

# Enabling China's Agri-Food Sector

*responding to challenges with foresight, infrastructure, institutional and enterprise reform*

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## Disclaimer and Acknowledgements

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## Abstract

Our main purpose is to discuss how prospects for China's agri-food sector critically depend on the efficiency, commercial orientation, and responsiveness of China's transportation system and intermediaries in the agri-food value chain. To provide context, we first examine the role that demographics play as a driver of growth and change in China's agri-food sector and the economy at large. Two main findings stand out: (i) China's population will become increasingly urban over the next 50 years; (ii) China's economic "demographic dividend" will expire in the late 2020s. These two demographic drivers motivate the discussion that follows.

An increasingly urban population means that China's society and economy must continue to evolve from one based on subsistence and local conditions to one that is market based and responsive. But a market economy also requires a well-functioning, efficient and responsive transportation and handling network. China's transportation infrastructure has been improving steadily. Improvements in its road and vehicular infrastructure have been some of the most important catalysts of growth and competition. Its internal waterways, although improving, remain significantly underutilized. China's railways have made noteworthy improvements in their passenger service but arguably been the least responsive mode to commercial incentives for freight transport. China has not been able to fully exploit its comparative advantage in high value, labour intensive perishable agri-food products due to its underdeveloped transportation and handling facilities and services for perishable goods. We discuss prospects and possibilities for dealing with these limitations.

The fact that China's "demographic dividend" will expire in the late 2020s means that reforms will have to be undertaken sooner rather than later if China is to reach its goal of being a middle-income developed country by 2050. A review of China's agri-food value chain suggests that primary agriculture and retail sector are competitive and responsive to incentives. This is attributable - at least in part - to the large number of market participants and limited jurisdictional curbs on competition among participants. But value chain intermediaries appear to be less responsive and efficient. Farmers and retailers have been handicapped by jurisdictional fiefdoms of intermediaries, perverse incentives in the value chain, and transportation bottlenecks. These act like a tax on producers, retailers and consumers alike, reducing what producers receive and increasing consumer prices, while also lowering choice.

Analysis indicates that, consistent with experience elsewhere, industries and enterprises that are coddled as a result of being designated as of strategic importance are less efficient and responsive than those that are not afforded such protection. If China is to realize its full potential and meet its objectives for both the economy and the agri-food sector, commercial intermediaries in the value chain must be weaned of public support and become more efficient and responsive to market signals. Overall, efforts to promote pluralism and choice for producers and consumers and encourage competition across geographic and institutional jurisdictions will foster growth and improve the welfare of China's citizens, particularly so for those in interior provinces.

## Enabling China's Agri-Food Sector

### 1. Introduction

Fifty years ago, China was a war-torn economy, emerging from one of the most tumultuous periods in its history. Even two decades ago, at the end of the Cultural Revolution, the outlook was grim. Today, China is the world's fastest developing nation, growing at rates unimaginable 50 years ago, a transformation no one predicted. This should caution anyone against making any confident forecast for China in the next 50 years. Instead, our focus is on China's putting in place enabling infrastructure and engaging in institutional reform that will promote and foster growth and adjustment in its rural areas and agri-food sector.

China is again emerging as a major player on the world's stage, and its economic strength and influence will continue to increase for some time. The economic gains from legal, institutional, and market reforms as well as greater trade and integration with international markets have become increasingly apparent to China's leaders and citizens. Discourse within China has shifted from a focus on whether or not China should engage in trade and exchange with the outside world to a focus on the speed with and degree to which China should open its doors. Critical determinants are the magnitude of economic gains, effects on the level and distribution of incomes and social well-being, and prospective impacts on political stability.

Rural areas, rural enterprises, and the agri-food sector have played key roles in China's on-going reforms and development. As is the case worldwide, China's agri-food chain must - of necessity - become more responsive to consumer and societal preferences and demands. But China's challenge is greater because adjustment was constrained for over three decades, China's adjustment must now be faster and deeper than elsewhere.

In this paper, we examine the challenges China faces in making this adjustment in the context of demographic change. In particular, we examine major trends in rural to urban population migration and in the age structure of China's population. These demographic phenomena both precipitate and respond to changes and adjustments throughout China's economy and society. Foresight is required if China is to take advantage of the opportunities and mitigate the potential adverse consequences these trends imply. Here, the main focus of our attention on implications for and prerequisite adjustments in China's transport infrastructure and agri-food value chain.

### 2. Demographics as a Major Driver in China's Economy and Agri-Food Sector

In this section, we examine the broad demographic trends underway in China. These trends will impact upon both China's productive capacity and the evolving nature of China's agri-food markets. As China is defined as much by its people as its terrain, an examination of demographic developments is a good place to start our discussion.

China's population is projected to increase from around 1.3 billion now until it reaches 1.45 billion some time around the year 2030, declining slowly thereafter until it is just under 1.4 billion in 2050. China's urban population is projected to increase from just over 450 million in 2000 to almost 970 million by 2050, a whopping increase of 520 million people (figure1). Part of this increase,

**Figure 1: China's Urban and Rural Populations 2000-2050**



Sources: Personal Calculations, China National Bureau of Statistics, and Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2002 Revision and World Urbanization Prospects: The 2001 Revision, <http://esa.un.org/urpp>, 19 September 2003

around 130 million, will be attributable to the “natural” increase of the urban population. The lion’s share, some 390 million, will come about through rural-to-urban migration, with China’s urban population exceeding its rural population for the first time some time around 2015. China’s population will move from the current situation where there is a 65:35 rural-urban split to a 30:70 rural-urban split in the year 2050. While the challenges posed by these trends are staggering, they are not insurmountable.

## 2.1 Age Structure

The portion of China’s population aged 25 to 64, considered the most productive working years, will increase from 52.7 % in the year 2000 to 57.3 % in 2015 falling thereafter to 49.9 % in 2050. China’s elderly population, those 65 years of age and older, is expected to increase steadily from 6.8 % in 2000 to 22.9 % in 2050. The percentage of all cohorts under 25 years of age is expected to fall steadily from 2000 to 2050.

