table 7.

As might be expected in the presence of distorting oligopoly rents, the use of the tax system to transfer income from corporations to labour-supplying households is marginally welfare improving. It certainly raises consumption expenditure and, by reducing national saving, offers a small reduction China's current account surplus. Yet, taken alone, the changes do not foster increased economic output or employment. The shifting of demand inward causes a slight real appreciation which reduces exports, and there are marginal contractions in GDP, investment and production employment.

In keeping with the slight real appreciation and the large share of non-traded services in household demand, the tendency is for traded goods industries to contract and services to expand. As is evident from Table 8, exceptions to this are agricultural products, which remain important in the household budget, and petroleum products, which are important intermediates in some services. Exceptions also include transport and construction, which are linked to China's contracting manufacturing base and, in the case of construction, to reduced investment. These sectoral responses stem from changes in strategic behaviour by oligopolistic firms. Transport, for example, has (for a service) and unusually high export share (Table 5). When this declines in favour of less elastic final demand, its mark-up rises as does its pure profit and this contributes to the contraction in its output.

Overall, the imposition of public dividend requirements on SOEs is shown to have only marginally healthy economic effects. It does not foster GDP growth. Nor does it significantly reduce the current account surplus or benefit labour supplying households.

Large fiscal expansion:

By increasing government dissaving, a fiscal expansion reduces the national saving rate, at least temporarily. If private households do not exhibit Ricardian equivalence and reduce their saving in anticipation of compensating future fiscal surpluses, the rise in government spending could be large enough to eliminate the current account surplus. Here the short run implications are explored of a fiscal expansion that is thus uncompensated – a rise in

government spending by about a tenth of initial GDP with no associated changes in the household or corporate saving rates. The closure chosen has a fixed real production wage with flexible production employment, no sectoral or international mobility of physical capital and fixed numbers of home firms (product varieties) with variable pure profits. The results are summarised in Table 7.

This very substantial shock, while it controls the current account and greatly reduces the need for further foreign reserve accumulation at least temporarily, has all the usual crowding out effects on the home economy. The home interest rate rises notwithstanding reduced reserve outflows and investment falls substantially. Domestic demand rises at the expense of export demand and so there is a significant real appreciation. In contrast with the Keynesian tradition, however, the fiscal expansion does not stimulate consumption-led growth. Instead, real GDP, consumption and employment all decline. The reasons for this can be seen in the sectoral effects indicated in Table 9. The first is the importance of export demand, which is the most elastic (Table 4). Its share of total demand declines for all industries, to be replaced by combinations of government, intermediate and final demand, with government demand the dominant offset for services. The surge in domestic demand drives up the prices of home goods and services relative to competing imports and this weighs against the potential real gains from the fiscal expansion. Moreover, the relative inelasticity of domestic demand induces oligopolistic firms to raise their mark-ups. This is most strongly the case in transport, where the rise in the domestic price is sufficient to cause a contraction in its total demand in spite of the fiscal stimulus.³⁴

Overall, then, a large fiscal expansion would temporarily reduce excess saving and the current account surplus. Yet these results suggest that its effects on other aspects of China's economic performance are negative. The real appreciation that is usually expected following a fiscal expansion is enhanced by intense intermediate use and relatively inelastic domestic demand. This, in combination with strategic price increases by oligopolistic firms, more than outweighs the expected temporary boost to consumption and output.

Privatisation:

Following privatisation of the remaining SOEs, and with the continued deepening of China's financial markets, it might be expected that most accounting profit, after corporate tax, would be returned to private owners (households), whose saving rates would then be the

³⁴ Construction demand also contracts but this is because of its significance in investment which is crowded out by government expenditure.

primary determinant of national saving. Assuming that the household saving rate remains constant in the face of this rise in household disposable income, this would reduce national saving unambiguously, as shown in Section 3.³⁵ In this analysis, therefore, the shock is simply a reduction to zero of the corporate saving rate. A short run closure is again assumed: a fixed real production wage with flexible production employment, no sectoral or international mobility of physical capital and fixed numbers of home firms (product varieties) with variable pure profits.³⁶ The economy-wide results are summarised in Table 7.

The loss of all corporate saving is sufficiently large to transform China into a net borrowing economy from a net lending one. Consumption expenditure would be larger by a quarter and national saving smaller by a fifth. Again, exports would be smaller and the broad focus of Chinese production would again be more inward than before. All this appears to comply with external pressures on Chinese policy makers, yet the effects on other measures of economic performance are not so positive. GDP is hardly different, home financial market tightening due to the reduced national saving contracts investment and there is no rise in either production employment or the skilled wage. This policy change would certainly not be a growth stimulus.

The sectoral details shown in Table 10 indicate the expected response to the real appreciation – most tradable industries contract in output and employment while most services expand. The exceptions are again agricultural products, the demand for which is boosted by the higher consumption expenditure and petroleum products which are key intermediate inputs to expanding services. Transport and construction contract, though this is due in part to their links as intermediate inputs to export oriented manufacturing on the one hand and investment on the other. As before, however, these patterns tend to be exacerbated by changes in strategic pricing by oligopoly firms. As with the other policies to address excess saving, the cut in corporate and national saving turns demand inward where elasticities are lower. This raises mark-ups and producer prices, particularly in metals, coal, motor vehicles, telecommunications and transport; with the largest such change once again in transport.

6 Policies to Reduce Oligopoly Rents

Since China's very high level of corporate saving is associated with the profitability of its oligopolistic and SOE dominated industries, an alternative approach to resolving the

³⁵ Were the privatisation to cause a sudden rise in household disposable income the permanent income hypothesis would suggest a temporary rise in the household saving rate. This would moderate the consequent reduction in total domestic savings. Thanks are due to Jenny Corbett for suggesting this.

³⁶ Thus, privatisation is here assumed not to accompany mergers, acquisitions or new entries.

external imbalance would be to directly constrain the oligopoly pricing that yields these profits. This can be achieved both by price regulation, which forces oligopoly firms to set prices nearer to their average costs, and anti-trust policy, which can take the form of splitting monopolies or simply relaxing barriers to entry. Here these two approaches are considered in turn.

