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**IMPLICATIONS OF CHINA'S FOREIGN EXCHANGE SYSTEM
FOR THE WOOL MARKET**

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Abstract

China's foreign exchange regime includes controls on the use of foreign exchange and an overvalued exchange rate. While a system of foreign exchange retention and secondary markets for foreign exchange has been introduced to mitigate the effect of the overvaluation, and to increase the efficiency with which foreign exchange is used, overvaluation still reduces returns to exporters. Given the more price-responsive nature of the post-reform Chinese economy, a likely consequence of this policy is that exports and hence foreign exchange availability are reduced. The low cost of foreign exchange at official rates stimulates the demand for imports, resulting in a shortage of foreign exchange. The price of exportables is lowered and the price of importables is raised. National income is reduced because many of the potential gains from trade are foregone. The reduction in income has a marked adverse effect on the market for wool. Reforms which allowed the exchange rate to reach its equilibrium level would, on balance, probably have a positive impact on the world wool market. They would certainly improve the performance of China's textile exports. A model to assess the effects of reforms on the demand for wool is developed.

IMPLICATIONS OF CHINA'S FOREIGN EXCHANGE SYSTEM FOR THE WOOL MARKET*

The policy reforms of the past decade have greatly increased the importance of foreign trade, and the foreign exchange system, in the Chinese economy. Over this period, China has also become a much more important participant in the world market for wool and wool products, particularly as an importer of wool. Between 1980 and 1986, China's imports of virgin wool have grown from 2.5 per cent of world imports to over 10 per cent (JWS 1987, Table 8).

China's foreign trade system, and its foreign exchange system in particular, have been identified as having a potentially major influence on wool imports (Simmons, Angel and Coote 1988). The foreign exchange system can also be expected to affect China's substantial exports of woollen fabrics and apparel.

The foreign trade system has profound implications throughout the economy. It exerts an influence on the overall size of the economy and hence consumption levels and living standards. In addition, it affects relative prices between activities and hence the pattern of production and consumption. China's foreign trade system has undergone vast changes since 1978 and there is clearly a great deal of interest in further reform to facilitate economic growth and development (e.g. Zhang 1987; Dai 1987; Tam 1986, Ho 1986). Lin (1988) concludes that it is widely recognized within China that the current foreign exchange system is untenable and that reform is essential for modernization. Substantial further change to the system appears likely, and an understanding of the implications of the current system is essential if the effects of future reforms are to be predicted.

The approach adopted in this paper takes into account the fact that the foreign exchange system has ramifications throughout the economy and these cannot be ignored in assessing its effects on a particular market. Further, it takes into account the fact that both central planning and market mechanisms now play a role in the allocation of goods and resources (Byrd 1987; Sicular 1988).

Given the dual nature of China's 'planned commodity economy', a central issue is the extent to which prices affect the allocation of resources. In a fully centralized system where export and import levels are determined solely by planning decisions, pricing instruments such as the exchange rate and tariffs serve only an accounting function. By contrast, in a decentralized market system, these variables play a central role in the determination of exports and imports. Thus the first issue addressed in this paper is the relative importance of plan and market in the relevant areas of China's economy.

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The next issue to be discussed is the nature of the foreign exchange and foreign trade systems, and their implications for the economy and its major sectors. An examination of the effects of the foreign exchange system on the market for wool is then addressed in Section 4 of the paper. Following this, a potential approach by which the overall effects of the foreign exchange mechanism on the market for wool might be evaluated in a general equilibrium context is outlined. Finally, some tentative conclusions are drawn and proposals for future work set out.

2. PLAN AND MARKET IN THE CHINESE ECONOMY

A major thrust of the reforms in China's economy since 1978 has been to decentralize economic decision making away from central planning and towards provincial governments and producing enterprises. This process has involved increased use of markets as a means of allocating resources, although planning by central and provincial authorities remains very important (Naughton 1985; Wong 1985), particularly in determining the distribution of gains and losses.

The extent to which decision-making has been decentralized depends upon the sector of the economy. It appears, for instance, that decision-making has been substantially decentralized in the agricultural sector (Sicular 1988; Lardy 1983). Progress to date has generally been viewed as having been somewhat less in the industrial sector, (Naughton 1985; Wong 1985; Chinese Economic System Reform Research Institute (CESRRI) 1988), however recent work suggests that the 1985 reforms have made the free-market prices very important in influencing industrial sector decisions at the margin (Byrd 1987; Wu and Zhao 1987). The foreign trade system has also been substantially decentralized, although important elements of central planning remain (World Bank 1988).

The relative importance of planning and markets as influences on outcomes in the three broad sectors of agriculture, industry and foreign trade are examined and their implications assessed in the remainder of this section.

2.1 The agricultural sector

The process of economic reform appears to have had its greatest impact in the agricultural sector. Here, the introduction of the household responsibility system has transferred much of the direct responsibility for decision making to the enterprise level. While the planning authorities have, at least until recently, imposed delivery quotas, the proportion of output marketed outside these quotas appears to have increased for most commodities, although Sicular (1988:287) reports that only 18 per cent of total agricultural production was sold at market prices in 1984.

The planning system has essentially involved a requirement for producers to deliver specified quantities of output to the state at set prices which, in the case of food, are generally above the net returns from the sale of that food. As Sicular (1988) demonstrates, such a system will undoubtedly have powerful redistributive effects, but may not greatly influence the allocation of resources, as long as the market prices relevant to marginal output decisions are not distorted and the redistribution does not greatly affect demand patterns.

The planning system undoubtedly inhibits the response to producers to price signals in a number of ways, including a tendency for the 'negotiated' prices for over quota

production to be related to within-quota prices, uncertainty about the link between current production and future quota delivery or contract levels, and central allocation of some inputs such as fertilizers. However, it seems clear from the available information on agricultural policy in China (e.g. Sicular 1985, 1987, 1988; Lardy 1985), and from the observed response of Chinese agriculture to major price changes in the 1980s, that the Chinese agricultural sector does now respond significantly to prices.

There appear to be very few quantitative analyses of agricultural supply response in China. The limited quantitative evidence that is available (e.g. Simmons, Trendle and Brewer 1988) does appear to be consistent with price having a significant effect on supply. The largely judgmental set of supply elasticities assembled by Yang and Tyers (1986) is also consistent with an important role for prices.

Casual empirical evidence on supply behaviour, at least since 1978, points to substantial price responsiveness. The increase in cotton production following the rise in cotton prices in 1980 is particularly marked and suggests that the response of individual commodities to changes in their prices can be very substantial. As is evident from Table 1, an increase in nominal cotton prices of around 50 per cent above their 1977 levels, together with the introduction of a 30 per cent above-quota price bonus for cotton, was associated with production more than doubling by 1984. This is despite the fact that virtually all cotton output was being purchased by the state. At least in some areas, there are now free markets for over-quota production for cotton and other crops.

Also evident from the table is the fact that the rise in cotton prices followed the major increase in cotton imports in the late 1970s. The ability of the agricultural sector as a whole to expand by drawing additional resources from the remainder of the economy would undoubtedly be much less than the response of individual commodities. However, the apparent price responsiveness of individual commodities is of importance in assessing the likely implications of changes in the foreign exchange regime, since changes in the exchange rate regime could potentially have marked effects on the relative prices of competing commodities which are importables, exportables or nontraded goods.

Table 1 Output, state purchases and purchase prices for cotton, 1970-88

	Output 10,000t	State purchases 10,000t	Cotton exports 10,000t	Cotton imports 10,000t	Cotton purchase prices Yuan/100kg	Cotton ^a above- quota price Premium %
1970	210.5	203.0	5.2	8.1	204	-
1971	195.8	191.3	5.1	12.2	204	-
1972	256.2	178.8	5.6	19.6	210	-
1973	246.1	240.3	5.2	47.7	204	-
1974	238.1	224.5	5.7	37.3	210	-
1975	205.5	222.7	10.6	17.7	207	-
1976	204.9	188.6	8.8	18.8	202	-
1977	204.9	198.0	4.1	18.1	208	-
1978	216.7	209.6	3.4	50.9	228	-
1979	220.7	208.1	2.7	54.9	268	30
1980	270.7	261.0	1.0	88.8	317	30
1981	296.8	287.2	0.1	80.1	312	30
1982	359.8	341.6	0.7	47.4	324	30
1983	463.7	458.6	6.8	22.3	342	30
1984	625.8	521.2	20.2	3.4	342	18
1985	414.7	431.8	34.9	-	322	16
1986	356.1	379.4	55.8	-	-	-

^aEstimates presented in Sicilar 1987 (pp.34, 77). Estimates for 1984 and 1985 are simple averages of the new prices for North and South China.

Source: Statistical Yearbook of China; Sicilar 1987.

The increases in agricultural product prices, and particularly in marginal (above quota) prices, after 1979 were not the only factor affecting output levels. Over the same period, the organization of agriculture changed from a commune to a household responsibility system (Lardy 1986; Niu and Calkins 1986). Under the household responsibility system, household income is much more strongly linked to the value of output than under the commune system where remuneration was based on inputs, as measured by work points. Recent estimates suggest that this institutional change was a major source of productivity growth, accounting for perhaps three-quarters of the productivity gains in Chinese agriculture between 1978 and 1984 (Macmillan, Whalley and Zhu 1987). Lin (1988) sees this change in agricultural incentives as contributing 50 percent of the agricultural output gains of the early 1980s.

The introduction of the contract system for agriculture in 1985 (Sicilar 1987) appears to mark a further step towards greater market orientation in Chinese agriculture. The replacement of compulsory procurement quotas with voluntary contracts, and the introduction of a single state price avoids problems such as quota under-fulfilment

associated with a dual price system. The introduction of this system was associated with a reduction in the price paid by the state for an additional (marginal) unit of output. This reduction in marginal output prices, together with increased prices for some inputs (Sicular 1986) and a decline in state investment in agriculture (Lardy 1986) are likely to have influenced the reductions in output of some agricultural products after 1985.

2.2 The industrial sector

The post-1978 reforms have substantially reduced the role of central planning decisions in the allocation of resources in Chinese industry. In the past, there has been widespread agreement that this sector remains less subject to price influences and more subject to planning decisions than the agricultural sector (Lin 1988; Naughton 1985; Perry 1985). Reforms in 1984 and subsequently appear to have largely increased the role of markets in this sector (CESRRI 1988), and so this conclusion may require re-evaluation.

While there appears to have been a great deal of decentralization of decision-making in industry, much of this decentralization is to provincial or municipal governments, rather than to enterprises (Lin 1988:16). If these governments were to simply set production quotas in much the same way that the central government previously did, then such decentralization would not contribute to increasing price responsiveness. However, there appears to be a good deal of evidence that these levels of government do respond to prices, either directly by passing price signals through to enterprises, or indirectly by taking into account price signals in their own planning and investment decisions.

Results from a survey conducted by the Chinese Economic System Reform Research Institute (1987) provide an indication of the extent to which industrial output had become subject to market price influences by 1984. At that stage, only 24 per cent of the gross output of firms was directly under mandatory plans and 57 per cent of sales were made under mandatory plans. However, almost 73 per cent of major raw materials were obtained through the planning system.