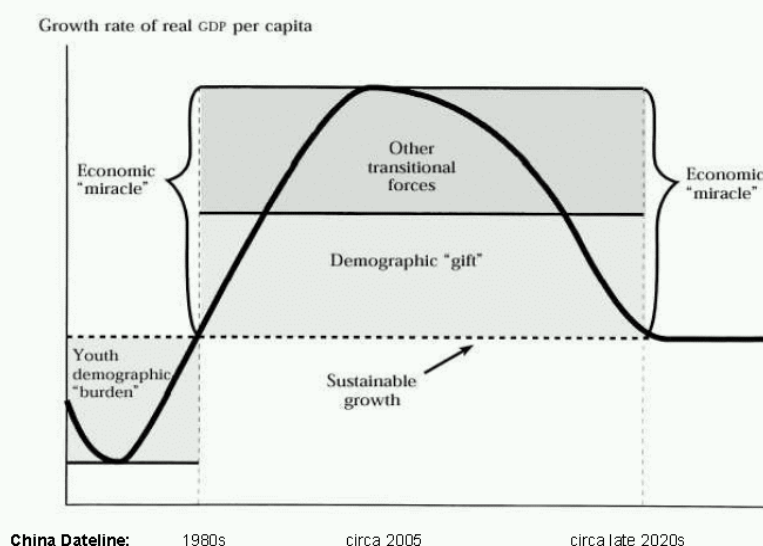
The numbers of children and young people aged 0 to 4, 5 to 14, and 15 to 24 are projected to drop by roughly 15 million, 41 million, and 20 million respectively between 2000 and 2025, as the propensity to have children declines. Concurrently, the numbers of folk aged 25 to 64 and over 65 are projected to increase by 139 million and 107 million. The numbers of young people will decline even further by 2050. When compared with 2000, those aged 0 to 4, 5 to 14, and 15 to 24 will drop by roughly 24 million, 69 million, and 44 million by 2050. There will be an increase of more than 232 million people over aged 65 between 2000 and 2050.

The proportion of China’s population that is of working age is expected to peak surprisingly soon — it will exceed 68 % some time around the year 2010, falling thereafter to reach 56 % around 2050. Concomitantly, the proportion of China’s population that is considered “dependent” will fall just below 32 % in 2010 and then rise to around 44 % in 2050. Expressed as a ratio, the working age population will be almost 2.2 times the dependent population in 2010. The ratio will remain “healthy” (at 1.7 or more) until 2030, but will fall to 1.3 by 2050.

Bloom and Williamson (2002) observe the important role that demographic elements have played in economic growth, particularly in the “miracle” economies of Asia. At the risk of oversimplifying, Bloom and Williamson note that as much as 40 % of improvement in growth and productivity could be traced to a “demographic dividend” or “gift” that arose with falling household sizes, lower dependency ratios, and other demographic trends. Japan’s “miracle” began in the late 1950s and appears to have subsided in the 1990s. The “miracles” of Chinese Taipei, Hong Kong, Singapore, and Korea began in the 1970s and are expected to slow between 2010 and 2020.

Within Bloom and Williamson’s framework, China’s “demographic dividend” probably would have begun in the late 1970s. However, China’s circumstances prevented the dividend from being realized until the 1980s when China began implementing policy and institutional reforms. If good governance can be maintained, these mutually re-enforcing drivers of growth and improvements in productivity will fuel China’s economy up until the late 2020s. Thereafter, the “demographic dividend” will decline (figures 2 and 3).

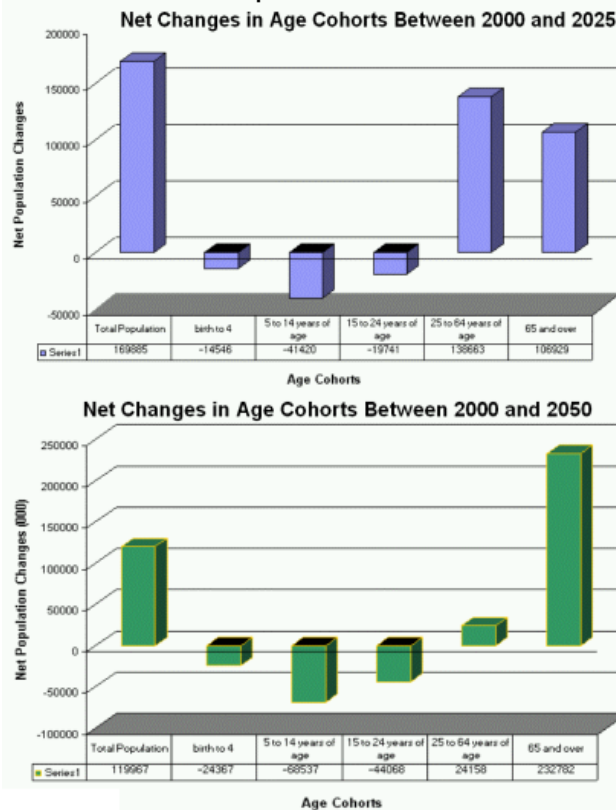
**Figure 2: Demographic Dividends and China’s Growth Prospects**



Source: adapted from Bloom, D. and J. Williamson (2002) Demographic Transitions and Economic Miracles in East Asia, World Bank Economic Review 12(3), pp 419-55.

## 2.2 Rural-Urban and Sectoral Populations and Migration Patterns

**Figure 3: China's "Demographic Dividend" will expire in the late 2020s**



Rural to urban migration and the process of urbanization have had and will continue to have profound impacts on the China's economy. Overall agri-food productivity in China is expected to rise as migration results from and contributes to farm labor rationalization, greater specialization, more efficient allocation of resources, and increased rural-urban trade. Migrants have also proven to be important catalysts in improving both rural and urban productivity as they help to ease credit constraints through remittances and facilitate the flow of information, technological change, and investment back to rural areas.<sup>1</sup>

In the past two decades, China has facilitated rural-urban and sectoral migration by gradually relaxing and in some cases repealing measures designed to control or limit it. For example, the household registration (or hukou) system and the collective approach to rural land tenure historically hampered rural to urban migration and adjustment between sectors. These systems underwent reform after the Household Responsibility System (HRS) was introduced between 1978 and 1984. The HRS, along with the introduction of market-type incentives like the two track pricing system, spurred productivity gains in the agri-food sector in the early to mid-1980s.<sup>2</sup> Initial productivity gains freed rural labor and resources for other economic activities, giving rise to a boom in township and village enterprises (TVEs) in the late 1980s and 1990s. China's official statistics indicate that the number of rural workers with non-farm employment in local rural enterprises almost doubled from 67 million in 1985 to 127 million in 1999.