Price regulation

Price cap regulation is now common in the privatised services of most industrialised economies.³⁷ Here the extreme assumption is made that it is possible, without social cost, to compel firms to set prices equal to their average costs. For this purpose strategic behaviour in price setting is switched off in the model, to be replaced by equations (18) and (19). This eliminates the pure profits that are shown in Table 6 to be particularly large in metals, petroleum, telecommunications, finance and transport. It therefore requires a very large departure from the 2005 initial equilibrium.³⁸ The closure chosen might be considered “medium run” in that the market for production labour is now flexible, with production employment fixed and the real production wage endogenous, while physical capital remains fixed and immobile sectorally and internationally. The government maintains a fixed fiscal surplus. The economy-wide results are summarised in Table 11.

Most striking is the fall in the prices of many of China’s intermediate products and services and hence the reduction in costs throughout the economy, relative to its foreign competition. There is, therefore, a large real depreciation and a considerable expansion in exports and GDP. Moreover, real production wage is larger by two thirds and the real skilled wage is more than doubled. The external imbalance is reversed, from large current account surplus to large deficit, though this extraordinary change occurs primarily because of the assumed immobility and rigid allocation of physical capital. Capital returns are larger by a fifth (notwithstanding the loss of pure profits) and this stimulates investment to a more than realistic degree, compounding the shift of the current account toward deficit. Indeed, if this rise in (annual) investment were halved, as it might be were a slightly longer run considered and capital mobility allowed, then the external imbalance would be just eliminated.³⁹

The sectoral effects of price cap regulation are presented in Table 12. There is a very large redistribution of the production labour force out of agriculture, processed agricultural

³⁷ See OECD (1997), Bradley and Price 1988 and Brennan 1989.

³⁸ The implications of this are that the accuracy of the solution algorithm is strained somewhat, though at least two-figure accuracy is achieved throughout, and that the relevance of the behavioural assumptions underlying the model might come into question in the search for so distant a new general equilibrium.

³⁹ At roughly 45% of GDP already, the scope for yet larger annual commitments to investment in China must be limited by absorption capacity and the availability of viable projects (Tyers and Bain 2008).

products and textiles and into industries that benefit most from cost reductions. These are less labour-intensive industries and they include metals, motor vehicles, other manufactures, finance and transport. As Table 11 showed, price cap regulation brings large increases in real wages and so those industries with highest labour intensity (Table 3) tend to contract both their levels of employment and their output. Even considering the higher unit factor rewards, many industries enjoy reductions in unit fixed costs as production runs expand.⁴⁰ These include metals, petroleum, motor vehicles, chemicals, other manufactures, transport and construction. Finally, the composition of exports changes with increased concentration in metals and motor vehicles with an expanded external role for the Chinese transport industry.

In aggregate, then, even though this policy regime retains some potentially distorting oligopolies, it is attractive in that it is clearly growth sustaining, it restores the prominence of consumption in that growth and it eliminates the external imbalance. Moreover, it moves the structure of the economy away from its prior dependence on inexpensive raw labour toward 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.

Anti-trust policies

In this experiment a long run closure is selected, in which labour markets are flexible and physical capital is mobile internationally and intersectorally. Free entry and exit of firms (varieties) are allowed, sufficient to reduce the magnitudes of pure profit levels in each industry by a third.⁴¹ For those industries making pure losses in the 2005 base equilibrium, including processed agricultural products and the utilities (electricity, water and gas), this implies the feasibility of exits sufficient to reduce these pure losses by a third. The economy-wide results are summarised in Table 11.

Because corporate saving is derived in the model from pure profits⁴² this shock also reduces corporate saving by a third. This is the principal factor in a reduction of national saving by five percent of base GDP. Yet this reduces the current account surplus by only a fifth because the long run equilibrium level of investment is lower than that in 2005. This, in turn, is due to the lower but more "normal" capital returns earned with reduced oligopoly rents

⁴⁰ The scale of output per firm changes by the same proportion as total industry output, since the number of firms is constant in this experiment.

⁴¹ A larger reduction in pure profits with free entry appears to yield no feasible solution. Because pure profits in the 2005 equilibrium are so large, particularly in the services industries, the number of new entrants required to eliminate them is many hundreds of per cent in some industries. The new free entry equilibrium with zero pure profits therefore lies beyond credible range.

⁴² This assumption is distinct from the link to all capital rewards assumed in Section 3.

and a capital stock that is larger by a fifth. Since the increment to the capital stock is foreign-owned there is more outflow of factor income on the current account. And there is an offsetting increase in the trade surplus, which occurs because free entry by itself does comparatively little to raise consumption expenditure.

Even though real wages and resource rents are raised substantially, real GNP falls and the rise in real GDP is modest compared with the effect of price cap regulation. So why are aggregate the effects of eliminating a third of pure profits so modest? The answer lies in the effects of free entry. The number of firms rises nationally by more than a quarter and with each new establishment comes additional fixed costs. The effects of this are evident from the sectoral effects of the shock, shown in Table 13. Output is larger in most industries but by proportions that are restrained compared with the price cap results of Table 12, and this is despite expansions in total capital use. The additional output stems primarily from new entries, which are very large in metals, petroleum, electronics, other manufactures, telecommunications, finance, transport and “other services”. Indeed, by contrast with the price cap results, the scale of output per firm declines in almost all these industries and, in association, the burden of fixed cost (as measured by the results for unit fixed cost supplied in the table) rises as do home producer prices.⁴³

The general pattern of labour reallocation is similar to the price cap results – contractions in employment in the labour intensive industries (agriculture, processed agricultural products and textiles) with expansions in motor vehicles, “other manufactures” finance and transport. Associated changes to the composition of exports are also similar, with refined petroleum, metals, motor vehicles and chemicals expanding by most the proportions of their output that is exported. Overall, notwithstanding higher fixed costs, the option of free entry to the SOE-dominated industries would appear economically productive for the government in that it would increase GDP, moderate the external imbalance and substantially raise real wage income.