Zhang and Zhang (1987:55) also point to very high shares subject to either mandatory or guidance planning in the production and marketing of raw and semi-finished materials. Even for these goods, however, approximately 20 per cent of total sales were made on the market by the enterprise itself, a ratio substantially higher than in many agricultural industries. Zhang and Zhang's (1987:53) results reprinted in Table 2 also reveal that very low proportions of the activities of urban or rural collectively-owned enterprises were determined by planning decisions. The same study also points to relatively high growth rates of enterprises with a greater market orientation, implying that the share of the economy responding to market signals is likely to increase even in the absence of further explicit policy changes. This apparent price responsiveness of local authorities and enterprises can lead to economic costs when price signals are distorted in favour of

particular activities such as consumer goods (e.g. Wong 1985:270), and this price responsiveness contributes to the case for reform of the pricing system, as well as the foreign exchange system.

Table 2 Share of inputs, production and marketing for enterprises under different types of ownership, 1984 (%)

	State owned	Urban collectives	Rural collectives
Supply	86.8	6.5	3.0
Production	29.5	12.2	4.0
Marketing	71.0	4.	

Source: Zhang and Zhang (1987:53).

The relatively large share of non-planned production and sales allows for considerable flexibility in the response of industry to relative price changes. The two-tier pricing system introduced in 1984 greatly increased the autonomy of individual enterprises and hence their ability to respond to at least short-term price changes (Diao 1987). However, it appears that the impact of price changes on industrial supply was reduced by the proportional nature of the two-tier pricing system. With planned production levels expressed as a percentage of estimated output, rather than being historically fixed, an increase in production implies an increase in future quota delivery requirements. Diao (1987:47) contrasts this proportional two-tier price system in industry with the potentially non-distorting fixed quota system he sees as more prevalent in the agricultural sector.

The incentive problem resulting from proportionality between output and contract output has been addressed in the contracted managerial responsibility system (*Far Eastern Economic Review*, 8 September 1988, p.132). While this system provides for contracts of between one and five years, the general practice appears, from author interviews, to be to set output for a period of around three years. This system may help to reduce the apparent inefficiency of many state enterprises in China, as well as to increase the price responsiveness of the state sector. Byrd (1987) and Wu and Zhao (1987) discuss the operation of the two-tier pricing system in some detail. They each conclude that the system has an important role in improving resource allocation, despite major problems involved, particularly in adapting the system over time. Byrd (1987) in particular emphasises the strong tendencies inherent in the system for out-of-plan production to increase as a share of output, both as total production grows and as enterprises find ways to shift production from within-plan to out-of-plan categories.

Economic reforms recently announced at the National People's Congress (*Australian Financial Review*, 15 April 1988) appear to have substantially increased the autonomy and responsibility of industrial enterprises. If fully implemented, the enterprise law, including

provision for bankruptcy, could be expected to make the industrial sector more price responsive in the longer term by making investment decisions more subject to market forces.

From the evidence surveyed, it seems clear that the current structure of the Chinese industrial sector allows a substantial degree of price responsiveness, despite the continuing importance of planning in the sector. Thus, price changes resulting from changes in the foreign exchange and foreign trade system can be expected to affect the level and composition of Chinese industrial output.

2.3 Foreign trade

Prior to 1978 the Chinese economy was relatively closed, with decisions on exports made by the planning process in accordance with an assessment of the level of imports required for particular purposes. All foreign trade was channelled through centralized Foreign Trade Corporations, with minimal opportunities for direct interaction between producing enterprises and importers of Chinese exports.

While the foreign trade plan remains at the centre of China's foreign trade regime, its nature and implications have changed dramatically since 1979. The plan has been identified as having three major functions (World Bank 1988:104):

- (i) protection of local production where it competes with imports;
- (ii) mandating certain exports to offset the overall anti-trade bias of aspects of the trade regime;
- (iii) attempting to balance imports and exports.

The overall foreign trade plan involves both command plan and guidance plan components. Command plans are specified in physical units and are mandatory for the provinces or enterprises to which they apply. Guidance plans, by contrast, are specified in value terms and involve a substantially greater degree of flexibility. The proportion of total trade covered by command plans has been declining, particularly on the import side, although the decentralization implicit in this change has been reduced by the introduction of measures such as import licensing, particularly since 1986.

The following account of China's export and import system is based heavily on the comprehensive World Bank (1988) study which provides a 'snapshot' of the system operating in late 1986. Other sources and author interviews have been used to update the assessment to mid-1988.

2.3.1 The export regime

Despite substantial reform and liberalization since 1978, the command plan system still covered 120 commodities, including coal, oil, agricultural products, textiles and

garments and handicrafts in late 1986, and command plan exports accounted for an estimated 70 per cent of total export value (World Bank 1988:22).

To some degree, the export controls were motivated by a desire to avoid adverse terms of trade effects in particular markets (Ho 1986). While important in particular markets, such as for food exports to Hong Kong, such terms of trade effects can easily be over-emphasized. Lin and Yang (1987) point out that, despite rapid expansion of its exports over the last decade, China's share of the total market in its major export markets remains quite low, even for its major labour-intensive exports, such as textiles and clothing. For clothing, for instance, China's share of the total clothing market (in 1985) was less than 1 per cent in the United States, Japan and the EC and 1.13 per cent in Australia.

Export controls on quota-category exports of textiles and clothing to the United States, the EC and other major markets are made necessary by the Multi-fibre Arrangement. However, the developing countries, in general, and China in particular, have been able to expand their exports of textiles and clothing beyond the quota limits by exporting in unrestricted categories (Trela and Whalley 1988:20). Given this, and the relatively low market share of China in these goods, there would not appear to be much justification for global, as distinct from MFA-category export controls, for these goods on terms of trade grounds.

In 1984, a major report on reform of the trade system by the Ministry of Foreign Economic Relations and Trade (MOFERT) recommended a number of major reforms, some of which have begun to be implemented since 1986. The major recommendations included (World Bank 1988:21):

- (i) Direct participation by large producing enterprises in foreign trade.
- (ii) Eliminating the state's responsibility for profits and losses in foreign trade.
- (iii) Adoption of an agency system for Foreign Trade Corporations (FTCs).

The second objective of eliminating the state's responsibility for profits and losses in trade has also been addressed in an experimental trade reform introduced in early 1988.

The introduction of direct participation by selected producing enterprises in foreign trade was strongly endorsed by World Bank (1988) on the grounds that the 'airlock' imposed by enterprises having to deal through FTCs prevented producing enterprises from obtaining a great deal of information from buyers about production techniques and product quality. Direct involvement of larger producing enterprises and consortia of smaller enterprises in foreign trade on their own account, however, appears to be increasing rapidly, and to have considerable potential to increase the efficiency and price responsiveness of the economic system.

An experimental system for exports from several major sectors was introduced in early 1988. Under this system, subsidies for exports were eliminated in the sectors of textiles and

apparel, light industry, arts and crafts, and mechanical and electrical. Instead, FTCs are now able to retain a much higher percentage of the foreign exchange earned from exports in these categories (70 per cent for textiles and apparel, arts and crafts and light industry, and 100 per cent for mechanical and electrical).

One potentially major problem with these arrangements is related to their interaction with the domestic pricing arrangements. Since the prices of many goods in these categories have not been decontrolled, and procurement prices are reportedly based on domestic prices, albeit with some negotiation, these prices could potentially distort the pattern of exports. Until recently, it was intended that this tension would be overcome by a fairly rapid phasing out of the domestic price controls. However, recent concern about inflation appears to have put back the schedule for price reforms (Australian Financial Review, October 3, 1988:26). If the remaining price controls are associated with fixed quantity constraints, they may have no effect on marginal responses and affect economic outcomes only through distributional effects, as demonstrated by Sicular (1988). It remains to be seen, however, what form price controls will take over the next few years.

As long as two-tier or relatively free pricing is retained domestically, the new experimental provisions for foreign trade can be expected to have major implications for the performance of the export sector. The number of FTCs has increased substantially in recent years, and the restrictions on the scope of their activity have been relaxed. Thus, price and non-price competition between these enterprises can be expected to make returns to enterprises converge towards the export market return adjusted for any incentives (e.g. foreign exchange retention) provided by government. While the strong traditional ties between FTCs and producing enterprises may limit the extent of price competition, the system for these major export sectors seems likely to be relatively responsive to the price incentives provided by the system.

The emergence of an agency system for exports, where FTCs sell exports on behalf of enterprises in return for a specified commission has been relatively slow, apparently because of the domestic pricing distortions for many goods, which make exports of most manufactured goods unprofitable at the official exchange rate. While this is the intended long-term path of development for the export system, its full emergence seems likely to be retarded by the current slowdown in pricing reforms.

Under the foreign trade system operating in 1986, it was estimated that 70 to 80 per cent of total exports were within the plan (World Bank 1988:11). Since then, it seems likely that the share of above-plan exports has increased very markedly. As noted by World Bank, the system prevailing at that time provided substantial incentives to expand out-of-plan exports. Further, the new experimental arrangements for textiles and clothing, arts and crafts, light industrial products and machinery and electronic exports greatly increase the extent to which the level of exports is price responsive. Given the importance of these

export categories (Lin and Yang 1987; World Bank 1988:122), it now seems likely that 50 per cent or more of total exports are price responsive and hence directly affected by the exchange rate and other pricing policies. Indirect effects on the behaviour of local governments (World Bank 1988:107) further increase the price responsiveness of the export sector. While some major export categories such as petroleum remain centrally determined, it is clear that the behaviour of the export sector as a whole can potentially be substantially affected by price policy influences.

2.3.2 The import regime

The import regime appears to have undergone relatively little change in recent years. The key features of the system are:

- (i) A command plan for imports of seven key raw materials - steel, chemical fertilizer, rubber, timber, tobacco, grain, polyester and other synthetic fibres (World Bank 1988:111).
- (ii) Central allocation of foreign exchange for imports on priority investment projects.
- (iii) Allocations of foreign exchange for other priority imports of raw materials, spare parts and equipment.
- (iv) Non-centrally funded imports or imports subject to import licensing.

The World Bank estimated command plan imports to be around 40 per cent and non-centrally funded imports to be 30 to 40 per cent of total imports. From author interviews in June 1988, it appears that central purchases of many commodities (and particularly wool) have declined markedly, with a corresponding increase in local orders.

Non-plan imports are divided into restricted and non-restricted goods. Restricted goods, of which there were 45 in 1986 (World Bank 1988:136) included most of the command plan imports (eg. steel, rubber, timber, synthetic fibres, tobacco), 'luxury' consumer durables such as motor vehicles, televisions and refrigerators, and assembly lines for such 'luxury' consumer durables. In late 1986 in the wake of a serious foreign exchange shortage the list of restricted imports was expanded to include wool.

Import licensing imposes a total ban on imports of some goods perceived as wasteful, e.g. motor vehicles, and very strict limits on goods already in "excess" supply, such as assembly lines for many consumer durables. Since the primary objective of import licensing is to keep the current account in reasonable balance, the extent to which it constrains imports will depend upon the seriousness of imbalances in the exchange rate, and in domestic spending. For restricted goods under the import plan, an import licence can be obtained relatively readily (World Bank 1988:138), while an application outside the plan is subjected to careful scrutiny to ensure, amongst other things, that the price paid by importers is not excessive. While the total imports by a province or enterprise, as well as imports of particular goods are apparently constrained by import licensing, it appeared, in

1986 at least, that a restricted import with suitable finance, and for which no domestic substitutes were readily available, would eventually receive approval (World Bank 1988:113). Under these conditions, imports are essentially being constrained by the general rationing of foreign exchange rather than the commodity - specific import licensing system.