As rural economic activity expanded, so too did labor migration from rural areas to urban centers. Differences in urban and rural incomes were so great and the demand so strong for laborers to do difficult or unpleasant work, policies to discourage migration became less effective. While some obstacles have been removed or mitigated, many remain. China's leaders recognize this and have expressed their intention to reduce the severity of the "peasants' burden", improve rural infrastructure and services, and further reform the household registration system.

Rural to urban migration and regional migration has largely been driven by socio-economic factors (see figure 4, illustrating income differences), but retarded by political and institutional considerations. Migration across provinces has occurred but has been modest relative to rural-urban migration. Generally, migrants moved from rural to urban areas and from the North, Central and West to the East and South.

## 2.3 Implications of these Demographic Trends

There are a number of observations and implications that arise as a result of these demographic factors and trends. The first and most obvious is that, as rural-urban migration continues, Chinese agriculture becomes less and less based on subsistence or local conditions and much more based on markets and incentives. However, the ongoing shift from a

<sup>1</sup> It has been estimated that only 30 % of the credit needs of rural households and small and medium sized enterprises in rural areas are met through official, formal banking and credit institutions (He 2003).

<sup>2</sup> These gains have subsequently been consolidated and augmented by further institutional and policy changes in land, labour and capital markets, and by gains attributable to scientific research and extension efforts.

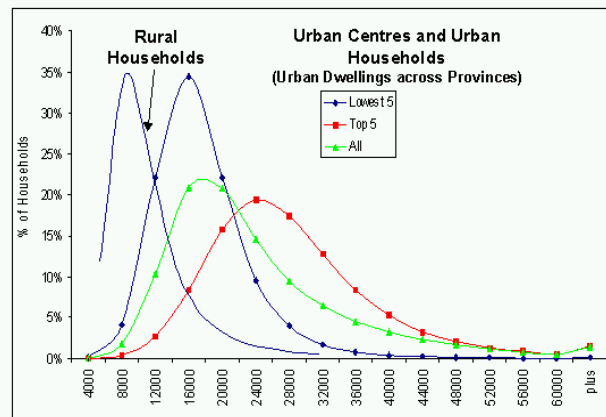


rural to an urban population and from subsistence to a market-based agricultural sector also requires a massive increase in the capacity and responsiveness of China's transportation infrastructure. Without such prerequisite and enabling infrastructure, adjustment will be difficult and opportunities will be foregone. This is why we review developments and prospects for different components of China's transportation network in section 3.

It is also apparent that, over the past two decades, China has reaped the benefits of both the demographic dividend and domestic institutional and policy reform. This resulted in average real per annum growth rates of around 8 percent. Since 1994, however, real growth has slowed as gains from institutional and policy reform have subsided. Nevertheless, while real growth rates have been in decline, they remain in the 4-8 % range and should remain so until around 2015. Thereafter, institutional and policy reform gains will be more difficult to come by. Real growth, if it follows patterns elsewhere, will hover around 4 % per annum until around 2030. Although economic growth will moderate, China's gross domestic product is projected to approach that of Germany before 2010, Japan sometime around 2030. The "demographic dividend" will then have been exhausted. Nevertheless, if "good governance" continues, China's GDP should approach that of the U.S. some time between 2040 and 2050. But this review also tells us that the fundamental mechanisms and incentives for ensuring maintaining growth and productivity must be pretty much in place by the late 2020s if China is to reach its goals of being a middle-income developed economy by 2050. For this reason, we briefly examine the nature of institutional behavior in China's agri-food value chain in section 4, with a particular focus on intermediate stages in the value chain.

Analysts expect that, with time, China to produce more of those products in which it exhibits a comparative advantage and less of those products in which it does not (figure 5). This suggests that China will produce more aquatic products, fruits and vegetables, and certain livestock products as well as labor-intensive value-added products over time and less of land-extensive grain and oilseed products. But we often are caught with simply assuming that China will have in place the efficient and responsive transportation infrastructure and responsive value-added enterprises necessary to deal with these higher value but often perishable products. It also presumes that China can meet the

**Figure 4: Contrasting Incomes Across Regions and Rural-Urban Designations**

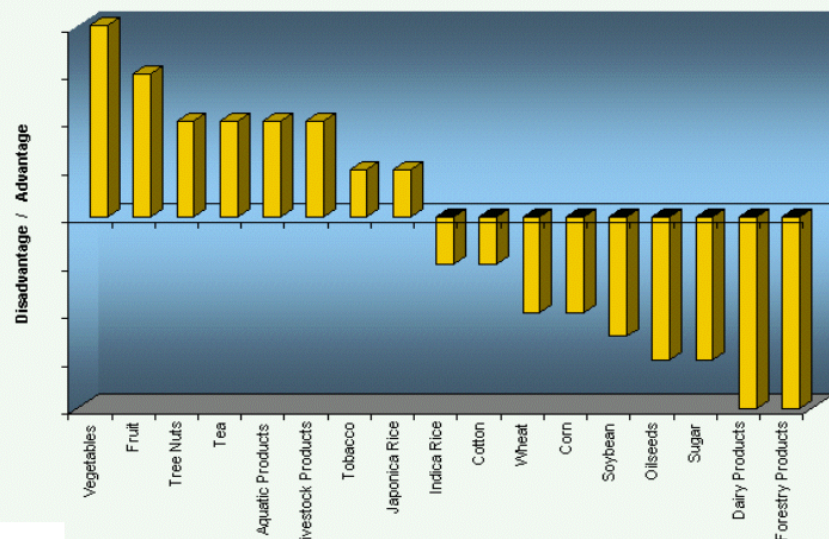


The socio-economic profile varies significantly across regions, municipalities and rural-urban designations. Rural and Urban Households have substantially income different distributions. The incomes of the lowest quintile of urban households still exceed the incomes of the average rural household. It is, therefore, not surprising that rural-urban migration continues. Differences in income are such that 'targeting' is a pre-requisite to success.

Only around 0.6% of households earn more than Rmb 60,000 mb or more per year (~ US\$ 7300).

Sources: China National Bureau of Statistics, World Bank(1997) Sharing Rising Incomes, China 2020: Disparities in China, esp. page 22, and personal calculations.

**Figure 5: Comparative Advantage Assessments: China's Agri-Food Products**



sanitary and phyto-sanitary requirements of market destinations in Europe, East and South-East Asia for the products in which it exhibits some comparative advantage, and that regulators and policy makers elsewhere do not introduce new regulations that serve as trade impediments. In the next two sections, we focus primarily on what might be involved in ensuring that the first two of these conditions - efficient and responsive transportation infrastructure and responsive commercially oriented value-added enterprises - actually occur.