7 Conclusions

China’s controversial current account surplus is linked directly to its retention of half of its GDP as savings. The primary cause of this is not exchange rate misalignment, nor is it new risks facing households in relation to health, education and retirement costs, even though these

⁴³ Of course, for those industries with negative pure profits in the 2005 base equilibrium (processed agricultural products and the utilities), there are partially offsetting contractions in firm numbers, unit fixed costs and producer prices.

appear to have contributed to higher household saving rates. A full 40 per cent of the national saving is corporate and it appears to emerge from industries still dominated by SOEs, which profited greatly from the post-2000 surge in China's overall growth. These firms have enjoyed protection against domestic competition, infusions of cost-constraining foreign technology through various forms of FDI and comparatively low corporate tax burdens. In particular, while they have been permitted to issue private equity and therefore pay dividends to private owners, they remain majority state-owned and, at least until 2008, they paid no dividends to the state.

Since households receive capital income after corporate tax and corporate saving, if the household saving rate from this income is constant increased corporate saving always yields a net increase in national saving. Policies that reduce corporate saving therefore address the problem of the excessive current account surplus. These include increased corporate taxation, or the payment of state dividends by profitable SOEs, or further privatisation of SOEs, so that dividends are paid directly to households. In the short run, national saving can also be reduced by a fiscal expansion. Such policies are directed to the scale and distribution of China's saving and they do not address oligopoly rents as the source of corporate saving, without which the current account surplus would be non-existent. This is more readily approached through competition policies, which include monitoring and price cap regulation on the one hand and the removal of barriers to private entry on the other. Both types of policies are here analysed using a model of the Chinese economy that incorporates full oligopoly behaviour.

Policies directed at savings, including SOE dividends, a fiscal expansion and privatisation, all have the effect of redirecting demand facing Chinese firms inward, away from exports. While these policies all control the external imbalance the results indicate that they would not foster China's continued growth. A key reason for this is that all forms of domestic demand are less elastic than export demand. In the absence of sound competition policy, mark-ups therefore rise and oligopoly rents increase. Even though the results suggest these policies would not significantly increase real wage income, they would raise China's apparent production costs relative to foreign competition and retard investment.

Turning to competition policies, the mere imposition of price caps to eliminate pure profits is shown to have a transforming effect on the Chinese economy. It would remove the external imbalance, raise GDP and exports by 40 per cent and consumption by two thirds. The associated improvement in aggregate welfare is suggested by a rise in CPI deflated GNP by a third and the real production wage by two thirds. Of course no competition policy has this level of effectiveness. Yet, so long as China's remaining SOEs are to continue to be protected,

these results strongly support tighter regulation. Of course, if free entry is to be allowed into industries currently dominated by SOEs, similar improvements in economic performance might still be expected. Simulation results confirm that this is the case, with the caveat that new entries bring fixed costs and that these constrain the magnitude of the associated gains.

Competition policies that will address the oligopoly rents directly therefore appear to offer more attractive prospects than policies to redistribute corporate saving. Moreover, even if existing oligopoly rents are not to be addressed immediately by government policy, since the pattern of development in other regions suggests that domestic demand must eventually be more prominent in China, the implications of this more inelastic demand for future oligopoly pricing suggest an increasing role for competition policy in any case.

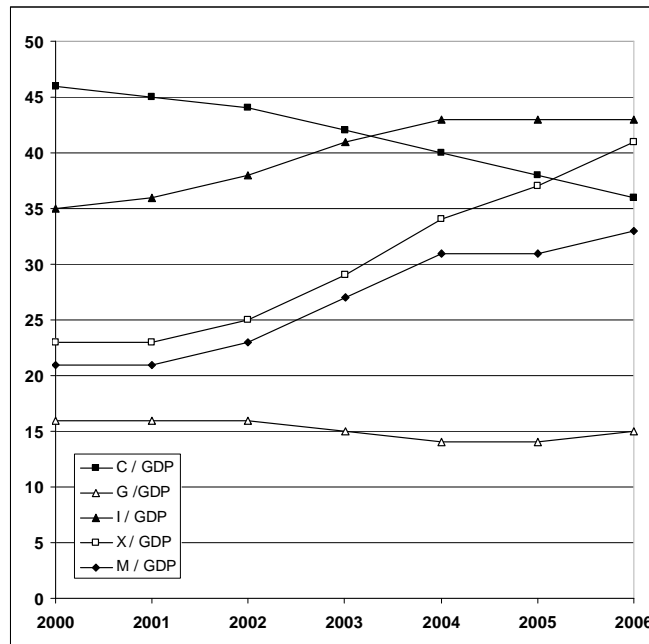
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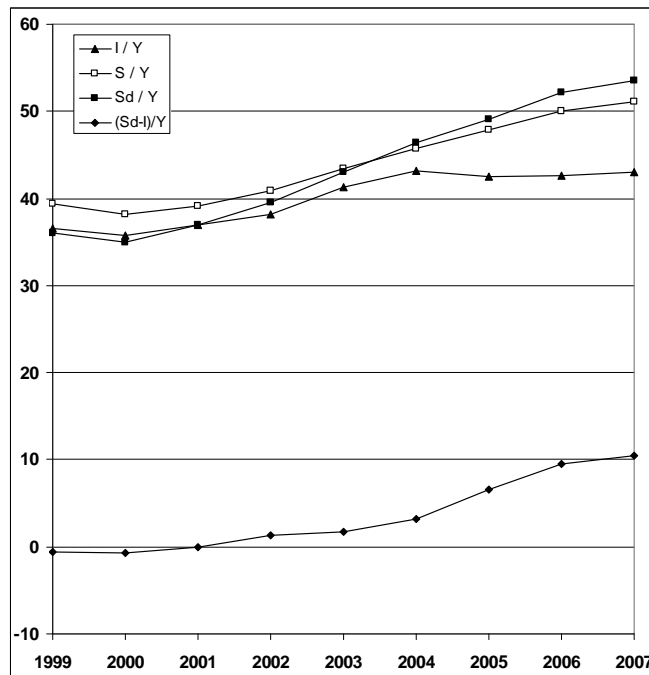
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Figure 1: Trends in the Structure of Chinese GDP