The import tariff includes a minimum tariff schedule and an import surcharge, whose combined rate ranges from zero to 200 per cent (World Bank 1988:146). Where imports are currently banned, as has been the case for motor vehicles, the tariff is essentially irrelevant. Where total imports of a good are restricted by import licensing, the sole effect of the tariff is on the allocation of economic rents between the government and the licence holder. However, where imports are constrained by the general foreign exchange rationing (and consequent scarcity premiums), the tariff will have important effects on the relative prices of different imports, and hence on the overall mix of imports.

The tariff structure includes several categories of exemption (World Bank 1988:150), including:

- (i) imports used directly for re-export;
- (ii) capital goods used for the transformation of industry; and
- (iii) imports of intermediate and capital goods for the Special Economic Zones, the coastal cities and Sino-foreign joint ventures.

The exemption for re-exports does not extend beyond the importing firm itself, and this appears to pose some problems for producers of intermediate goods (such as wool top-makers) who do not directly engage in exporting.

The overall pattern of the tariff schedule appears to be broadly consistent with the structure of import licensing, with those goods essentially banned under the import licensing system (such as motor vehicles) facing very high tariffs (200 per cent in the case of motor vehicles) and synthetic fabrics attracting quite high tariff rates (140 per cent). From author interviews, it appears that most wool imports for domestic use now attract a duty of 20 per cent, while wool imported for processing and re-export is duty free. The overall pattern of the import schedule may provide at least a general guide to the pattern of industry protection desired by policy makers.

For non-command imports, the FTCs usually act as agents for the purchasing enterprises and the enterprises are generally free to select an appropriate FTC (World Bank 1988:23). Thus, the price signals resulting from exchange rate changes and import tariffs would generally be transmitted back to the importing enterprise. The important exception to this principle arises where the resulting domestic price would be below the fixed domestic price, in which case the domestic price is charged. Thus, imports of goods such as televisions are reportedly very profitable to FTCs.

2.3.3 The foreign trade system overall

From the above discussions, it is clear that the Foreign Trade system has become considerably more price responsive and flexible than it was in the past. While command plan exports remain a substantial component of total exports, it seems clear that exports in general are now substantially responsive to the price signals generated by world markets and the exchange rate. The possibility that total exports have been artificially stimulated by excessive use of command exports now seems much less plausible given that export subsidies for the large export sectors of textiles and clothing, light industry and arts and crafts have reportedly been replaced by partial retention arrangements for foreign exchange.

World market prices, and the exchange rate also appear to strongly impact on the demand for imports, particularly given the general use of the agency system for imports. The effect of these forces is attenuated in some cases by import licensing, by tariffs and by interactions with official minimum prices, and more generally by the rationing of foreign exchange at the official exchange rate.

Overall, it seems that the foreign trade system has become more flexible, more price responsive and, probably, more efficient than the more centralized system which it replaced. More importantly, the system is considerably more transparent than a pure planning system and hence some inference about the implications of exogenous shocks, or policy changes can be made.

3. NATURE OF THE FOREIGN EXCHANGE SYSTEM

Given the degree of price responsiveness of the major sectors of the Chinese economy, the foreign exchange system can be expected to have an important role in influencing trade and the overall performance of the economy. The purpose of this chapter is to examine the key features of the Chinese foreign exchange system and to assess its likely implications for the traded goods sector.

Prior to 1979, the exchange rate had a relatively limited role in influencing the allocation of resources. With a heavy emphasis on planning in determining the level and pattern of exports, the exchange rate performed largely an accounting function, having only a limited role in influencing the pattern of exports and imports.

Since 1979, the foreign exchange system has been substantially reformed. A major change was the substantial devaluation, at least for trade related transactions, involved in the introduction of the Internal Settlement Rate for Trade in 1981. The major 1981 reforms, however, also involved a highly centralized system of foreign exchange control with tight restrictions on holding of foreign exchange (Zhang 1987). In 1985, the official exchange rate was essentially merged with the internal settlement rate and further

devaluations occurred in 1986 and 1987, as is evident from Table 3. However, the exchange rate has been pegged to the (admittedly declining) US dollar since July 1986.

A particularly important recent change has been the introduction of legal secondary markets for foreign exchange (Australian Financial Review, August 19, 1988). The existence of these Foreign Exchange Adjustment Centres in each province allows foreign exchange to be transferred between enterprises to reflect differences in its value in each use, and reduces the waste resulting from hoarding of foreign exchange. Some degree of arbitrage between centres is possible, and reportedly keeps the extent of divergences between provincial markets relatively small.

Table 3 China's exchange rate and internal settlement for trade (Y/US\$)

	Official exchange rate ^a	Internal settlement rate	Cost of earning foreign exchange
1975	1.86	-	-
1976	1.94	-	-
1977	1.86	-	-
1978	1.68	-	-
1979	1.55	-	-
1980	1.49	-	-
1981	1.70	2.8	2.61
1982	1.89	2.8	2.86
1983	1.98	2.8	3.22
1984	2.32	2.8	4.00
1985	2.94	2.8	5.00
1986	3.45	-	..
1987	3.72	-	..
1988	3.72	-	..

^aPeriod average, Yuan/US dollar.

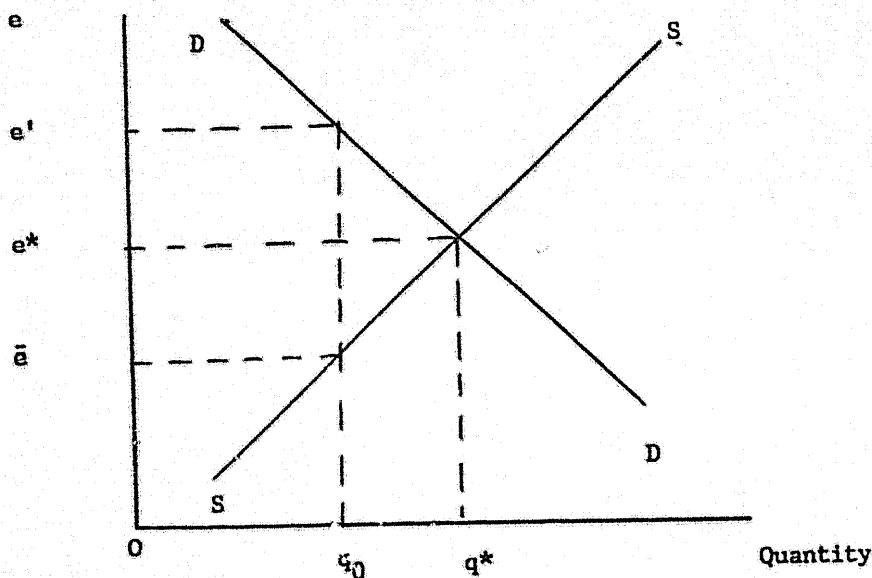
Source: IMF, International Financial Statistics; Ho (1986); Tam (1987).

Zhang (1987) notes that the marked devaluation occurring in 1981 appeared to have a number of beneficial effects. In particular, he points to substantial growth in the level of exports, and increases in both the diversity of exports and the share of exports derived from outlying provinces. In view of the apparent effectiveness of earlier exchange rate adjustments in achieving these ends, and in reducing the need for export subsidies, the apparent slowdown in the adjustment of the exchange rate seems somewhat surprising. From interviews with officials in 1988, it appears that concerns about the inflation associated with the previous devaluations have inhibited further adjustment of the exchange rate.

There are a number of clear indications that the exchange rate remains substantially overvalued. One strong indication is the 'shortage' of foreign exchange which necessitates a policy of strong controls on the use and holding of foreign exchange (Zhang 1987). Such a shortage arises because, at the official rate of exchange, imported goods are artificially cheap, and selling goods on the export market is not sufficiently attractive to generate the volume of imports demanded.

Another indication of the overvaluation of foreign exchange is provided by the substantially higher rates apparently prevailing in the secondary markets for foreign exchange. In August 1988 the rate on the Shanghai secondary market for foreign exchange was reported to be around 6.3 Yuan/US dollar, well above the official rate of 3.72 Yuan/US dollar (Australian Financial Review, August 19, 1988). Since transactions in these secondary markets are a legal means of transferring foreign exchange between entities, these rates do not reflect the risk premium likely to be associated with black market transactions. Rather such high rates in the secondary market would appear to reflect a very marked overall shortage of foreign exchange.

Figure 1 Supply, demand and price of foreign exchange



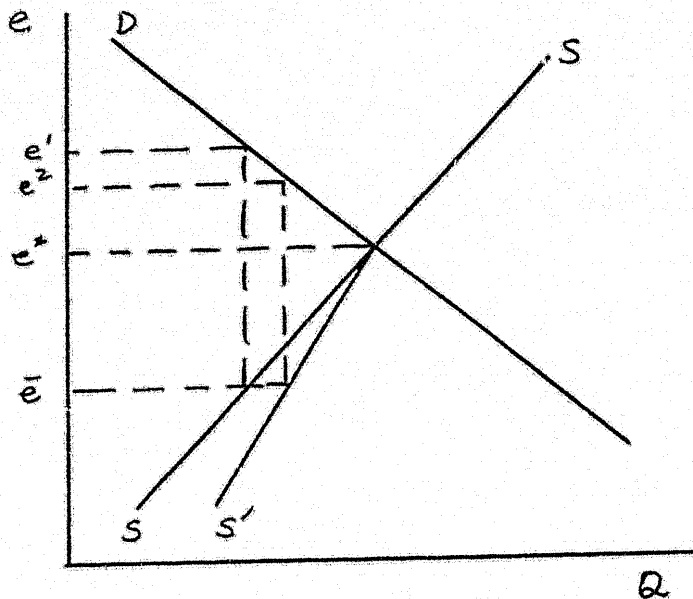
The rate for foreign exchange on a relatively free secondary market for foreign exchange such as the Shanghai market allows a very rough estimate of the degree of overvaluation to be made. On the basis of the evidence on price responsiveness presented earlier, it can be assumed that the supply of foreign exchange is an increasing function of the price of foreign exchange. Similarly, the demand for foreign exchange can be expected to be a downward sloping function of its price, with a higher price discouraging use of

foreign exchange for imports and diverting purchases to domestic sources of supply. Given these assumptions, the market for foreign exchange can be represented by the short-side disequilibrium model presented in Figure 1 and discussed in more detail in the Appendix. This figure corresponds to the repressed deficit case considered by Desai and Bhagwati (1979), a model which appears appropriate in the light of China's success in avoiding excessive trade deficit problems throughout most of the 1980s. In this model, the overvaluation of the exchange rate is maintained by some form of restriction on imports constraining the total value of imports to equal the value of exports (plus borrowing). In China, import licensing and tariffs are important components of the process of restricting trade.

In the disequilibrium model depicted in Figure 1, the supply of foreign exchange is determined by the official exchange rate. At this rate, the demand for foreign exchange exceeds the supply. The domestic price, or scarcity value, of foreign exchange is, however, determined by the 'short side' of the market, in this case the supply side. Because the supply of foreign exchange at the official rate, q_0 , is less than supply at the equilibrium rate, e^* , at which supply and demand would be equated, foreign exchange acquires a scarcity value depicted by e^1 . If the slopes of the supply and demand curves are equal, which does not seem an unreasonable assumption, the equilibrium exchange rate would lie half way between the official exchange rate and the secondary market rate.