### **3. Transportation and Handling Infrastructure as Critical Enablers**

Efficiency, growth and adjustment in China's primary agriculture and in its agri-food value chain have been hampered the limitations of its physical transportation infrastructure and institutional impediments. In this section, we briefly review the capacity and prospects for the different components of China's transportation infrastructure, as is relevant for the development of modern agri-food markets. Where warranted, we also discuss how China might "enable" the agri-food sector by reforming its institutions in the transportation and handling sector.

If markets are to serve their roles as scarcity indicators and in allocating resources, products and services must be able to move across geographical and jurisdictional boundaries. China's ports, rail, road and waterway networks are the most important means through which arbitrage and contestability in products and services can occur. Road, rail and waterway networks are also fundamental to the development of China's interior provinces; it typically takes as much or more time for produce to travel from China's western provinces to coastal markets as it does for North American produce to cross the Pacific and enter the same markets. As transport and other marketing costs fall, the economy will become more efficient in sending price signals that will realign regional production patterns, eliminate spot shortages, equalize prices, and raise farm incomes in China's interior provinces (Gilmour and Gale 2002).

The efficiency and capacity of transportation and distribution network are critical because they are important determinants of: (a) how much product is lost or wasted between the producer and the consumer; (b) whether markets can function efficiently and whether new entrants can enter markets relatively easily (c) whether the sector can adjust its structure in order to realize economies of scale and specialization. While China plans to further expand its ports, rail, road and inland waterway networks, improvements will not be realized overnight. Transportation bottlenecks, therefore, are likely to place constraints on the movement of agri-food products until at least 2020.<sup>3</sup> Distance from markets and high transportation costs disadvantage producers in interior provinces in particular. An under-developed transportation system results in lower rural incomes, lower incomes in inland provinces, resource misallocation, and slower overall development due to lower levels of efficiency.

#### **3.1 China's Ports**

Ports are the first point of entry into China and the last point of exit from China. Without well functioning ports, China will not be able to fully realize the gains it can make from trade. From 1990 to 2000, while the global shipping industry was contending with over-capacity, China's seaports struggled to keep up with 160 % growth in sea-borne freight. Containerization and inter-modal port facilities account for a growing share of shipping freight and container handling facilities are in particularly short supply.

China's ports will become more specialized as time passes. There already exists a trend toward greater concentration of port facilities with fewer, higher tech coastal hub ports and many smaller inland and seaside feeder ports. The top ports slated for further support and investment are: Shanghai, Ningbo, Tianjin, Dalian and Xiamen. As time passes, China's seaports are dealing sequentially with bottlenecks and difficulties in achieving efficiencies in ship navigation and scheduling, berthing, cargo off loading, inspection, customs clearance, security, and tracking and storage.

Presently, the main container ports are Shanghai, Ningbo, Tianjin, Dalian, Qingdao, Shenzhen, Xiamen and Yantian. With the tremendous increase in container movements, there is a great need in China to develop more deep water berths to accommodate larger container ships; many of China's ports are at the mouths of the rivers which carry great amounts of silt and require constant dredging. Trade prospects for perishable foods and higher value agri-food products - both

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<sup>3</sup>China's leaders are aware of both physical and institutional bottlenecks and are working to resolve them. International agencies like the Asian Development Bank and the World Bank are likewise encouraging investments in China's infrastructure.

imports and exports - will depend in part on the nature and capacity of China's container handling facilities and complementary down-stream handling and distribution services.<sup>4</sup>

Container movements are particularly important for trade in perishable products and products requiring some manner of identity preservation. Containerization and inter-modal facilities are now growing much faster than shipping as a whole. In spite of dramatic increases in container handling facilities, demand for container facilities has far outstripped supply; Shanghai's container traffic volume - now estimated at 6 to 7 million TEUs per year - has grown by 25 % per year since 1994 and shows little sign of abating. Shanghai's TEU volume throughput must grow to over 20 million TEUs per annum by 2015 if it is to meet anticipated demand.

By 2020, Shanghai and its satellites should surpass Singapore and Hong Kong as the world's largest container port, with a total throughput over 30 million TEUs. Otherwise, the development of markets for time-sensitive high value products will be hampered, slowing growth throughout the Yangtze River's economic hinterland. Similar growth must occur in "hub" ports around Guangdong, Fujian, Hebei, and Shandong. These are critical to facilitate trade.

### 3.2 China's Rail System

The Ministry of Railways (MOR) presides over the largest rail network in Asia, employing over 2 million people and operating over 66,000 km of track. The Ministry of Railways (MOR) remains both a branch of government and a quasi-commercial agency. MOR profitability, efficiency and financial viability as well as customer impact were not matters of prime concern in the past, whereas social objectives were very important. Under its old *modus operandi*, the MOR was unable to take the kind of decisions required of commercial enterprises.

Up until the early 1980s, China's railways carried well over 50 % of all goods and people. By the mid-1990s, the rate dropped below 40 % while highway and air transport has increased. In the late 1990s, transport experts projected that rail use would continue falling unless institutional and commercial reforms were undertaken. Because of heavy state involvement in railway operations, foreign investors opted instead to focus on highway projects and port facilities. Railway officials exploited the MOR's monopoly position, were distracted by subsidiary activities (e.g. factories, restaurants) and mixed commercial and social objectives and functions (e.g. hospitals, schools).

This approach is now changing. Senior MOR officials now recognize that it is necessary to separate commercial, regulatory and social functions and to introduce more market mechanisms and competition into the operation of the railways (MOR 2002).<sup>5</sup> The first step envisaged in the MOR reform process is to disentangle "ministry" functions from commercial functions. The reshaped Ministry will be centrally based and will: (a) plan China's national transportation investment strategy, (b) oversee infrastructure construction, repair and maintenance, (c) oversee dispatching and scheduling, (d) regulate rail rates and safety, (e) oversee revenue divisions.

MOR intends to convert today's existing 14 regional administrations into commercial enterprises, although they would remain government-owned under current plans. With time, the 14 "enterprises" are likely to be further consolidated. To introduce dynamism and a degree of competition, analysts suggest that track access rights be opened, territories be redrawn to encourage some overlap, and creating parallel tracks for competing enterprises in some markets. Private interests have expressed interest in branch line ownership and operation, ownership of some railway stations and specialized operations, and container and rail-car ownership and leasing.