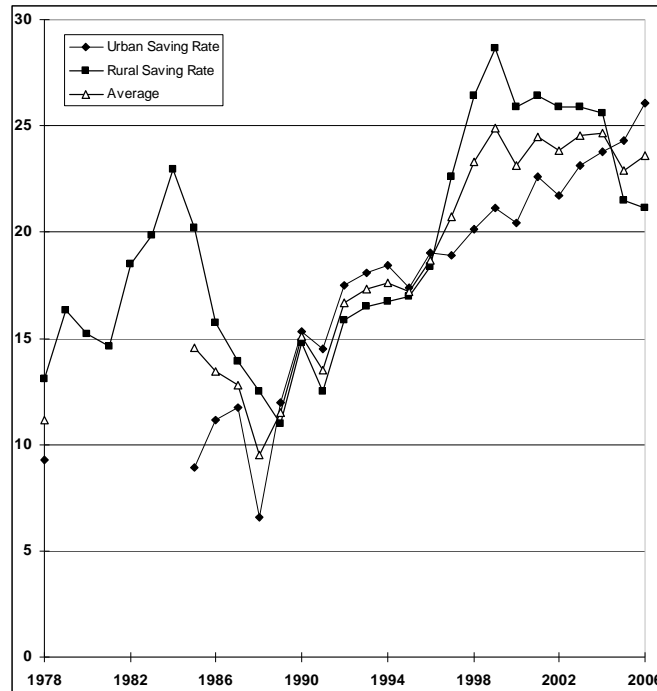
Source: United Nations Statistics Division, <http://unstats.un.org/unsd/snaama/>.

Figure 2: The Saving-Investment Gap from the National Accounts
(% of GDP)



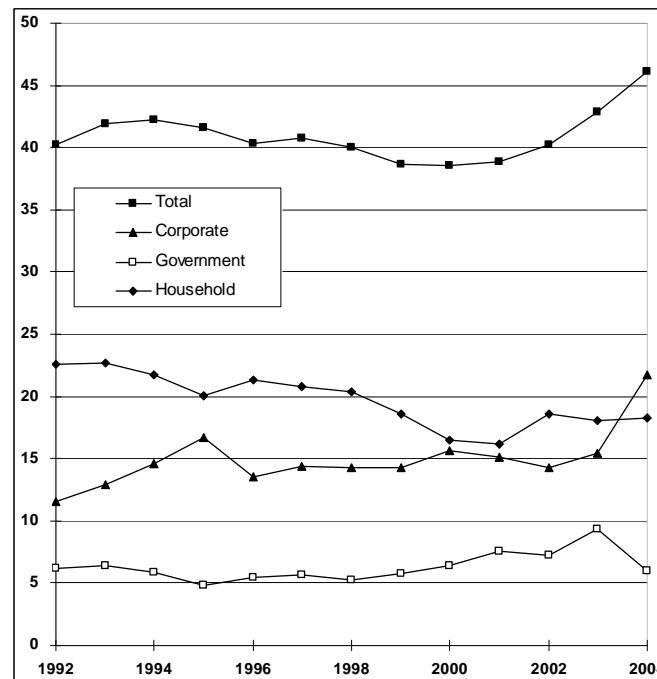
Source: GDP is from the Chinese Statistical Yearbook 2007 except that values for 2006 and 2007 are revised data from the National Bureau of Statistics of China, published April 2007. Final consumption expenditure in 2007 is estimated using the growth rate of total retail sales of consumer goods in 2007 and final consumption expenditure in 2006. Investment is Gross Capital Formation and the value for 2007 is estimated with the growth rate of Total Investment in Fixed Assets in 2007 and gross capital formation in 2006. Net exports in 2007 is estimated from the growth rate of net exports of goods in 2007 and net export of goods and services in 2006. Government consumption expenditure in 2007 is estimated from final consumption expenditure in 2007 and the share of government in total consumption expenditure in 2006.

Figure 3: Household Saving Rate from Consumption Survey Data
(% of household disposable income)



Source: The data are from the China Statistical Yearbook. Urban income is per capital annual disposable income of urban households. Urban consumption is per capital annual consumption expenditure of urban households. Correspondingly for rural households.

Figure 4: Saving from National Accounts “Flow of Funds” Data
(% of total income)



Source: Flow of Funds tables in the *China Statistical Yearbook*, 1994-2006. Note that the data have not been updated for years beyond 2004.

Table 1: Model structure

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

Table 2: Economic Structure in the Model Database

	Value added share of GDP	Share of total exports	Export share of output	Share of total imports
Agriculture	12.9	2.0	3.6	4.8
Metals & minerals	11.5	7.6	9.7	10.6
Coal	0.5	0.8	33.1	0.0
Petroleum	4.1	1.1	5.3	4.2
Processed agriculture	3.9	6.7	14.7	5.5
Electronic equipment	3.2	18.3	65.4	18.4
Motor vehicles	1.5	2.3	15.1	4.3
Chemical products	3.9	6.5	17.1	14.0
Textiles	6.8	23.8	44.0	8.7
Other manufactures	9.9	24.8	35.5	17.1
Electricity	1.6	0.1	0.8	0.0
Water	0.2	0.0	1.4	0.0
Gas mfg & distribution	0.1	0.0	0.0	0.0
Communications	3.0	0.1	1.4	0.1
Insurance and finance	3.2	0.3	2.2	0.7
Transport	6.0	1.6	7.8	1.7
Construction	8.7	0.2	0.3	0.3
Other Services	19.1	3.7	4.1	9.5

Source: Model database (social accounting matrix), derived from Dimaranan and McDougall (2002).