The simplified representation of exchange rate determination presented in Figure 1 omits some key features of the market for foreign exchange. The first is the extent to which enterprises, or the provincial authorities responsible for enterprises, are entitled to retain a certain proportion of their foreign exchange earnings. The effect of this foreign exchange retention scheme is to shift the supply curve of foreign exchange to the right over that portion of the curve for which foreign exchange remains in shortage. As long as the official rate is below e^* , foreign exchange will command a premium and the potential value of retained foreign exchange earnings, either directly for purchasing inputs or through their sale on the secondary market, provides an incentive for enterprises to increase their exports. Thus, in Figure 2, the new supply curve of foreign exchange S' is drawn to the right of SS at all exchange rates below e^* .

Figure 2 Supply, demand and price in the presence of a Foreign Exchange Retention Scheme



As is evident from Figure 2, the effect of a foreign exchange retention arrangement is to increase the supply of foreign exchange and to drive the secondary market price down from e^1 to e^2 . Tam (1987:9) estimates that the average retention rate of local authorities, ministries and enterprises was around 30 per cent in 1986 while Zhang (1987:52) points to a wide range of retention ratios for different products and regions, with most commodities appearing to be in the range 25 to 100 per cent.

Where the base rate of 25 per cent retention applies, the usual practice is for 12.5 per cent to be allocated to the enterprise and 12.5 per cent to the provincial government. Even with a relatively large divergence between the official exchange rate and the secondary market rate, such a retention rate provides only a limited incentive to exporters. It appears, however, that provincial governments frequently respond to this incentive by encouraging the enterprises under their control to expand their production for export.

As was noted in Section 2, the retention rate applying to a substantial proportion of trade is probably now substantially above the base rate of 25 per cent. The introduction of the experimental system under which exporters in the arts and crafts, textile and clothing and light industry sectors receive a 70 per cent retention rate means that some of China's most important exports are now covered by this much higher retention rate. While this system generally applies to the FTCs, rather than directly to the producing enterprises, the increased ability of enterprises to choose between FTCs, and the possibility of negotiation between the FTC and the enterprise over a range of factors such as price and the supply of material inputs presumably means that price signals are transmitted fairly effectively.

The foreign exchange contract system also allows enterprises to obtain a higher rate of foreign exchange retention for above-plan exports. The introduction of this system, and the experimental system of higher retention rates has been associated with a reduction in the extent of distortions in both product and input markets. Under both systems, it appears that export subsidies are not available on marginal units of production. Further, the higher rates of foreign exchange retention have been associated with reductions in the central allocations of material inputs. For wool, in particular, it appears from author interviews that central purchases of wool for distribution through the allocation system at fixed prices had declined to 50 per cent or less in 1988.

Given the stimulus to exports now provided by the foreign exchange retention arrangements and the foreign exchange contract system in China, the degree of overvaluation may be greater than was initially assessed. By increasing the incentive to export, and hence increasing the available supply of foreign exchange, the retention arrangements can be expected to bring the secondary market price closer to the official price, as is evident in Figure 2. Thus, the current equilibrium price of foreign exchange is likely to be nearer to the 6.3 to 7.0 Yuan/US dollar quoted in the secondary markets than the official rate of 3.72 Yuan/US dollar. The equilibrium exchange rate has undoubtedly risen (i.e. devalued) substantially in 1988 given the current high rate of inflation.

4. IMPLICATIONS OF THE FOREIGN EXCHANGE SYSTEM FOR TRADE

The major implications of China's foreign exchange system are those arising from the overvaluation of the currency and the consequent disincentive to exports. In addition, it creates an incentive for individuals to devote time and resources to non-productive activities such as attempting to increase their access to artificially scarce foreign exchange.

The most direct effect of an overvalued exchange rate is to lower the price obtained for exports. If the price of an export good on the world market is P^* , the price received by a domestic enterprise for a unit of the good exported is eP^* . If the exchange rate is overvalued, e is too low and hence eP^* is reduced accordingly. Devaluation of the currency increases e and hence increases the domestic price of the good.

The increased price of exports following a devaluation raises the supply of exports. If China is a price taker on world markets for a particular commodity, this increase in the supply of exports will increase the foreign currency value of exports. In fact, as long as the world demand for a particular export has a demand elasticity greater than one in absolute value, the increase in exports will increase the supply of foreign exchange. Devaluation will also tend to increase the flow of foreign exchange from other sources, such as remittances.

A second consequence of overvaluation flows from its negative effect on the supply of foreign exchange. Since the total available supply of foreign exchange is reduced, total expenditure of foreign exchange must be correspondingly reduced. This effect is brought out in Figure 4, where the total supply of, and demand for foreign exchange, is reduced from q^* to q_1 . While one of the justifications frequently offered for maintaining an overvalued exchange rate is to encourage the import of capital to facilitate development, the effect of overvaluation must be to reduce total imports. Any purchases of capital equipment must therefore be made from within a diminished total supply of foreign exchange, and hence are likely to face increased competition from other claims on foreign exchange. Unless a particular category of imports can obtain a substantially larger share of the total available foreign exchange than it would in an undistorted situation, the level of its imports must decline.

As was noted in the previous chapter, if foreign exchange is allocated between the competing demands on the basis of the returns available in each use, then a scarcity premium will develop. The cost of foreign exchange to an enterprise will be e' , above the equilibrium exchange rate e^* , which in turn is above the official exchange rate e . Where an enterprise has access to a secondary market for foreign exchange or 'foreign exchange adjustment centre' this scarcity premium becomes explicit, either as an increase in the cost of purchasing imports, or as the opportunity cost of using foreign exchange when the scarcity premium ($e' - e$) could be obtained by selling it in the market. If enterprises do not have access to a secondary market, the scarcity premium is just as real, although it will vary substantially between enterprises.

As Dervis, de Melo and Robinson (1981) have demonstrated, the effects of the foreign exchange overvaluation on the economy will depend upon whether scarce foreign exchange is allocated using a secondary market, or some other allocation rule. If a secondary market is used, the value of foreign exchange, at the margin, will be the same in all cases. By contrast, if a relatively arbitrary, but plausible rule such as equiproportional reductions in all imports demands is used, the marginal efficiency conditions will be violated and the overall efficiency losses will be greater.

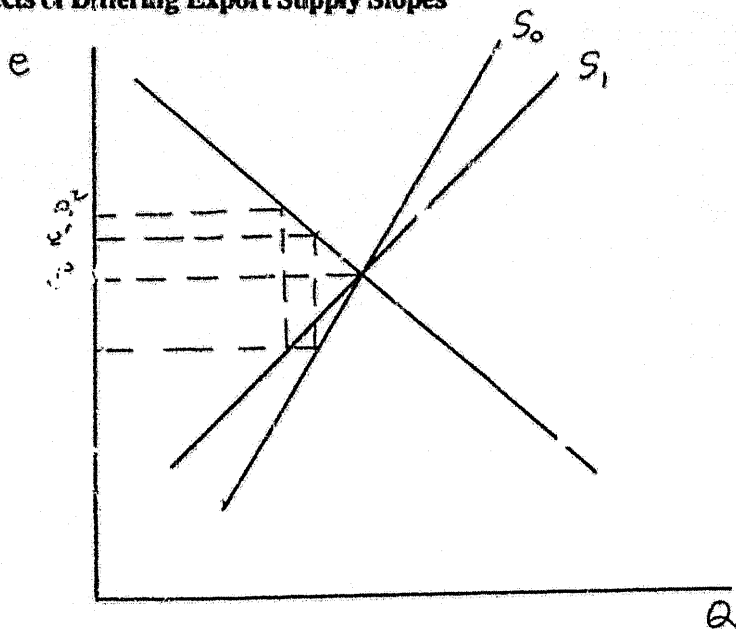
The effect of exchange rate overvaluation is the same as a tax of $(e^* - e)$ on exports and a tax of $(e' - e^*)$ on imports. The relative size of these effects depends upon the relative slopes of the supply and demand curves. If the supply of foreign exchange is less responsive to price, then any given degree of overvaluation will have a smaller effect on the import sector than would otherwise be the case, as can be seen in Figure 5. By contrast, the less price responsive the demand for foreign exchange, the greater is the impact of foreign exchange overvaluation on the price of imports.

The implicit tax on exports with an overvalued exchange rate clearly tends to reduce the size of the export sector. The implicit tax on imports, however, has the opposite effect on the import-competing sector. The scarcity of foreign exchange created by overvaluation,

and its consequent high price, means that many goods which could be imported at lower cost are, instead, produced domestically.

The political pressures to stimulate imports of investment goods and raw materials, which contributed to the original decision to overvalue the currency, are likely to further stimulate the domestic production of 'non-essential' or 'luxury' goods by reducing the share of imports allocated to such goods. It seems likely that this has happened in China. Wong (1985:270) points to very high profit levels in watchmaking, for instance. This factor may also contribute to the widespread concern amongst Chinese authors about the apparent bias towards consumer goods, at the expense of heavy industry, in recent years (CESRRI 1987:12). Once production of substitutes for importable consumer goods is established, its demands for raw materials and parts add to the overall demand for foreign exchange, intensifying the overall shortage of foreign exchange. Measures such as the use of import licensing to prevent the import of additional assembly lines may help to reduce the severity of this problem but, if the profit incentive remains, are likely to result in even higher cost responses, such as domestic production of assembly lines.

Figure 4 Effects of Differing Export Supply Slopes



While the overvalued exchange rate regime stifles the production of exportables, and stimulates the production of importables, it has exactly the opposite effect on consumption of these commodities. Domestic consumption of goods which continue to be exported is stimulated by their low price, while domestic consumption of importables is discouraged by their artificially high price. Given the apparently large degree of overvaluation of the Yuan, these relative price effects are potentially important in markets such as the fibre market

where importables such as wool and synthetics compete directly with an exportable such as cotton.

5. IMPLICATIONS FOR THE FIBRE AND TEXTILE MARKETS

It appears that the major administrative and policy influences are very different between the fibre and textile/clothing sectors and so the characteristics of each have been considered in turn.

5.1 The market for fibres

Up to 1984, the market for wool was relatively tightly controlled, with the price paid to producers determined by the state (Du 1987:13). There was no negotiated price or over-quota price and so, presumably, price had very little role in determining the quantity produced. Since 1985, however, the price of a number of commodities including wool has been liberalized, allowing more flexibility than was previously available, with an apparent dramatic increase in demand and the prices paid (Du 1987:16).

As was noted in Section 2, the supply of cotton in China appears to be highly price responsive, and the new agricultural marketing arrangements appear to allow much greater price flexibility in this market. As China appears, at this stage, to be an exporter of cotton, the current overvaluation of the currency can be expected to artificially depress the domestic price of cotton.

The market for synthetic fibres appears to be heavily controlled, with imports of synthetic fibres and the chemicals used to produce them strongly restricted. The objective of this policy appears to have been to protect the synthetic fibre industry, in which China is unlikely to have a comparative advantage. The tariff structure provides for very high effective rates of protection to these activities (World Bank 1988). Recently, however it has been reported that retail prices for synthetic fabric have been reduced, perhaps reflecting some reduction in emphasis on this objective.