While a great number of physical improvements to China's rail infrastructure are underway, a few are worthy of particular note. On the basis of the existing four vertical and four lateral lines, the railway sector is focusing its efforts on the completion and improvement of the network identified in the 9<sup>th</sup> five year plan. Effort is being focused on eight vertical lines (Beijing-Harbin, eastern coast corridor, Beijing-Shanghai, Beijing-Kowloon, Beijing-Guangzhou,

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<sup>4</sup> Over time, China will start to import greater volumes of perishable livestock, dairy, tropical fruit and citrus products.

Concurrently, if problems with water shortages can be overcome, North China in particular is likely to increase its exports of temperate climate fruits and vegetables and possibly perishable pork and poultry products.

<sup>5</sup> Former MOR Minister Han tried to reverse the decline in railway patronage by reducing costs, improving service, increasing train speeds on trunk lines, and working on a heavy-load railway linking important ports with inland industrial cities.

Dalian-Zhanjiang, Baotou-Liuzhou and Lanzhou-Kunming) and eight lateral lines (Beijing-Lanzhou, north corridor, south corridor, land bridge corridor, Nanjing-Xi'an, riparian railway, Shanghai-Kunming and southwest sea outlet corridor). Completion of these links will greatly facilitate movements of people and freight throughout China and improve market integration and contestability across regional markets.

Some international connections are also worthy of mention. A new western line will transit Burqin (north of Urumqi) on its way into Russia. This route will shorten distance and transit times to Russia as most products are currently shipped via the north-east. A subsidiary of this line will link China to Kazakhstan and other countries of central Asia. In the North East, two lines are under construction that will link up with concurrent and complementary efforts in Russia and Mongolia. In the south, rail links to Vietnam, Laos, Thailand and Myanmar will help meet the demands of China's growing trade with South-East Asia. As time passes, such overland links to Central and South-East Asia, Mongolia and Russia will improve welfare in land-locked interior provinces.

Thus far, however, reforms to the efficiency and commercial orientation of China's rail system have been more effective for passenger traffic than for freight. While competition from highway transportation is increasing, it should still be preferable (and more economical) to ship long haul and large volume shipments of bulk products and non-perishable products via rail. This is not always the case, however, as rail shipment is not always reliable nor is it always cost effective. Incentive systems still require some attention; railway administrations and other transportation enterprises are only likely to provide perishable freight facilities, and realize cost savings if there exist rewards for good performance and penalties for poor performance. Managers' incomes, rewards, and tenure must be based – at least in part -- on their ability to realize efficiencies, compete with other transport modes, or meet demand for services. Access to rail transport should not be discriminatory on the basis of the ownership of the goods to be shipped. Likewise, user fees or tariffs for freight should not discriminate on the basis of goods' ownership.

China's efforts to capitalize on its comparative advantages remain hampered by the limitations of its transport system, especially railways. The most severe limitations are with regard to the limited role commercial considerations and competition play. From a physical perspective, the lack of refrigerated cars, containers and supporting infrastructure for the transport of perishable goods to and from inland positions is also a problem. Shandong province and Shaanxi province, for instance, already produce and export temperate climate fruits and vegetables to East Asia and South East Asia. If the foregoing rail transportation inefficiencies and issues relating to water management can be overcome, North China and the eastern Loess Plateau could make further in-roads in international markets for temperate fruits (like apples and pears), vegetables and horticultural products. South Central China may also increase its production and trade in citrus crops, semi-tropical fruit like lichi and longan and some vegetable products and could regain some of the ground it has lost in pork production.<sup>6</sup>

### **3.3 Inland Water Transport**

China possesses an inland waterway system comprising over 5,000 navigable rivers and a total navigable length of 116,500 km, the most extensive inland waterway transport system in the Asia-Pacific region. Most of the country's navigable waterways are located within the courses of the Yangtze, Zhujiang (Pearl), Huaihe, and Helongjiang rivers. The Yangtze and its tributaries currently account for roughly half of the national total. In addition to the major rivers, there is the Beijing-Hangzhou Grand Canal, with a navigable length exceeding 1700 km, but which is expanding as a result of new construction efforts. With most of China's rivers flowing in an east-west direction, the Grand Canal provides a critical north-south link, reducing the need for inter-modal transport as its capacity expands.

Inland waterways are currently under-utilized for long distance bulk commodity transport; freight traffic carried on inland waterways accounts for less than 5 % of total domestic freight movements. There are several reasons contributing this under-utilization: the construction of dams for power and irrigation with no locks for transportation; insufficient

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<sup>6</sup> Commercial reforms will not resolve all of China's rail problems. The geographic imbalance between industrial activity and natural resources is also problematic, as is the economic disparity between inland and coastal regions. Demand for transportation to ship resources and products out of the interior is high, while consumption in those regions is too low to fill inland back-hauls. Empty containers are often shipped into interior provinces for resources to be hauled back to the coast, making transport costly and inefficient. Hence, development of the hinterlands will require more than just a new policy and institutional orientation.



maintenance of infrastructure and fleet; inadequate investment; and shortcomings in barge design. Since the mid-1990s, however, inland water transport has been rising as governments and commercial interests have recognized its cost effectiveness, particularly for long-hauls (> 200 km) and for bulk commodities.

Within the waterway network there are more than 2,000 inland ports, including 85 leading ports. Several of these leading ports each have annual cargo throughput over 10 million tonnes. Wuhan, Chongqing, Wanxian, Fuling, Badong, Yichang, Nanjing, Nantong, Zhenjiang and Zhangjiagang comprise the top 10 inland ports and account for over 80 % of berths capable of accommodating vessels up to 10,000 dead weight tonnes (dwt). The fleet of vessels within the inland waterways now exceeds 230,000, with a total capacity of over 20 million tonnes. Total cargo carried on the inland waterways reached almost 700 million tonnes in 2000 and the total throughput approached 150 billion tonne-km (with an average trip distance > 200 km). The volume of container traffic carried to or from major river ports grew by 26 % per year, from around 100,000 TEU in 1990 to almost 2 million TEU in 2000.