Table 3: Factor Intensities by Industry^a

	Capital	Production labour	Skilled labour	Land and nat resources
Agriculture	11	59	0	30
Metals & minerals	66	27	5	2
Coal	28	30	3	39
Petroleum	86	5	1	7
Processed agriculture	38	54	7	0
Electronic equipment	66	26	8	0
Motor vehicles	59	35	6	0
Chemical products	62	32	6	0
Textiles	40	52	7	0
Other manufactures	68	27	5	0
Electricity	69	21	11	0
Water	8	30	16	47
Gas mfg & distribution	49	37	14	0
Communications	92	5	3	0
Insurance and finance	80	12	8	0
Transport	78	18	4	0
Construction	56	37	7	0
Other Services	54	27	19	0

a These are factor shares of total value added in each industry, calculated from the database. Capital shares include pure profits. Shares sum to 100 per cent horizontally.

Source: Model database (social accounting matrix), derived from Dimaranan and McDougall (2002).

Table 4: Conjectural Variations and Initial Elasticity Values

	Index of firm numbers ^a	Conjectural variations parameter	Demand elasticities				
			Final	Investment	Government	Intermediate	Export
Agriculture	100	0.02	-28.6	-15.6	-16.0	-10.2	-40.1
Metals & minerals	5	0.60	-4.4	-2.8	-2.8	-2.9	-8.9
Coal	5	0.70	-6.1	-2.4	-2.5	-3.6	-11.2
Petroleum	3	0.70	-2.8	-2.3	-2.1	-2.1	-6.2
Processed agric	50	0.10	-30.8	-16.4	-17.0	-12.0	-26.8
Electronic equipmt	25	0.50	-6.4	-2.9	-2.9	-2.7	-9.8
Motor vehicles	5	0.60	-10.0	-3.4	-3.7	-4.8	-16.9
Chemical products	5	0.60	-6.3	-2.5	-2.5	-3.6	-10.4
Textiles	100	0.10	-16.9	-10.4	-10.2	-6.5	-25.7
Other manufactures	100	0.20	-7.1	-4.0	-4.0	-2.6	-9.5
Electricity	5	0.40	-12.3	-7.5	-7.7	-6.4	-21.0
Water	5	0.02	-42.5	-27.6	-28.3	-20.1	-60.1
Gas mfg & distn	5	0.70	-7.7	-4.8	-4.9	-4.9	-13.4
Communications	5	0.90	-1.4	-1.5	-1.7	-1.7	-5.1
Insurance & finance	10	0.80	-2.6	-2.2	-2.2	-1.8	-6.6
Transport	10	0.70	-1.6	-1.6	-1.5	-1.3	-5.9
Construction	70	0.50	-5.1	-4.4	-4.0	-2.5	-12.3
Other Services	100	0.30	-8.6	-3.1	-2.8	-3.4	-11.7

a This index represents the “effective” number of strategically interacting firms in each industry.

Sources: Effective firm numbers and conjectural variations parameters are crude estimates, based on industry concentration, from the national statistics. Elasticities are calculated via the equations in the appendices, where elasticities of substitution sourced from surveys cited by Harris and Cox (1984) and Dimaranan and McDougall (2002).

Table 5: Initial Demand Shares, Average Elasticities and Mark-ups^a

	Intermediate demand share	Final demand share	Export demand share	Investment demand share	Government demand share	Average demand elasticity	Industry mark-ups ^b
Agriculture	53	40	4	3	0	-18.8	1.06
Metals, Minerals	84	3	10	2	1	-3.5	1.39
Coal	61	4	33	0	2	-6.2	1.19
Petroleum	58	12	5	14	12	-2.4	1.69
Proc agriculture	50	34	15	0	1	-20.7	1.05
Electronics	24	4	65	6	0	-7.5	1.15
Motor vehicles	46	8	15	29	1	-6.6	1.18
Chemicals	77	6	17	0	0	-4.9	1.26
Textiles	45	11	44	0	0	-16.1	1.07
Other mfg	43	5	35	16	0	-5.5	1.22
Electricity	84	13	1	1	1	-7.3	1.16
Water	71	18	1	0	9	-25.5	1.04
Gas mfg & distn	50	10	0	8	32	-5.2	1.24
Telecommunications	42	24	1	5	27	-1.7	2.45
Finance	57	29	2	3	8	-2.2	1.86
Transport	53	18	8	7	14	-1.8	2.26
Construction	4	2	0	86	8	-4.3	1.30
Other Services	46	21	4	4	25	-4.7	1.27

a All these variables are endogenous in the model. Initial (base) values are provided here.

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

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

Table 6: Calibrated Pure Profit, Fixed and Variable Cost Shares of Total Revenue and Industry Scale

Per cent of industry turnover	Pure profit ^a	Fixed cost ^b	Variable cost ^b	Scale ^c
Agriculture	0	5	95	95
Metals & minerals	16	12	72	30
Coal	6	10	84	42
Petroleum	35	6	59	49
Processed agriculture	-3	8	95	60
Electronic equipment	9	5	87	94
Motor vehicles	4	11	85	40
Chemical products	5	15	80	26
Textiles	1	5	94	92
Other manufactures	10	8	82	52
Electricity	-3	17	86	25
Water	-17	21	96	23
Gas mfg & distribution	-1	20	81	20
Telecommunications	51	8	41	25
Insurance and finance	40	6	54	44
Transport	40	15	44	15
Construction	15	8	77	45
Other Services	15	7	79	95

a Pure profits are calculated from national statistics 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.

b The first three columns of the table are calibrated. First, elasticities are estimated, from which mark-up ratios are calculated. The pure profit shares are then used to deduce the fixed cost residual.

c Scale is defined as the ratio (in %) of the gross quantity produced and minimum efficient scale, which in turn, is the level of output where unit fixed cost is 5% of unit variable cost.

Source: Pure profit proportions are deduced from profits data supplied in China's Statistical Yearbook, as detailed in Appendix 3.