Demand for wool has increased dramatically in recent years, as is evident from the data presented in Table 4. The main factors underlying this expansion appear to be the rapid growth in incomes in China in recent years, increasing urbanization, and changes in styles of clothing (Angel, Simmons and Coote 1988). While domestic production increased by over 80 per cent between 1975 and 1986, this rate of growth was substantially below the growth in consumption of almost 230 per cent over the same period (see Table 4). Wool production actually peaked at 101 million kg in 1982 and has since declined. As a consequence, imports of wool have risen from 14.7 million kg in 1975 to 124 million kg in 1986, an increase of almost 750 per cent. Imports have been above 20 million kg since 1978, and exceeded domestic production in 1985 and 1986. Clearly, based on these figures,

wool production appears likely to be an import competing industry for some time. By contrast, the substantial volume of wool contained in fabric and garment exports implies that the woollen textile industry is strongly export oriented.

Table 4 Wool production, consumption and trade (kt, clean weight)

	Production	Raw wool imports	Net domestic consumption ^a	Exports ^b
1975	52.3	14.7	63.4	3.6
1976	67.9	17.4	80.0	5.3
1977	69.9	17.9	79.6	7.3
1978	71.1	24.1	86.7	8.5
1979	79.9	22.3	92.5	9.7
1980	92.0	28.3	112.4	7.9
1981	94.5	53.4	115.0	32.9
1982	101.0	84.1	137.7	47.4
1983	97.0	73.1	144.8	25.3
1984	91.5	39.3	152.0	21.3
1985	88.5	92.6	163.0	18.1
1986	95.0	124.0	175.0	44.0

^aRefers to the quantity of wool finally consumed, rather than to mill use.

^bRaw wool equivalent, virtually all in processed form.

Source: Australian Wool Corporation/International Wool Secretariat.

The raw cotton market has behaved very differently from the wool market, with output growing strongly since the early 1980s, while consumption appears to have grown much less rapidly. The cotton industry now appears to have the ability to export raw cotton on a fairly consistent basis, as long as domestic prices provide a sufficient return to producers. Basic data on production, state purchases, exports and imports of raw cotton are presented in Table 5.

The most pronounced change evident in Table 5 was the increase in raw cotton production over the period, and particularly the dramatic increase between 1979 and 1984, when cotton production virtually tripled. Also of interest is the slump in cotton production in 1985 and 1986 from the high level of 1984. Estimated mill consumption of cotton increased dramatically over the period, with expansion of the textile industry, although estimated consumption appears to have declined in 1985 and 1986. The extent of any decline in consumption is almost certainly exaggerated. Stock levels were very high after the bumper harvest of 1984, and have undoubtedly enabled domestic consumption to remain temporarily above the estimated levels. However, the apparent decline in production raises questions about the implications of current price levels for production and exports.

Table 5 Production, state purchases, exports and imports of raw cotton (kt)

	Production	Purchases	Exports	Imports	Apparent ^a mill consumption
1975	2055	2237	1061	177	1171
1976	2049	1886	877	188	1360
1977	2049	1980	406	181	1824
1978	2167	2096	342	509	2334
1979	2207	2081	269	549	2487
1980	2707	2610	99	898	3506
1981	2868	2872	11	801	3658
1982	3598	3416	74	474	3998
1983	4637	4586	681	223	4179
1984	6258	5212	202	34	4267
1985	4147	4318	349	-	3798
1986	3541	3794	558	-	2983

^aCalculated as Production - Exports + Imports. Makes no allowance for stock changes.

Sources:

Some basic statistics on chemical fibre production, imports and total availability are presented in Table 6. From these figures it is clear that total chemical fibre production has been rising rapidly, but not as rapidly as consumption. Thus, imports have also been rising rapidly, and have made up around half of total consumption of chemical fibres. Given these figures, and the fact that synthetic fibre production is a highly capital intensive process in which China is unlikely to have a comparative advantage, it seems likely that China will remain a net importer of synthetic fibres for some time.

Data on the purchase prices of wool and cotton are presented in Table 7 to provide some information about the price incentives for the production of cotton and wool in China.

As can be seen from Table 7, the purchasing price of wool (on a clean basis) was around three times the price of cotton in the 1975-78 period. When the purchasing price of cotton was increased in 1980, however, the price of wool remained virtually unchanged and the ratio of the price of wool to the price of cotton fell to around 2 until wool prices rose in 1985, returning the wool/cotton price to around 3. Presumably, the increase in wool prices in 1985 was a consequence of the price reforms initiated in 1985 was a consequence of the commodity marketing reforms of 1984, and is therefore likely to be sustained given continuing strong demand.

Table 6 Production, imports and availability of chemical fibres

	Production kt	Imports kt	Availability kt
1975	155	108	263
1976	146	169	315
1977	190	205	395
1978	285	268	553
1979	326	215	541
1980	450	411	861
1981	527	629	1156
1982	517	434	951
1983	541	398	939
1984	235	530	765
1985	948	831	1779
1986	1017

Sources:

Table 7 Purchase prices of raw wool and cotton in China

	Greasy wool Yuan/kg	Cotton Yuan/kg	Ratio of wool to cotton price (clean basis) ^b
1975	3.06	2.07	2.96
1976	3.12	2.02	3.10
1977	3.28	2.08	3.20
1978	3.40	2.28	3.00
1979	3.40	2.68	2.50
1980	3.43	3.17	2.20
1981	3.48	3.12	2.2
1982	3.58	3.24	2.20
1983	3.66	3.42	2.20
1984	3.73	3.42	2.20
1985	5.04	3.22	3.10
1986			

^aIndex.

^bAssuming a clean yield of 50 per cent for wool.

Source:

Since wool is an importable, and cotton has been an exportable, the domestic wool to cotton ratio would be expected to be above the international price ratio for the same quality commodities because of the overvaluation of the currency.

5.2 The textile market

In contrast with the situation at the fibre level, it appears that the retail price of woollen fabric is very much higher than the retail price of cotton fabric. Even allowing for the greater width of the wool fabric relative to cotton (1.5 m rather than 1 m), the difference between the two prices is striking. With the raw wool/raw cotton price ratio around 3 to 1, a 10 to 1 price ratio at the retail level requires explanation. While wool requires substantially more processing to convert it from the raw state to finished fabric, it seems unlikely that these additional costs could explain the greater divergence between the fabric prices. From interviews with wool and cotton processors in Shanghai and Guangzhou, it appears that labour costs, in particular, make up only a small proportion of total costs. A relatively high retail price for wool would be easily explained if woollen products were importables, and cotton products exportables. However, as was evident in Table 7, China remains a substantial exporter of woollen goods.

Another indication that domestic prices of wool fabric may have been kept high relative to export parity can be obtained by examining the export unit value series. For the limited time period over which these data are available (1982-86), it appears that the per metre price of worsted wool fabric exports has been substantially below the average retail price of woollen and worsted fabric. Part of the difference between the two series could be due to retailing costs, although these are likely to be relatively low in a low labour cost country such as China. Another contributing factor is the 30 per cent tariff on imported wool, which is rebated on wool which is used in export products. However, the use of worsted fabric data for unit export values raises the unit value of exports relative to the retail price series which includes generally lower priced woollen fabrics.

In contrast with wool, the export unit values for cotton are in most cases, above the retail price. This is consistent with the price of cotton fabric, a basic consumer staple, being held below the returns available on export markets. Another possible explanation would be that these export unit values are affected by quota rents on binding MFA quotas, and that marginal export returns obtainable from non-MFA markets are somewhat lower. This argument would also apply to exports of woollen fabric unless quotas on woollen fabric are non-binding.

Table 8 Retail prices and export unit values for woollen and cotton fabric

	Wool ^a retail price Yuan/m	Wool ^b export unit value Yuan/m	Cotton retail price Yuan/m	Cotton export unit value Yuan/m	Wool/ cotton retail ratio
1975	15.5	-	1.60	-	9.7
1976	16.2	-	1.60	-	10.0
1977	16.0	-	1.60	-	10.0
1978	16.7	-	1.60	-	10.4
1979	17.1	-	1.60	-	10.7
1980	18.1	-	1.58	-	11.4
1981	18.6	-	1.59	-	11.8
1982	18.5	12.8	1.60	1.72	11.6
1983	18.1	11.9	1.80	1.59	10.0
1984	20.3	12.5	1.59	1.77	12.8
1985	22.8	13.0	1.70	1.75	13.4
1986	..	12.9	1.80	2.20	..

^aAverage for woollen and worsted fabrics.

^bWorsteds fabric.

Source:

Several possible explanations for the volume of wool exports remaining substantial while the domestic price is well above export returns need to be examined. Perhaps the most likely cause of this difference is the relative loss of fibre identity at higher levels of processing, where value added becomes increasingly important as a share of the total value. This explanation would be consistent with a much higher share of wool in garment exports than in fabric exports. This hypothesis does appear to be consistent with the actual pattern of exports. While wool accounts for only 0.4 per cent of Chinese fabric exports, it makes up 4 per cent of garment exports (AWC 1988:14). Given the importance of other inputs in the production process, and the differences between final products, an increase in the price of wool would be expected to reduce its share of the total export market, but not necessarily drive it out of the market altogether.

Other, regulatory-type considerations probably also contribute to the continued presence of wool exports despite such an unfavourable export/domestic price ratio. One such factor is the partial separation between domestic and export production sectors. Wool imports for domestic use are subject to import licensing and customs duties, while imports of wool for production of exports are exempt from duty and unconstrained by import licensing. Presumably, enterprises which are able to retain all or part of their foreign exchange earnings and convert them to Yuan on the secondary market find exports profitable. Another possible explanation for continuing exports is the a requirement that

relatively autonomous enterprises maintain some sort of foreign exchange balance in their activities.

The high foreign exchange retention rates allowed to some inland provinces (Zhang 1987) would be consistent with these provinces wishing to export wool products. This factor, plus the probable under-pricing of raw wool in the past would have provided an incentive for them to discourage the flow of wool to the traditional coastal textile and garment making regions, and may well have contributed to the much discussed 'wool war' (AWC 1988).

5.3 Qualitative assessment of the effects of a change in exchange rate policy

From the basic structural information presented in this paper, some initial, tentative, assessment of the effects of removing or relaxing the overvaluation of the Yuan can be made. Such an exploratory, quantitative analysis is often useful as an initial step in an analysis. It complements more formal analysis of model structure and may reveal linkages which are difficult to represent in a formal model and could perhaps therefore escape notice.

From a hypothetical equilibrium

From a hypothetical equilibrium, removal of the overvaluation of the Yuan would be expected to result in the following changes:

- (1) **A fall in the price of domestic raw wool and in domestic wool production.** Since wool production is an import competing industry in China, the scarcity premium on foreign exchange makes its price higher than in the situation of foreign exchange equilibrium. A devaluation, by reducing the scarcity of foreign exchange, would make wool cheaper.
 - This assumes that the authorities react to the increase in the availability of foreign exchange by uniformly relaxing the import licensing regime which, after all, was introduced as a means of dealing with this problem..
- (2) **A rise in the price of exportable woollen garments.** The rise in the price of exports following a devaluation would stimulate the diversion of some woollen garments from the domestic to the export market, raising the prices of these garments on the domestic market.
 - While the effect of this development on China's demand for wool for use in export processing would be favourable, the negative impact on domestic demand would be adverse for the global demand for wool. However, in practice, the domestic price of wool apparel appears to be very high because of the restriction on supplies imposed by import licensing, and a relaxation of import controls associated with liberalisation may mean that the domestic price of wool garments would actually fall.
- (3) **A rise in the price of cotton.** Since the cotton fibre industry appears likely to continue to be able to operate as an export industry (although this assumption needs to be carefully examined following the recent production decline and the increase in demand for land associated with rapidly rising demand for food), a devaluation might be expected to raise its price. This would be beneficial for substitute products such as wool and synthetics.