Official plans for the inland waterway network place an emphasis on inland port development and the construction of 20 inland river channels totaling 15,000 km in major north-south and east-west corridors. Port development will involve the construction or upgrading of key ports and their subsidiaries along the Yangtze, Pearl, Heilongjiang, Songhuajiang and Liaohe river systems. Container traffic, critical to the transport of perishable agri-food products, may grow to 7 million TEUs before the year 2015 and reach as high as 15 million TEUs by the year 2030 – provided inland shipping technologies continue to improve and difficulties relating to traversing shallow waters can be overcome. Improved access and lower transport costs implied by such developments will, as discussed elsewhere, provide a boon to inland producers and consumers. The greatest beneficiaries of this investment and improvements in efficiency will be the provinces of South Central China (Sichuan, Hunan, Hubei, Guizhou, Chongqing).

The main challenges facing waterways development are insufficient depth, inadequate river port infrastructure and inadequate inland transport connections. Key areas of focus are inland port infrastructure (particularly cargo handling), transport locks, transport equipment, dredging operations, vessel traffic management, organization and navigation systems and pollution clean-up. Care must be taken to ensure that: (a) transport corridor development is well-integrated, with a major focus on capacity constraints in transport and handling facilities; (b) managerial and technical reforms and training are introduced to take full advantage of new infrastructure – strengthening governance. It is important that efforts to modernize the waterway and the fleet be complementary and proceed in “lock-step” fashion, in order to match the carrying capacity of improved infrastructure. Likewise, waterway tariffs are in need of concurrent reform, but should not discriminate on the basis of vessel or cargo ownership.

### **3.4 China's Roads and Vehicular Transport**

Improvements in China's road system, vehicular traffic, and the competition they have facilitated are some of the most important catalysts of growth and improvements in efficiency in China over the past decade. By 2010, China intends to have extended its road network to 2 million kilometers and highways reaching 35,000 kilometers, up almost one-third from today's 1.4 million kilometers. By 2020, China's road network will continue to expand, with the network reaching 2.5 million kilometers, and a doubling of highways to 70,000 kilometers.

Between now and 2020, China also plans to improve road links with its neighbors. A major highway will link Kashi and Urumqi to Pakistan. Urumqi will also be linked by both road and rail to Shanghai, on routes that go through Lanzhou, Xi'an, Xinyang and Nanjing. Another will link Beijing and Erlianhaote in Inner Mongolia to Mongolia. South Central China will have improved highway links to Laos, Myanmar and Thailand and these highways will also find their way to Shanghai via Kunming and Changshe. As observed above in the railway discussion, overland links to other countries will foster growth and improve well-being, particularly so in land-locked interior provinces.

Building a market-oriented road transportation system is essential for the growth of China's economy, including the agri-food value chain. A developed road system facilitates the movement of both people and products and does more to promote competition and efficiency than almost any other private or public undertaking.

### 3.5 Cold Chain Transport and Management

Within the agri-food sector, China's comparative advantage does not lie in the production of land extensive crops like rice or wheat. Rather, there is an emerging consensus that China's comparative advantage probably lies in the production and further processing of fruits, vegetables, horticultural products and select livestock products. It must be observed, however, that – in addition to being labour intensive – many of these products are perishable in nature. Therefore, a prerequisite for China to truly exploit its comparative advantage in these products is for it to have in place the necessary institutional, infrastructure, and human capital to deal with such products. Cold chain storage, handling and transportation are a critical component of this.

Warehousing and storage facilities are critical to an efficient marketing system. With China's growing production and consumption of high-value frozen and perishable foods, cold warehousing and transport facilities are becoming an important link in the marketing chain. Yet, cold storage capacity is believed to be only 20-30 % of growing cargo demand. Spoilage losses of up to 33 % of perishable freight and illnesses caused by poor handling are common. A lack of controlled atmosphere equipment makes it costly to transport frozen and perishable foods. China now produces such equipment, but incentives in the value chain are not yet sufficient for them to be widely used.

To accommodate both domestic and international demand for perishable foods, cold chain infrastructure and its management must be improved. In developed countries, processed food markets are characterized by a network of cold storage warehouses, companies that consolidate food from farms, processors, and other companies and then distribute them to regional and local warehouses, which ultimately deliver foods to retailers and consumers. In China, these crucial intermediary links have not kept pace with consumer demand or productive capacity.

Reforms have partially dismantled state-run distribution monopolies, but these necessary reforms left a fragmented system of small traders with limited geographic scope. Producers and retailers have had to piece together delivery networks. Customers receive small shipments from large numbers of suppliers, with little consistency. Producers must deal separately with cold storage warehouses and arrange for inter-city and intra-city transport.<sup>7</sup>

Cold warehousing facilities are one important link in the cold chain; temperature-controlled transportation is another. Railways remain the most common method of distribution, including frozen food products. Transporting frozen goods by rail in China, however, has big drawbacks, including the need for advanced bookings and ongoing relationships with railway administrators. As temperature-controlled equipment is not always available, food products, in some cases, are simply cooled with bagged ice and covered with a blanket. Marketers of temperature-sensitive food products also have concerns about excessive loading and unloading under less than ideal conditions, excessive damage potential, and unreliable delivery times. For domestic markets, such practices increase the risk of food-borne illness. For international markets, such practices can preclude access altogether.

Problems with rail transport have caused many foreign and indigenous ventures to develop their own trucking fleets. China's third-party trucking industry is also growing rapidly – in response to the competitive market demands and China's integration into international trade. Several large international shipping and logistics companies are now making inroads into China's distribution system, in some cases providing controlled temperature trucking services.<sup>8</sup> But, for the most part, such services are in short supply and dominated by domestic firms with jurisdictional monopolies (eg. COSCO). Improved highway segments--including new Shanghai-Nanjing, Guangzhou-Shenzhen, Beijing-Tianjin, and

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<sup>7</sup>For some commodities--such as bulk-frozen beef, pork, and poultry--the system gets by. Some frozen products can be maintained for extended periods and are less vulnerable than chilled or refrigerated goods to temporary interruptions in the storage chain. Chicken, for example, has a rated shelf life of one year at -18 degrees C, although problems can mount quickly if temperatures rise; the bacteria count in chicken doubles every six hours when chicken is stored at 4 degrees C (typical refrigerator temperature). Other frozen products require more sophisticated temperature-controlled handling, and may not fare well in China's warehouses, which customarily store frozen products at -18 degrees C. From a distributor's point of view, frozen goods are easier to handle, as these products can more easily endure temporary breakdowns in the cold chain. Chilled meats, dairy products, fruits and vegetables, on the other hand, have short shelf lives and will deteriorate rapidly without efficient handling under controlled conditions.