Table 7: Short Run Economic Effects of Saving Policy Shocks^a

	Public SOE dividends ^c		Large fiscal expansion, 10% GDP ^b		Privatisation (reduced corporate saving) ^d	
	% changes	% of base GDP	% changes	% of base GDP	% changes	% of base GDP
Real GNP ^e	0.74		-2.8		0.3	
Real GDP ^f	-0.03		-3.6		0.2	
Real exchange rate	0.32		4.3		3.0	
Consumption ^g	2.67	1.22	-4.3	-0.4	24.7	11.3
Household saving ^g	2.95	0.73	-1.0	-0.3	27.4	6.8
Corporate saving ^g	-5.71	-0.95	5.3	0.8	-100	-16.0
Government saving ^g	0.00	0.00	-1276	-9.6	0.0	0.0
National saving ^g	-0.51	-0.21	-21.3	-9.0	-22.9	-9.2
Investment ^g	-0.04	-0.01	-5.3	-1.8	-4.2	-1.5
Foreign investment ^g	0.10	0.00	3.6	0.1	4.2	0.1
Reserve accumulation ^g	-2.08	-0.20	-72.8	-7.0	-83.6	-8.1
Value of Exports ^g	-1.86	-0.73	-16.9	-6.6	-15.2	-5.9
Value of Imports ^g	0.61	0.18	1.0	0.3	6.6	2.0
Trade surplus ^g	-10.50	-0.91	-79.8	-6.9	-91.5	-7.9
Current account surplus ^g	-2.73	-0.20	-100	-7.1	-113	-8.1
Real skilled wage ^e	0.00		0.0		0.0	
Real land rent ^e	-0.04		-0.9		0.7	
Real resource rent ^e	0.40		-9.5		4.3	
Production employment	-0.13		-7.0		-0.3	
Av gross rate of return ^h	-0.20		-1.5		-1.1	

a Here the shocks are directed at reducing the gross saving rate by reducing government saving and redistributing corporate saving to the public via increased corporate tax or complete privatisation, whereby corporations return all net income to public owners.

b The powers of corporate tax rates (the base values of which vary by industry in the model) are increased by 10% for mining and minerals, coal, petroleum, chemicals, electricity, and telecommunications, 5% for electronics, motor vehicles and transport, 2% for other manufactures and 1% for other services. The fiscal closure retains fixed government expenditure and a fixed fiscal surplus, with additional corporate tax revenue allowing reduced labour income tax, the power of which falls by 8%.

c Government spending and the fiscal surplus are here made endogenous and the current account surplus exogenous. Spending is increased sufficiently eliminate the current account surplus. This turns out to require spending to increase by 65%, or roughly 10% of initial GDP.

d In this simulation corporate saving is virtually eliminated, on the assumption that SOEs become public companies that return all net earnings after corporate tax to shareholding households.

e To facilitate welfare interpretation this is expressed relative to the consumer price index.

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

g This is expressed relative to (fixed) international (import) prices.

h 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.

Source: Simulations of the model described in the text.

Table 8: Short Run Sectoral Effects of Public SOE Dividends^a

% changes	Output volume	Production employment	Gross rate of return ^b	Producer price ^c	Mark-up	Pure profit	% point changes in shares of demand facing firms				
							Intermediate	Final	Export	Investment	Government
Agriculture	0.4	0.8	0.4	0.4	-0.01	-0.4	-0.4	0.8	-0.4	0.0	0.0
Metals & minerals	-0.8	-0.3	-0.5	0.4	0.11	-0.1	0.1	0.1	-0.2	0.0	0.0
Coal	-1.3	0.0	-0.5	0.4	0.17	0.8	0.6	0.2	-0.8	0.0	0.0
Petroleum	0.2	0.0	0.0	0.1	-0.04	0.3	-0.2	0.3	-0.1	-0.1	0.0
Proc agriculture	-0.1	-0.1	-0.4	0.3	-0.01	0.7	-0.1	0.9	-0.8	0.0	0.0
Electronics	-0.5	-0.1	-0.6	0.1	0.02	-0.3	0.0	0.1	-0.2	0.0	0.0
Motor vehicles	-1.5	-0.1	-0.6	0.5	0.20	1.6	0.1	0.3	-0.7	0.2	0.0
Chemical products	-0.7	-0.1	-0.6	0.3	0.07	-0.1	0.1	0.2	-0.3	0.0	0.0
Textiles	-0.9	-0.8	-1.1	0.1	0.02	-1.4	0.0	0.4	-0.4	0.0	0.0
Other manufactures	-0.5	-0.3	-0.6	0.2	0.04	-0.2	0.0	0.2	-0.2	0.0	0.0
Electricity	0.0	0.0	-0.2	0.3	-0.04	1.5	-0.3	0.4	0.0	0.0	0.0
Water	0.1	0.0	0.3	0.3	-0.01	0.4	-0.3	0.4	-0.2	0.0	0.0
Gas mfg & distn	0.1	0.0	-0.1	0.2	-0.04	4.9	-0.2	0.3	0.0	0.0	-0.1
Telecommunications	0.2	0.0	0.5	0.5	0.19	0.9	-0.3	0.5	0.0	0.0	-0.2
Finance	0.6	0.0	0.5	0.3	-0.13	0.8	-0.5	0.6	0.0	0.0	-0.1
Transport	-0.7	-0.1	0.5	1.0	0.80	1.3	-0.2	0.5	-0.3	0.0	0.0
Construction	-0.3	-0.2	-0.4	0.3	-0.01	-0.1	0.0	0.1	0.0	-0.1	0.0
Other Services	0.4	0.4	0.0	0.2	-0.12	-0.1	-0.3	0.5	-0.1	0.0	-0.1

a Here the powers of corporate tax rates (the base values of which vary by industry in the model) are increased by 10% for mining and minerals, coal, petroleum, chemicals, electricity, and telecommunications, 5% for electronics, motor vehicles and transport, 2% for other manufactures and 1% for other services. The fiscal closure retains fixed government expenditure and a fixed fiscal surplus, with additional corporate tax revenue allowing reduced labour income tax, the power of which falls by 8 %.

b 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.

c The producer price is here defined relative to international (import) prices. Changes in it therefore indicate adjustments in the sectoral real exchange rate.

Source: Simulations of the model described in the text.