- (4) **A fall in the price of synthetics.** Since this industry is import competing, increased availability of foreign exchange and a lower scarcity premium following a devaluation would lower import prices and hence the price of domestically produced fibre. The fall in synthetic prices would be a negative factor for wool, although synthetic fibres are now used extensively in wool blends, possibly reducing the extent of competition between the two fibres.
- (5) **An increase in Chinese demand due to an increase in Chinese incomes and living standards.** This would be a strong positive factor given the apparently very high income elasticity of demand for wool in China (Angel, Simmons and Coote 1988).

In this situation, the overall impact on world wool demand would depend upon all of these impacts. The reduction in Chinese wool production would be a positive factor and the rise in the price of wool products in the Chinese market would be negative factors, while the increased supply of Chinese exports onto world markets would lower the average costs of transforming wool into garments and hence expand total wool consumption. The substitution effects between wool and cotton and wool and synthetics would probably be very largely offsetting. The overall effect would probably depend heavily upon the effects of the reform on Chinese income levels. If this were substantial, as seems likely, then the overall demand for wool would strengthen and world prices would tend to rise. If external sector reform were coupled with, or acted as a catalyst for the reform of internal constraints such as those imposed by the virtual absence of a labour market (CESRRI 1987), the effects on income could be substantially larger (Srinivasan 1984).

6. MODELLING THE EFFECTS OF CHANGES IN CHINA'S FOREIGN EXCHANGE REGIME

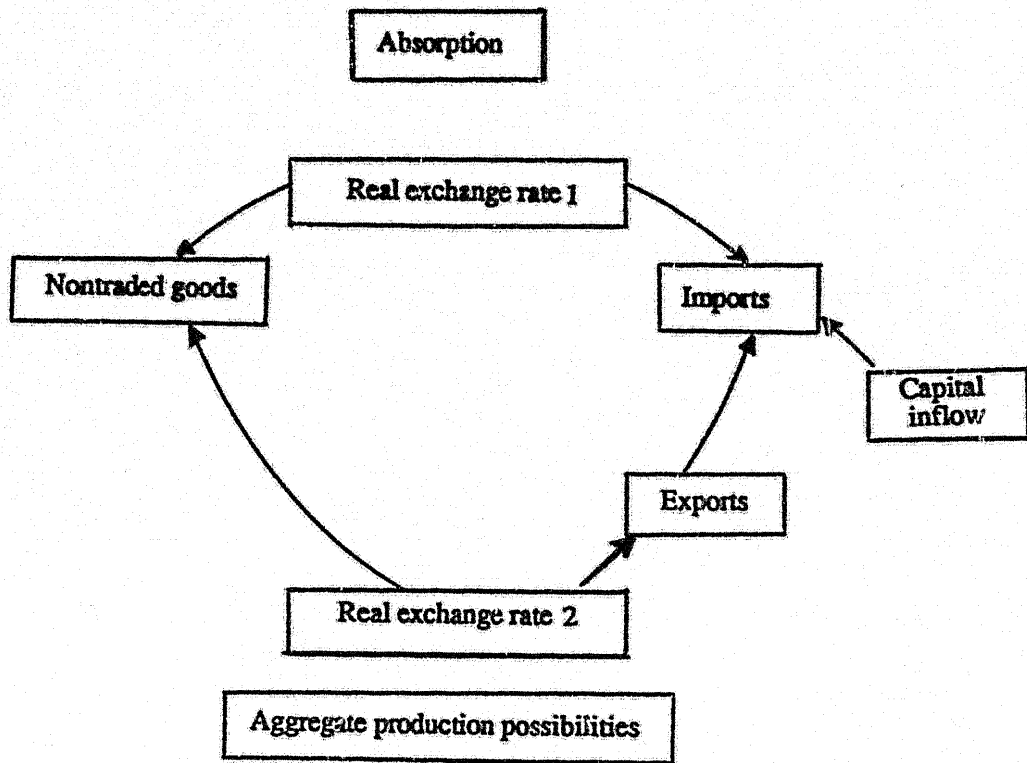
Prior to designing any model, it is very important to consider the major features of the system under study. Thus, the first part of this Section is devoted to a schematic consideration of the major features of the system. Following this, part 6.2 contains a discussion of some of the major modelling issues involved. Finally, a general model framework is set out in part 6.3.

6.1 The System Under Study

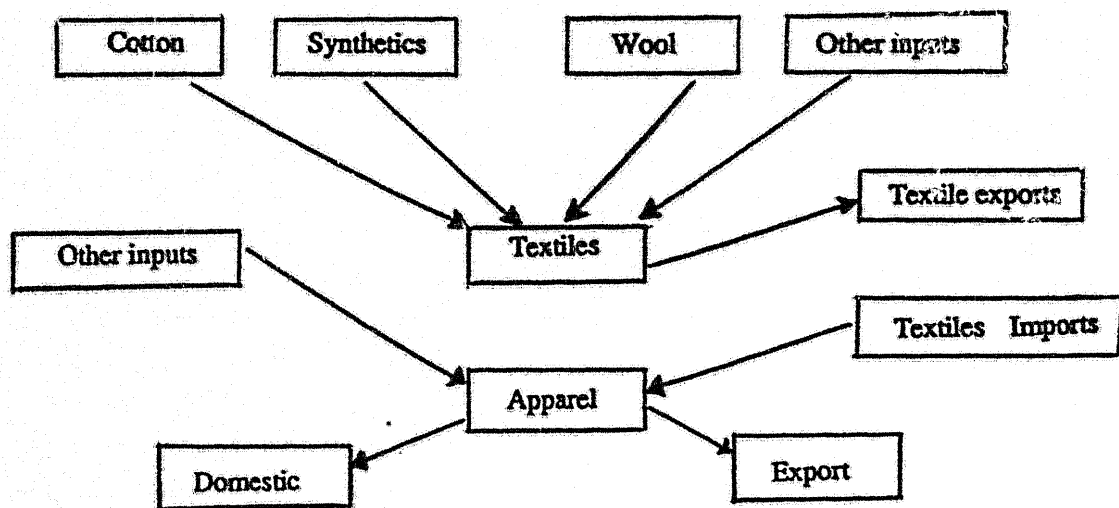
The system under study can be divided into three major components: China's macroeconomy, the Chinese textile and apparel sectors, and the world markets for textiles and apparel. These three broad components of the system are depicted in Figure 6.1.

The first component of the system is China's macroeconomy. The price of imports relative to nontraded goods is determined within this system, as is the price of exports relative to nontraded goods. The system as depicted can determine only relative prices. If, however, some means of determining the absolute price level is introduced, then all of the nominal prices can be determined.

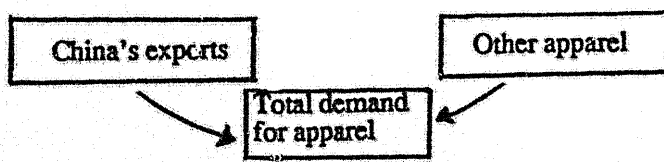
Figure 6.1 Macro model



Textile/apparel market



World market for apparel



The next section of the figure deals with the textile/apparel market. Within the market, the three major classes of fibre inputs are combined with other inputs (materials, labour, capital) to produce textiles. Relative prices (including exchange rate effects) influence the allocation of these textiles between the domestic and export markets, with the vast majority of production being utilized domestically. Domestic textiles, and some imported textiles, are combined with other inputs to produce apparel. The relative prices obtained from the domestic and export markets then influence the allocation of apparel between the domestic and export markets.

The final panel of Figure 6.1 shows the world market for apparel, in which China's exports compete with products produced in other countries. An outward shift in China's export supply schedule has both substitution and expansion effects within the world market. The effect is an increase in China's market share at the expense of other apparel producers. The market expansion effect is the increase in the size of the total market brought about by the increase in the supply of exports from China. Protection in the world apparel market reduces both the substitution and the market expansion effects of increases in China's exports.

The overall effects of changes in China's foreign exchange policies on the world market for fibres depend upon their impacts both on domestic demand for wool in apparel, and the effects of increased Chinese apparel exports on the global demand for apparel wool. Clearly, any model of the system under study needs to capture these important features of the market.

6.2 Modelling Issues

The effects of the exchange rate system are inherently general equilibrium in nature. It affects, and is affected by, all of the key aggregates in the system and any satisfactory model must take into account these interactions. Even the simple graphical model developed earlier in this paper and in Appendix 1 was general equilibrium in character.

Unfortunately neither the simple graphical analysis presented earlier, nor the qualitative analysis in the previous section can allow us to capture the inter-relationship between the macro-aggregates and the micro-variables, such as wool imports, of immediate concern. The number of variables involved and the complexity of their inter-relationships also rules out the use of purely theoretical models.

One means of overcoming this problem is to develop a computable general equilibrium model of the Chinese economy, with particular disaggregation of the wool, cotton and synthetic fibre industries, and the textile and garment sectors. Dervis, de Melo and Robinson (1981) have demonstrated the feasibility of using such a model to analyse foreign exchange shortages and models of this type can incorporate considerable detail at the individual industry level.

The technology for constructing such models has improved dramatically with the development of the GEMPACK suite of programs in the IMPACT project, making it possible to focus more on the economics, rather than the modelling issues. The two World Bank papers (1985a, b) provide a consistent input-output table and estimates of many of the relevant parameters (e.g. income and price elasticities) needed to construct a model of the ORANI type (Dixon, Parmenter, Sutton and Vincent 1982). The major shortcomings of these data for the purpose are the lack of distinction between domestic and imported intermediates in the intermediate use matrix and the degree of aggregation of the agricultural sector (into crops and animal husbandry) sector and the textiles and clothing sector (one industry). The somewhat dated nature of the database (1981) is also of some concern given the dramatic changes in the structure of the economy in recent years. More fundamentally, the database is based largely on the official prices, rather than the free-market prices which are relevant for resource allocation at the margin.

In recent years, models of the CGE type, with appropriate modifications, have been used extensively to analyse post-reform centrally-planned economies (Kis, Robinson and Tyson 1985). In applying this technique to contemporary China, a number of adaptations of the techniques used in modelling other developing countries (Robinson 1988) will be required. The more important of these adaptations would include: modelling the effects of the foreign exchange retention scheme; incorporating command-plan levels of some imports and exports; adapting the input-output and price data to reflect open-market rather than quantity-constrained official prices for material inputs; incorporating restrictions on labour mobility, particularly between urban and rural activities; and incorporating import licensing for some categories of imports. Appropriate adaptations to capture the effects of these factors appear to be feasible.

Given the major changes in the Chinese economy associated with policy changes and rapid economic growth, any modelling exercise can lead, at best, only to a highly stylized representation of the economy. Even given this constraint, modelling work can provide many useful insights. It provides an explicit framework for analysis, which frequently leads to the discovery of important, but otherwise overlooked, causal linkages. Thus, for instance, the Dixon, Powell, Sutton and Vincent (1982:61) discovered the 'Keynesian' behaviour of the neoclassical ORANI model in response to a demand shock only after applying such a shock to their numerical model. Similarly Stoeckel's (1979) small CGE model of the Australian economy highlighted the major differences between a resources boom resulting from a mineral discovery and one resulting from an increase in the price of minerals. The objective of this modelling exercise is to develop a model which, while highly stylized, does capture the main economic features involved and provides some insights into the operation of the system.