<sup>8</sup> The business licenses for these firms in China may also include warehousing in the specified scope of business, but these firms -- to date -- have mostly concentrated on transporting goods and have not yet significant capital investments in cold storage warehousing, although several operate dry warehouses at container yards in China's ports.

Shenyang-Dalian, routes--are nevertheless making truck distribution a more practical option. Such improvements are welcome, as the flexibility of truck transport makes it well suited to perishable transport.

Until China's WTO accession, investment in trading, wholesaling, and distribution has been dominated by state-held institutions and off-limits to foreign investors, with a few exceptions. Markets were carved up along both geographic and jurisdictional grounds, leaving them fragmented and open to manipulation. As time passed, some foreign enterprises were allowed to develop their own systems, but were precluded from exploiting those developed by others. Similar obstacles have been encountered by private entrepreneurs and non-incumbent domestic enterprises. Still, there is evidence that -- when incentives are "right" -- China has the ability to produce and transport high -value perishable products that meet or exceed international standards. Joint ventures with Japanese and Singapore investors, for example, have produced high value fruit, vegetables, juice, poultry and pork products for export to East and South-East Asia. But the incidence of such successes is well below China's potential.

With China's accession to the WTO, this will change as foreign and non-incumbent access to transportation and distribution facilities and services will be liberalized. But it will take some time for new systems and relationships to develop. This is unfortunate, as it is in the production and processing of high value perishables that China has its greatest comparative advantage in the food sector. If China is to fully realize its potential in this respect, its leaders must take care to ensure that cold storage handling and storage facilities and services do not become captured or rationed but, instead, encourage a competitive market for such facilities and services to emerge.

#### **4. The Agri-Food Value Chain**

##### **4.1 China's Primary Producers<sup>9</sup>**

Many countries, both developed and developing, have learned through painful experience that few things can be more costly than a misguided or poorly designed policy. China too has had its share of policy-induced disasters, with the Great Leap Forward and Cultural Revolution among the more prominent. China's growth since 1978 has also shown the gains that can be had when prices, policies and institutions get closer to "Right" (Huang 1998).

With the exception of the past few years, China has historically taxed the agricultural sector (Huang, Ma and Rozelle). Events of the past two decades - such as the advent of the Household Responsibility System and the introduction of Two Track Pricing - have demonstrated that China's farmers respond well to improved incentives. It has also often been the case that the benefits of government interventions ostensibly designed to assist farms have actually been captured by state owned intermediaries in the value chain and input suppliers (like the grain bureaus). What are the implications of such observations? At the simplest level, it means that China's farmers are highly responsive and that primary agriculture is quite competitive already and will become more so, if given the means. It also seems that government policies have often undermined rather than enhanced efficiency and productivity.

Our expectation is that primary agriculture's productivity will continue to improve as governments and government-linked enterprises relinquish their role in procurement, marketing and value added and focus instead on providing the research, agricultural extension, infrastructure and other services the agriculture sector requires. Collectively, increases in the quantity and quality of infrastructure and services will contribute to improvements in productivity, efficiency and well being for farmers and rural residents.

##### **4.2 The Retail Sector**

China's retail food sector has matured rapidly, as consumers have increased their demand for convenience and quality in food products. An increasingly competitive food retail sector has emerged, featuring modern supermarket chains and a wider choice in products. The continuing evolution of China's retail sector has important implications for how foreign and domestic food products reach the consumer.

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<sup>9</sup>We will not discuss the primary sector extensively as it is well covered elsewhere in this volume. However, it is instructive to compare and contrast the increasingly competitive primary and retail sectors with the somewhat less competitive and responsive intermediate levels of the value chain.

From the 1950s through the 1970s, government entities procured, distributed, and sold nearly all agri-food products. Even as late as 1980s, there was little value-added in the country's food system. Processed foods were limited, as most households prepared meals from rice, noodles, raw produce, and meat. Service and hygiene in food retail outlets were poor, and food distribution systems were inefficient. Following the implementation of economic reforms, food marketing was one of the first sectors in China to be open to private interests and non-incumbent state-linked commercial entities and directed by markets. Producers were permitted to sell grain, produce, and meat to consumers in urban farmers' markets. Small food stores, kiosks, and restaurants sprang up, and by the late 1980s, department stores were offering large food sections. Many different players entered the food retail sector, including private entrepreneurs, non-incumbent state-held firms, and foreign ventures; state-owned retail outlets now account for less than half of retail enterprises and employment.

China's food retail sector was transformed during the 1990s by the rapid rise of supermarkets, including large domestic chains, such as Lianhua, Hualian, and Nong-gong-shang. Several foreign supermarket operators based in Japan, the Netherlands, and Hong Kong entered the China market, but most pulled out or reduced their presence as they found it difficult to compete with domestic firms in China's markets.

In recent years, however, domestic incumbents have faced challenges posed by foreign hypermarket retailers that offer low prices and a large array of goods and services under one roof. Hypermarkets have attracted shoppers by offering convenience, comfort, and low prices. Hypermarkets keep prices low through efficient supply chain management. The food distribution system used by supermarkets and other food retailers in China still has much inefficiency, with numerous layers of distributors and associated mark-ups between producers, processors and retailers. Hypermarkets reduce mark-ups by purchasing goods directly from manufacturers or consolidated distributors. Hypermarkets have also introduced modern store management and purchasing methods. While most retail procurement in China tends to be localized, hypermarkets have tried to establish wider distribution networks.

To date, hypermarkets have captured only a small share of the national market (< 2 percent). However, their "demonstration effects" on China's market may be much greater, as domestic chains respond to the success of these stores in major centers. Just as the competitive threat of foreign supermarket chains in the 1990s led to improved customer service in domestic chain stores, the competition from hypermarkets may lead to even more choices for consumers in domestic stores and stimulate further improvements in the efficiency and openness of the distribution system. China's major chains are responding by increasing the services offered to consumers, offering more fresh produce, and improving the efficiency of supply chain management to counter the hypermarkets' success.

China's two largest retail food outlets, Lianhua and Hualian, are now in the process of merging and have also expanded into the hypermarket format. This new chain is almost 3 times the size of its closest competitor and is the only chain to enjoy a nation-wide presence. Industry analysts suggest, however, that the new chain must overhaul its management structure as redundancies may undermine its competitiveness. As China's retail market remains fragmented, such mergers will be common for at least 20 years as efficiencies and economies in the value chain are realized. Mergers, consolidations, and bankruptcies will and must be allowed to occur if China's retail sector is to continue to increase its efficiency and responsiveness.