Table 9: Short Run Sectoral Effects of a Large Fiscal Expansion^a

% changes	Output volume	Production employment	Gross rate of return ^b	Producer price ^c	Mark-up	Pure profit	% point changes in shares of demand facing firms				
							Intermediate	Final	Export	Investment	Government
Agriculture	-6.9	-8.9	-12.4	1.3	0.0	-71.2	-1.1	1.7	-0.9	0.0	0.3
Metals & minerals	-10.9	-5.4	-7.5	5.5	1.4	-3.0	1.4	0.1	-2.0	0.0	0.5
Coal	-10.3	-9.0	-7.1	3.1	1.3	1.6	3.4	0.3	-5.2	0.0	1.5
Petroleum	3.8	0.1	3.1	2.4	0.1	6.7	-3.4	-0.8	-0.8	-1.5	6.5
Proc agriculture	-9.7	-8.3	-15.8	2.0	0.1	4.4	1.7	1.9	-4.1	0.0	0.5
Electronics	-7.8	-7.3	-10.1	1.5	0.1	-7.6	0.6	0.2	-1.1	0.0	0.3
Motor vehicles	-19.5	-8.8	-11.8	5.8	2.5	7.6	1.8	1.2	-6.2	2.3	1.1
Chemical products	-11.8	-2.9	-14.6	3.2	0.7	-15.9	1.5	0.4	-2.0	0.0	0.1
Textiles	-12.5	-13.1	-16.5	1.3	0.1	-36.3	0.6	1.1	-1.7	0.0	0.1
Other manufactures	-8.9	-6.9	-10.0	2.7	0.4	-7.1	1.1	0.2	-1.5	0.1	0.1
Electricity	-5.4	-1.0	-8.7	2.0	0.0	14.3	-0.9	0.3	-0.2	0.0	0.7
Water	2.0	0.1	3.3	2.5	0.0	4.2	-3.3	-1.2	-0.9	0.0	5.4
Gas mfg & distn	15.1	7.5	24.1	5.3	-0.2	-145.9	-7.9	-1.9	0.0	-1.7	11.6
Telecommunications	8.5	0.7	13.0	7.4	-0.7	16.7	-6.2	-3.6	-0.5	-0.9	11.2
Finance	-0.4	-0.5	0.8	4.3	0.4	4.5	-2.7	-1.4	-0.5	-0.3	4.9
Transport	-6.3	-3.7	6.6	11.4	8.2	14.8	-3.5	-1.0	-2.7	-0.6	7.9
Construction	-2.6	-1.5	-8.4	3.4	-1.3	-7.6	0.2	0.0	-0.1	-5.2	5.1
Other Services	5.3	4.3	15.1	6.6	2.2	26.8	-6.2	-3.0	-1.6	-0.7	11.5

a Here government spending and the fiscal surplus are made endogenous and the current account surplus exogenous. Spending is increased sufficiently eliminate the current account surplus. This turns out to require spending to increase by 65%, or roughly 10% of initial GDP.

b 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.

c The producer price is here defined relative to international (import) prices. Changes in it therefore indicate adjustments in the sectoral real exchange rate.

d Percentage *point* changes in shares of demand facing firms.

Source: Simulations of the model described in the text.

Table 10: Short Run Sectoral Effects of Privatisation^a

% changes	Output volume	Production employment	Gross rate of return ^b	Producer price ^c	Mark-up	Pure profit	% point changes in shares of demand facing firms				
							Intermediate	Final	Export	Investment	Government
Agriculture	3.9	4.3	4.1	3.5	-0.2	-11.6	-3.8	6.5	-2.3	-0.4	0.0
Metals & minerals	-6.9	-3.5	-5.0	3.7	0.8	-2.0	0.4	1.0	-1.5	0.0	0.1
Coal	-11.2	-8.4	-2.0	4.5	2.0	11.5	6.2	1.5	-8.0	0.0	0.3
Petroleum	3.6	0.1	1.2	1.0	-0.7	3.4	-1.5	2.5	-0.4	-1.1	0.5
Proc agriculture	-0.1	-0.3	-1.6	2.5	-0.1	6.8	-1.1	7.3	-6.2	0.0	0.0
Electronics	-4.3	-4.4	-5.7	1.1	0.1	-3.4	0.4	1.3	-1.7	-0.1	0.0
Motor vehicles	-9.4	-4.4	-6.3	3.3	1.0	2.9	1.0	2.9	-4.2	0.2	0.2
Chemical products	-5.6	-1.4	-4.6	2.8	0.7	0.2	0.8	1.7	-2.6	0.0	0.0
Textiles	-7.9	-8.2	-9.5	1.4	0.2	-12.3	0.4	3.8	-4.3	0.0	0.0
Other manufactures	-4.6	-3.7	-5.3	2.0	0.2	-3.0	0.7	1.6	-1.9	-0.3	0.0
Electricity	0.4	0.1	-0.2	2.7	-0.3	12.7	-2.9	3.2	-0.2	-0.1	0.1
Water	2.3	0.7	8.1	3.1	-0.1	4.6	-2.7	3.4	-1.0	0.0	0.3
Gas mfg & distn	3.6	1.6	3.5	2.5	-0.4	22.2	-2.1	2.1	0.0	-0.8	0.8
Telecommunications	3.3	0.2	6.9	5.3	1.2	10.4	-3.2	4.1	-0.3	-0.6	0.0
Finance	6.4	5.1	6.2	2.9	-1.1	8.2	-3.9	4.8	-0.4	-0.4	-0.1
Transport	-3.3	-2.1	5.7	7.7	5.6	11.5	-2.1	4.0	-2.0	-0.6	0.6
Construction	-4.8	-3.5	-7.4	2.7	-0.4	-6.1	0.4	0.5	-0.1	-1.7	0.9
Other Services	4.6	3.9	2.9	2.4	-0.8	3.4	-2.8	3.6	-0.8	-0.5	0.4

a Here corporate saving is virtually eliminated, on the assumption that SOEs become public companies that return all net earnings after corporate tax to share-holding households.

b 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.

c The producer price is here defined relative to international (import) prices. Changes in it therefore indicate adjustments in the sectoral real exchange rate.

d Percentage *point* changes in shares of demand facing firms.

Source: Simulations of the model described in the text.