6.3 The Model

The model developed in this section is of the broad ORANI type (Dixon *et al* 1982; Vincent 1987). Major features of this type of model are that it is linear in percentage changes, and that domestic and imported products are imperfect substitutes. Another standard feature of these models is a two level representation of technology in which intermediate inputs are demanded in fixed proportions to the output level of each industry and total primary factors are also demanded in fixed proportions to output. Changes in output levels thus require changes in the level of primary factor inputs which, in the presence of any fixed factor, requires substitution between factors. In general, this is represented using CES (Constant elasticity of Substitution) technology, although more (or less) flexible production structures are available.

In the model developed in this paper, several adaptations to this general pattern are made to account for particular features of the system under study and the available data. Because of the focus of the study on the fibre market, the Leontief or fixed proportions assumption is too strong in the case of fibres used in the textile industry. Thus, this assumption is relaxed to allow for inter-fibre substitution according to a CES technology.

For many goods, there are marked differences between the characteristics of the product produced for the export market and that produced for the domestic market. These differences involve both the physical characteristics of the goods and the package of services involved in their marketing. To capture these differences, it is assumed that products sold on the domestic market are differentiated from those sold on the export market. These differences are represented using a Constant Elasticity of Transformation (CET) functional form (Robinson 1988).

In the short run version of the model, capital is assumed to be fixed in each sector. It would be relatively straightforward to build a longer run version of the model in which the capital stocks in each industry were endogenous, although this would introduce some difficulties in formulating investment functions which have been avoided in formulating the current model. To simplify matters, and in the absence of a well developed theory of investment for China, investment in each sector has been specified as simply increasing in line with total real absorption. As is common in short run models, investment does not add to the effective capital stock. The underlying time period is assumed to be sufficiently long for new equipment and machinery to be installed, but not brought into production.

Given the focus of the study on foreign exchange and trade policies, it seems reasonable to omit an explicit representation of fiscal behaviour. The

model is constrained so that the current account deficit is a constant proportion of gross domestic product. Implicitly it is assumed that whatever adjustments to fiscal policies and foreign borrowings are needed to achieve this outcome are made by the authorities. Given the recent stabilisation of China's foreign borrowing (do Rosario 1989), this appears to be a reasonable assumption.

6.4 Data and Structure

The broad structure of the model was determined by the problem under study, subject to the availability of data. As discussed above, the initial source of data was the World Bank (1985a) input-output table for 1981. While this structure is somewhat dated given the rapid development and policy change which has occurred, it should give at least some indication of the effects of broad policy changes. At this stage, the World Bank table appears to be the best available, but a new and much more detailed table is currently being prepared in China. Development of a prototype model at this stage will facilitate more detailed modelling when this table becomes available.

The table used contains 23 sectors, with each sector producing only one commodity (World Bank 1985a:55). Purchasers' prices are used instead of Basic Values. To increase the comprehensibility of the final model, and to facilitate sensitivity testing with respect to parameters, the final model contains only five major sectors: Agriculture, Heavy Industry, Light Industry, Construction, Transport and Services. A number of quite small sectors of particular interest are separated out from these major sectors. These sectors are:

- . Wool production
- . Cotton production
- . Synthetic fibre production
- . Cellulosic production
- . Textile production
- . Apparel production

The broad structure of the model is evident from table 6.2.

The major modification required for the input-output part of the database is the replacement of the official prices used in the calculation of the 1981 database by the free market prices which now guide resource allocation at the margin (Sicular 1988; Byrd 1987). Free market prices for particular commodities have been collected from a range of sources and the ratio of these prices to the official prices is being used to recalculate the value shares. Some difficulties have emerged with data availability and reliability, but it seems feasible to develop reliable estimates at the level of aggregation required in this study. The implicit assumption that the underlying input-output quantity relationships are

7

stable is reasonably strong given the evidence on productivity growth in agriculture following liberalisation (Macraillan, Whalley and Zhu 1987), but this assumption is ubiquitous in input-output based models. When the new table becomes available, it will be possible to assess the extent of changes in these coefficients and their implications.

The use of free market data, rather than the state prices applying to inframarginal deliveries is essential for modelling of the emerging price responsive economy in China. This has important implications for the type of data which will be required for future modelling developments. If the data are based on official prices, or an average of state and domestic market prices, the so-called social average prices, then complex retrospective adjustment will be required before the data can be used for modelling purposes.

6.5 The Equations of the Model

The full set of equations making up the model under construction is presented in Table 6.3.

The first seven equations of the model specify demands for each good. Of these equations, the first four relate to final demands by households, for investment and for government consumption. The demand elasticities are being derived using available estimates of income elasticities for each good, budget share data and an estimate of the Frisch parameter (see Dervis, de Melo and Robinson 1981) and so will satisfy all of the theoretical constraints such as homogeneity in prices and nominal income, symmetry and adding up.

The second and third equations specify investment as proportional to total real absorption. In the absence of a suitable theory of investment behaviour, this assumption is at least relatively neutral in its effects on model behaviour. Government behaviour is also assumed to change only in line with changes in total real absorption.

Export demand is specified in equations 5 and 5(a). In these equations, the demand for China's exports of particular goods depends upon the price of its products relative to those of other countries. This substitution is specified for convenience using a Constant Elasticity of Substitution functional form. Equation 5(a) specifies the size of the total world market for good i as a function of a weighted average of China's exports and production in other countries. Equation 5(a) is only required for the apparel market in this study.

Intermediate demands are specified in equations 6 and 6(a). For all goods except textile fibres, these demands are simply proportional to output levels in the using industry, industry j . This is simply a consequence of the Leontief assumption generally employed to model material inputs in models of this type. For textile fibres, however, this assumption is replaced by a CES function which

TABLE 6-3 STRUCTURE OF THE CHINA MODEL

A. Demands for Goods

1. Household Consumption Demands

$$q_i^{(3)} = \varepsilon_i a_R + \sum_{k=1}^2 \eta_{ik} R_k^2 \quad g$$

2. Fixed Investment Demand

$$q_i^{(2)} = a_R \quad g$$

3. Investment in Stocks

$$q_i^{S(2)} = a_R \quad g$$

4. Government Demand

$$q_i^{(5)} = a_R \quad g$$

5. Export Demand

$$q_i^{(4)} = q_{W_i}^{(4)} - \sigma_i^W \left(p_{is}^e - \sum_{s=1}^2 E_{is} p_{is}^e \right) \quad g$$

$$q_{W_i}^{(4)} = B_i \cdot \left(\sum_{s=1}^2 E_{is} p_{is}^e \right) \quad (s = 1, \text{China}; 2, \text{Rest of World}) \quad 1$$

6. Intermediate Demands (excl textile fibres)

$$q_{ij}^{(1)} = x_j \quad g^2-4$$

Demand for fibres by textile industry

$$q_{ft}^{(1)} = x_t - \sigma^f \left(p_{fk}^f - \sum_k F_k p_{fk}^f \right) \quad 4$$

NB. These replace the Leontief eqns applying to all other intermediate inputs

7. Domestic Absorption of Good i from all Sources

$$q_i = \sum_j B_{ij}^{(1)} q_{ij}^{(1)} + B_i^{(2)} q_i^{(2)} + B_i^{S(2)} q_i^{S(2)} + B_i^{(3)} q_i^{(3)} + B_i^{(5)} q_i^{(5)} \quad g$$

8. Domestic / Import Substitution

$$q_{is} = q_i - \sigma_i^m \left(p_{is} - p_i^2 \right) \quad 2g$$

$s = 1, \text{domestic}; 2, \text{imported}$

9. Transformation in Production

$$x_{id} = x_i + \sigma_i^T \left(p_{id} - p_i^x \right) \quad 2g$$

10. Gross Output of Good i

$$x_i = \sum_{d=0}^1 J_{id} x_{id}$$
g

11. Primary Factor Inflows

$$q_{vj}^p = x_j - \sigma_i^p (p_{vj}^p - \sum_{v=1}^3 S_{vj}^p p_{vj}^p)$$
3g

12. Market Clearing Conditions (Products)

(a) Domestic market clearing

$$q_{i1} = x_{i1}$$
g

(b) Export market clearing

$$q_i = x_{i2}$$
g

13. Factor Market Clearing

(a) $q_l^p = \sum_{j=1}^2 L_j q_{lj}^p$ - Labour 1

(b) $q_{vj} = h_j$ - Capital in g

(c) $q_{vj} = l_j$ - Land in g

14. Zero Pure Profits at the Margin

(a) In Production

$$\sum_{d=1}^2 J_{id} p_{id} = \sum_j H_{ij}^{(1)} p_j + \sum_{v=1}^3 H_{vj}^p p_v^p$$
g

(b) In Importing

$$p_{i2} = p_{i2}^m + t_i + \phi_2$$
g

(c) In Exporting

$$p_{i0} = p_i^e = v_i + (1-R)\phi_1 + R\phi_2$$
g

15. Identities and Nominal System Constraints

15 (a) $gdp_r = \sum_i K_i x_i$ 1

15 (b) $gdp = \sum_i K_i (p_i^x + x_i)$ 1

16 (a) $a_R = \sum_i W_i q_i$ 1

16 (b) $a = \sum_i W_i (p_i^z + q_i)$ 1

17. Constraining Absorption to a Fixed Share of gdp

$$a - gdp = k$$

18(a) Total Exports at Official Prices

$$e = \sum_i V_i (p_i^e + \phi_i)$$

(b) Total Imports at Official Prices

$$m = \sum_i M_i (p_i^m + \phi_i)$$

(c) Balance of Trade at Official Prices

$$b = T_e e + T_m m$$

19(a) Price Deflator for gdp

$$p^x = \sum_i k_i p_i^x$$

19(b) Price Level Determination

$$p^x = m - gdp_r$$

19(c) Price Deflator for Total Absorption

$$p^a = \sum_i W_i p_i^a$$

19(d) Price Deflator for Absorption of i

$$p_i^a = \sum_{s=1}^2 A_{is} p_{is}$$

19(e) Price Deflator for Production of i

$$p_i^x = \sum_{d=0}^1 J_{id} p_{id}$$

TOTAL NUMBER OF EQUATIONS

$$g^2 + 23g + 13$$

Endogenous Variables (Percentage Change)

Variable	Description	No.
a	Nominal absorption	1
a_R	Real absorption	1
b	Balance of trade at official exchange rate	1
e	Exports at official exchange rate	1
gdp_R	Real gdp	1
gdp	Nominal gdp	1
m	Imports at official exchange rate	1
p_i^e	Foreign currency price of export i $s=1, \text{China: } 2, \text{Row.}$	2g
p_{uv}^p	Return to primary factor u in ind. i	2g+1
p_i^c	Composite price for absorption of i	1
p_i^a	Price for absorption of i	g
p_i^k	Price of i in 0, 1, 2, 3 Exports, Domestic, Imported	3g
p_i^x	Price for prodn of i (Composite of dom & exp.)	g
p^z	Aggregate price of prodn (gdp deflator.)	1
q_i	Total absorption of i	g
$q_i^{(1)}$	Intermediate use of i by ind. j	g ²
$q_i^{(2)}$	Stock demand for good i	2g
$q_i^{(3)}$	Household demand for i	g
$q_i^{(4)}$	Export demand for i	g
$q_i^{(4)}$	World demand for apparel	1
$q_i^{(5)}$	Government demand for i	g
q_{is}	Demand for i by source $s=1, 2: \text{Dom, Imported}$	2g
q_{vj}^p	Demand for primary factor u by industry j	3g
x_j	Output level of industry j	g
x_{id}	Dem Supply of good i to domestic (1) or export (0) mkt.	2g
ϕ_R	Free market exchange rate (Foreign Exchange Adjustment Coef.)	1