Table 11: Economic Effects of Competition Policy Shocks^a

	Price caps in the medium run ^b		Increased entry in the long run ^c	
	% changes	% of base GDP	% changes	% of base GDP
Real GNP ^d	31.0		-2.6	
Real GDP ^e	41.2		4.0	
Real exchange rate	-6.3		-3.7	
Consumption ^f	60.4	25.6	3.8	1.0
Household saving ^f	61.9	15.4	2.4	0.6
Corporate saving ^f	-97.2	-15.9	-33.0	-5.6
Government saving ^f	0.0	0.0	0.0	0.0
National saving ^f	-1.9	-0.6	-11.6	-5.0
Investment ^f	60.9	21.4	-9.6	-3.4
Foreign investment ^f	11.3	0.3	0.8	0.0
Reserve accumulation ^f	-225.9	-21.9	-15.3	-1.5
Value of Exports ^f	44.2	17.3	10.1	3.9
Value of Imports ^f	124.5	37.9	4.3	1.3
Trade surplus ^f	-237.6	-20.6	30.5	2.6
Current account surplus ^f	-284.0	-20.5	-19.3	-1.4
Real production wage ^d	68.0		19.3	
Real skilled wage ^d	122.3		13.3	
Real land rent ^d	2.5		-1.9	
Real resource rent ^d	151.6		13.2	
Total number of firms	0.0		27.3	
National capital stock	0.0		22.4	
Av gross rate of return ^g	21.6		-23.1	

a Here the shocks are directed at reducing oligopoly rents, from which corporate savings flow, through price regulation and anti-trust policies. All shocks are designed to remove pure profits and induce more competitive pricing.

b The market for production labour is flexible, so that full employment is retained, but capital is fixed in total stock and in sectoral distribution, as is the number of firms (varieties) in each industry. Oligopoly rents (pure profits) are driven to zero.

c In the long run the labour market is flexible, physical capital is domestically and internationally mobile and pure profits are eliminated by free entry and exit of firms (varieties). Here the number of firms (varieties) is endogenous and oligopoly rents (pure profits) are exogenous. The latter are shocked down by a third, encouraging new entries, increased fixed costs, foreign ownership of domestic capital and capital income repatriated abroad.

d To facilitate welfare interpretation this is expressed relative to the consumer price index.

e As a measure of collective output volume, this is expressed relative to the GDP price.

f This is expressed relative to (fixed) international (import) prices.

g 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.

Source: Simulations of the model described in the text.

Table 12: Sectoral Effects of Price Caps in the Medium Run^a

% changes	Output volume	No of firms (varieties)	Unit fixed cost	Gross rate of return ^b	Producer price	Production employment	Export share of output
Agriculture	-25	0	63	4	22	-40	-99
Metals & minerals	262	0	-30	24	-27	53	81
Coal	56	0	16	34	18	19	-86
Petroleum	421	0	-34	7	-40	11	95
Proc agriculture	-16	0	48	57	17	-29	-96
Electronics	67	0	0	-1	-6	6	-11
Motor vehicles	190	0	-23	126	-11	32	62
Chemical products	115	0	-12	69	-9	7	-4
Textiles	-35	0	73	-22	11	-48	-63
Other manufactures	98	0	-6	40	-7	20	-25
Electricity	94	0	3	215	20	6	-95
Water	-51	0	114	345	57	-18	-100
Gas mfg & distn	100	0	-5	173	5	17	-71
Telecommunications	135	0	23	37	-20	8	21
Finance	160	0	3	11	-20	85	21
Transport	258	0	-19	23	-38	76	117
Construction	115	0	-16	-41	-23	18	207
Other Services	61	0	13	12	4	21	-53

a Here the shocks is directed at reducing oligopoly rents, from which corporate savings flow, through price regulation. All shocks are designed to remove pure profits and induce more competitive pricing. In this “medium run” the market for production labour is flexible, so that full employment is retained, but capital is fixed in total stock and in sectoral distribution, as is the number of firms (varieties) in each industry. Oligopoly rents (pure profits) are driven to zero.

b 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.

Source: Simulations of the model described in the text.

Table 13: Sectoral Effects of Increased Entry in the Long Run^a

% changes	Output volume	No of firms (varieties)	Production scale ^b	Unit fixed cost	Gross rate of return ^c	Producer price	Production employment	Export share of output
Agriculture	-9	-7	-2	6	-2	4	-18	-58
Metals & minerals	21	42	-15	23	-35	-8	22	39
Coal	2	31	-22	34	-20	2	1	-18
Petroleum	49	188	-48	101	-55	-18	179	80
Proc agriculture	-5	-18	16	-10	10	1	-17	-21
Electronics	5	63	-36	62	-24	-1	12	1
Motor vehicles	65	21	36	-24	-16	-9	28	107
Chemical products	19	17	2	2	-14	-4	14	20
Textiles	-19	-12	-8	13	-2	3	-26	-12
Other manufactures	10	46	-24	37	-20	-3	12	5
Electricity	16	-2	19	-12	5	-5	-2	60
Water	5	-27	43	-27	115	0	-22	-17
Gas mfg & distn	14	1	13	-8	1	-5	-2	57
Telecommunications	13	174	-59	152	-39	-9	165	37
Finance	8	216	-66	205	-43	-3	63	6
Transport	55	52	2	2	-41	-25	40	126
Construction	-4	27	-25	38	-34	-4	-7	40
Other Services	0	69	-41	76	-23	1	4	-58

a Here the shocks are directed at reducing oligopoly rents, from which corporate savings flow, through anti-trust policies. Firms price more competitively. In this “long run” the labour market is flexible, physical capital is domestically and internationally mobile and entry and exit of firms (varieties) is allowed. The model closure therefore has the number of firms (varieties) endogenous and oligopoly rents (pure profits) exogenous. Sufficient new entries are allowed to reduce pure profits by a third.

b Scale is defined here as the ratio of firm-level output to minimum efficient scale, where the latter is the volume of output at which average fixed cost falls to 5% of average total cost when unit factor rewards are held constant.

c 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.

Source: Simulations of the model described in the text.