Total No of equations endogenous variables

$$g^2 + 23g + 12$$

Exogenous Variables $\beta_j =$ Ratio of absorption to gdp K_j - Capital stock in industry j L_j - Land use by industry j P_{i2}^m - Foreign currency price of imports of i P_{i2} - Export price of R.O.W. (except apparel) q_i - Total labour force t_i = Tariff rate on imports of i v_i = Export tax on exports of i ϕ = Official exchange rate αR^* = Retention rate weight on official & secondary mkt returns.
(Parameter in ordinary simulations)Coefficient $A_{i,j} =$ Share of absorption of i derived from sources $B_{i,j}^{(1)} =$ Share of intermediate use in j in total absorption of i $B_{i,j}^{(2)} =$ Share of investment in total absorption of commodity i $BS_{i,j}^{(2)} =$ Share of stock demand in total absorption of commodity i $B_{i,j}^{(3)} =$ Share of household consumption in total absorption of commodity i $B_{i,j}^{(5)} =$ Share of government in total absorption of i $E_{i,j} =$ Share of China and R.O.W. in world markets for i $H_{i,j}^{(1)} =$ Share of intermediate good j in total costs of industry i $H_{i,j}^{(2)} =$ Share of primary factor v in total costs of industry j $J_{i,j} =$ Share of domestic market product⁽¹⁾ & exports (0) in total prodn of i $K_i =$ Share of i in total value added. $L_j =$ Share of industry j in total employment $M_i =$ Share of i in total imports $S_{i,j}^p =$ Share of primary factor v in primary factor inputs of j $V_i =$ Share of i in total exports at official prices $W_i T_R =$ Share of imports/exports in trade balance at official prices $W_i =$ Share of good i in total absorption

allows for substitution between fibres. Some indication of the likely order of magnitude of this parameter can be obtained from Harris's recent study of inter-fibre substitution (Harris 1988).

Equation 7 aggregates total absorption of each good, including intermediate use, stock demand, household demand and government demand. Export demand is not included in equation 7 because export and domestic products are assumed to be differentiated.

Equation 8 represents substitution in demand between domestic and imported products of the same industry using a CES functional form to allocate total demand, q_j , between domestic and imported sources. Equations 9 represent the corresponding process by which domestically produced goods, x_j , are transformed between domestic market products and export products. The g equations of the form shown in 10 aggregate total output across domestic and exported products.

The 3g equations with the form shown in 11 represent the demands for the primary factors of land, labour and capital. In the absence of changes in relative factor prices, the demand for each factor will be proportional to the output level in industry j . However, changes in relative prices can allow changes in the mix of primary factors and allow expansion of the composite primary factor bundle.

Equations 12(a) and 12(b) are market clearing conditions for the domestic and export markets for each good. There is no need for a market clearing condition for imported goods because they are assumed to be in perfectly elastic supply - the semi-small country assumption. Given this assumption, the level of imports is determined only by demand.

Equations 13(a-c) are market clearing conditions for the primary factor markets. The change in the total supply of labour is constrained to equal the sum of the proportional changes in the demand for labour weighted by the shares of total employment in each sector. The stock of capital and of land available to each industry is exogenously set in 13(b) and 13(c).

The zero pure profit conditions specified in equations 14(a-c) impose the condition that, at the margin, there are no pure profits in production. Clearly, when the existence of infra-marginal delivery quotas and rationed supplies of inputs or goods is taken into account, there will be some pure profits in the system. However, these have no implications for production or consumption decisions and can be ignored in this model, which does not incorporate distributional effects. Within this model, the function of these equations is to allow for price determination. It assumes only that at the margin there are sufficient firms competing actively for pure profits to be eliminated.

In formulating equations 14(b) and 14(c) it is assumed that there are zero profits in importing and exporting. As in the case of domestic production, there are clearly some infra-marginal profits earned, and losses covered, in this case by

the Foreign Trade Corporations. The returns to exporters consist of the export price in foreign currency, P_i^e , times a weighted average of the official rate E_1 and the secondary market rate, E_2 , less any export taxes. In equation 14(c), this relationship is expressed in proportional change form using appropriate weights for the two exchange rates. At the margin, however, the price of imports is equal to the foreign price adjusted to domestic currency using the secondary market rate, plus any tariff imposed on good i . Import licenses and quotas have been ignored because they appear to be motivated primarily by the need to save foreign exchange. In this case, their restrictive effect will operate in the model through the secondary market exchange rate.

Equations 15(a) and 15(b) express nominal and real gdp as the weighted sum of output in each sector. Equations 16(a) and 16(b) express absorption in a similar way. Equation 17 imposes the fundamental constraint that the trade deficit is a constant share of gdp. Changes in the right hand side of this equation change the share of gdp which the current account deficit can represent.

Equations 18(a) and 18(b) are simply definitional identities designed to make changes in these variables explicit.

Equations 19(a) and 19(b) introduce the nominal price level into the model. Based on Chow's (1987) analysis, the price level in the model is expressed as a simple function of the money supply in equation 19(b). This specification implicitly rules out any interest elasticity of money and leaves money neutral in the absence of rigidities such as a fixed nominal exchange rate. Since this model, like the ORANI model (Dixon *et al* 1982) is likely to be relevant to a period such as two years, this lack of interest rate behaviour is not likely to be a serious problem.

An initial version of the model has been written in the GEMPACK program and most of the relevant data collected. Simulation results from the model should be available in the relatively near future.

7. Conclusions

The basic purpose of this paper was to provide an initial assessment of the likely implications of changes in China's foreign exchange and foreign trade regime on the demand for wool, and hence to develop an approach to analysis of the problem.

The first question addressed in the paper was whether the major sectors of the Chinese economy are now sufficiently price responsive for the exchange rate to have a major influence on behaviour. From all the available evidence examined, it seems clear that this is the case even though important elements of planning remain and the transmission of price signals is still inhibited in some cases. While these factors will tend to reduce the responsiveness of the economy to price changes, it seems that changes in prices resulting from the foreign exchange system are likely to have major effects on resource allocation throughout the economy.

All the evidence surveyed points to the conclusion that the Yuan is currently overvalued, with the effect of discouraging exports and imports and encouraging the production of import substitutes such as many consumer goods. By choking off socially desirable exports and creating a scarcity of foreign exchange, the overvaluation actually makes the price of foreign exchange to those who need it higher than it would be under a more liberal regime. Consumption of exportable goods is artificially encouraged while consumption of imported goods is generally discouraged. By discouraging socially desirable exports and imports, the overvaluation also lowers national income.

Removal of the overvaluation would have a number of effects on the wool market. The direct effects on relative prices would be likely to include lowering the domestic price of synthetics, but raising the price of cotton. The price of an import-competing material such as wool would normally be expected to fall but, based on the data, this price already appears to be very low relative to the price of cotton. Similarly, the price of an exportable such as wool fabric would normally be expected to rise, but the domestic relative price of these goods already appears to be very high. The effects of any reform on income levels and hence on consumption will be critical given the apparently very high income elasticities of demand for wool in China.

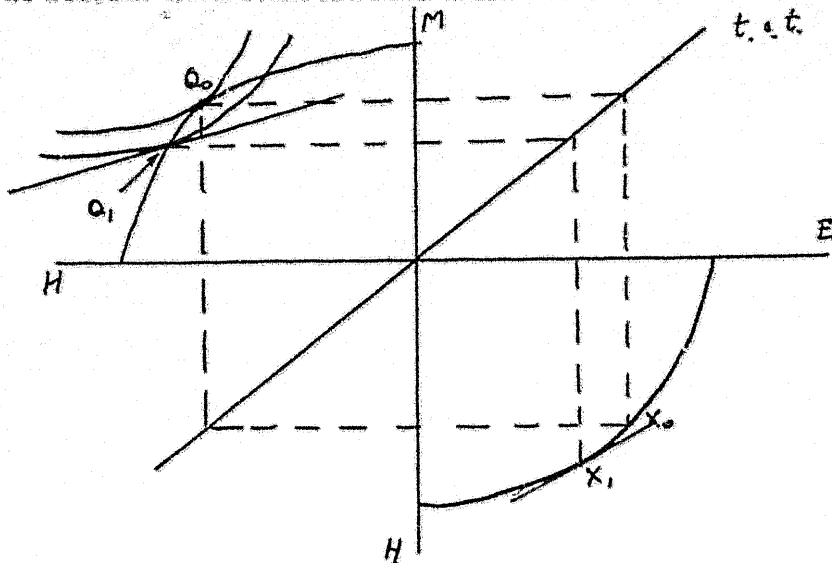
Quantitative models to estimate the effects of possible foreign exchange regimes would require a relatively detailed model of the fibre, textile and garment industries together, ideally, with an economy-wide model to capture the pervasive effects of the foreign trade regime on the economy. Some form of quantitative analysis appears feasible in a reasonable time frame given recent developments in computer software. The development of such a model is the next step to be undertaken in this analysis.

Appendix 1

Effects of Exchange Rate Overvaluation on Relative Prices and Production

The stylized representation of exchange rate determination presented in Figures 1 and 2 can be derived from a model of differentiated product trade such as that by de Melo and Robinson (1988). In this model, domestic resources and technology give rise to the production possibilities frontier (HE in Quadrant 4 of Figure A.1) representing the feasible combination of Home (H) and Export (E) goods.

Figure A.1 Production and Trade in a Differentiated Product Model of the Economy



Export goods are used to purchase imports (M) at a constant price indicated by the slope of the terms of trade line in Quadrant 1. The consumption possibilities frontier, HM, can then be traced out. The common slope of this line and the Community Indifference Curve at point Q_0 define the real exchange rate in the absence of intervention. This real exchange rate P_M/P_H corresponds, for a given foreign price P_M^* , and a numeraire value of P_H , to the equilibrium nominal exchange rate e^* depicted in Figure 1.

Exchange rate overvaluation which lowers the price received for exports relative to the price of home goods and causes a move around the production possibilities frontier from X_0 to X_1 . To maintain equilibrium in the home goods market, requires a rise in the price of imports, and a fall in absorption, as depicted in the move from Q_0 to Q_1 . Given a fixed foreign price of exports and imports, and with the price of home goods fixed as the numeraire, the high price of imports corresponds with the high foreign exchange rate for import transactions, e' , depicted in Figures 1 and 2.

The diagram advanced in Figure A.1 provides an explicitly general equilibrium basis for the extremely simple representation of the foreign exchange market in Figures 1 and 2. In Figures 1 and 2, the effects of overvaluation (or undervaluation) on real income are not considered, since these are likely to be relatively small in a static model. If allowance is made for the longer term losses associated with the use of an overvalued exchange rate and a consequently less open economy, these losses are likely to be greater. Further, if the restriction on imports is brought about by import licensing, there are likely to be additional income losses associated with rent-seeking behaviour. Hopefully, however, the simple model presented in Figures 1 and 2 provides a clear, if simplified, indication of the basic cause and effect of overvaluation.

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