Competition is also increasing among smaller scale convenience store chains, state-held stores and private "Mom and Pop" food stores. Convenience store chains have increased their market share for sales of small purchase items like drinks, packaged foods, snacks, and ready to eat foods. Foreign invested chains popularized the format, but many convenience stores are now operated or franchised by larger scale domestic chains. Convenience store chains seem to be gaining ground because of their superior distribution system and because they are quite responsive.

This discussion underlines the fact that China's retail sector is competitive and dynamic. However, as is the case with primary agriculture, its ability to respond to new consumer and societal needs as well as outside competition is undermined by inefficiencies in the agri-food value chain and the transportation and distribution system.

#### **4.3 Challenges for the Agri-Food Logistics and Value-Added Chain**

About 30% of China's food production is processed, compared to 70 to 80% in more developed countries. Gross output value for the food industry in 2003 is thought to now be somewhere around RMB 900 billion RMB (~ USD 100 billion).

By comparison, US food industry output is about USD 500 billion, or 1/6 of the industrial sector. China's food processing industry accounts for just 1/12 of overall industrial output even though primary agriculture plays a much larger role in China's economy. This is well below China's potential. This sub-standard performance arises in part because of jurisdictional fiefdoms and rivalries at intermediate stages in the agri-food value chain.

The deliberate carving up of jurisdictional and commercial mandates is an inhibiting factor to commercial development. As an example of this, the means of logistics support are in the hands of several government departments. The Civil Aviation Administration, Bureau of Internal Trade, Light Industry Association, the Post office and the (3) Ministries of Railways, Communications and Information all play roles, with the State Economic and Trade Commission as the designated lead. Unlike the retail sector -- where SOEs make up less than half of all activity -- SOEs still account for almost two-thirds of wholesale, logistics and processing activity. Institutions try to protect their own interests, with a view of "not letting water flow to other people's fields". For example, institutions have often acted based on the interests of their commercial affiliates rather than working towards common standards; regulatory and commercial activities are not always well separated.<sup>10</sup>

Chinese enterprises will and must become increasingly market-oriented, open to new technologies and quality sensitive. Those that don't will fail. Those that do will gain market mandates not only in China but also in East Asian and world markets. Over the next few years, the agri-food marketing, handling and processing industries are expected to become more efficient and expand considerably as WTO accession results in more logistics service competition, and accelerated market and legal reform. Most observers expect double-digit growth to occur, provided institutional and regulatory impediments can be overcome. China could more than treble the gross output value of its food processing industry's output by 2015 and quintuple it by 2030 if the economic fiefdoms of different institutions could be dismantled or disciplined and the efficiency of the value chain improved. But this depends quite critically on how Chinese enterprises and commercial ministries respond, whether they respond to the new environment by trying to erect new barriers to entry or by improving their commercial and competitive orientation.

#### **4.4 Are Intermediate Stages of the Agri-Food Value Chain Over-Administered and Over-Interfered?**

Work undertaken by the ADB and the OECD examined the role that private and non-incumbent state-held firms had on growth, productivity and income in different provinces and municipalities across China. Their findings suggest that, in the 1990s, urban per capita incomes increased by several thousand Yuan (> Y 5000) for every 5 % increase in the share of private and non-incumbent firms relative to the overall number of commercial enterprises (that is, including SOEs). Conversely, incomes were lower in locations with greater numbers of SOEs.<sup>11</sup>

Empirical analysis indicates that state-owned and state-linked enterprises and sectors are often "over administered" and "over interfered". Many state-held enterprises and sectors with a large state-held presence appeared to be in "Stage 3" of the production function with regard to managerial and administrative. This means that such enterprises and sectors are too bureaucratic in their management structure and behavior. Such enterprises would actually be more productive and contribute more to society if they had fewer management staff and a more commercial orientation. Industries with a large SOE presence or that are deemed "strategic" seemed particularly prone to this. This may not be surprising as such industries and enterprises do not always face hard budget constraints and remain as reliant on political and social connections and interventions as they are on commercial success.

For a mixture of enterprise types, Huagang Li (1999) found rapid total factor productivity growth associated with greater degrees of competition and openness. Even without privatization, the enterprises in Li's survey demonstrated much responsiveness to market incentives. Li's study suggests that hard budgets, low barriers to market entry, and competition may be more important than privatization per se in fostering efficiency and growth.

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<sup>10</sup> Foreign firms and domestic firms report several jurisdictional and logistical barriers. Among the most severe are lack of cargo tracing services, a lack of control and accountability in refrigerated transport, geographic and jurisdictional fragmentation of networks, (deliberate and inadvertent) failure to share information, institutional and regulatory limitations on carrier selection, and complicated and time-consuming approval processes and customs procedures. Freight forwarding and logistical services in particular were found to be heavily regulated and top heavy with respect to management.

<sup>11</sup> Beijing was an outlier in the analysis but, as center of government, this is not surprising.

Li, Rozelle, and Brandt (1999) examined rural industry performance using a number of measures and explanatory factors, including managers' ages, education levels, experience with the firm, experience as managers, and experience with government. In their analysis, education was modestly beneficial from a production efficiency perspective. However, managers' experience in management, government, and the firm all adversely effected efficiency. This might be seen as an indictment of historical selection processes for enterprise managers in SOEs.

Szirmai and Ren (1997) suggest that China experienced "Rapid Growth Without Catch-Up" for 10 of 14 manufacturing sectors; only food and beverages, tobacco, apparel and non-metallic mineral products exhibited improved productivity over the period of their study (1980-92). This suggests that China's growth was extensive in nature and largely attributable to increased input use, with only small contributions from managerial effort.

Fan and Zhang (1999) observe that 17 % of the growth China experienced from 1978-95 was attributable to structural change - largely in the shifting of resources from lower to higher productivity sectors. This gain was largely due to (individually self-determined) labor reallocation - geographic and sectoral migration. Increased input use accounts for over 40 % of growth, much of it coming from higher levels of capital. Interestingly, Fan and Zhang found that capital reallocation actually hindered efficiency. As enterprise managers and political leaders typically make such decisions, Fan and Zhang's findings may indicate that such decisions are not always made on efficiency grounds but are influenced by other, non-commercial, considerations.

Guo (1999) and others have noted that "bureaucratic entrepreneurs" in China face social and political incentives as well as productivity and efficiency incentives. Walder (1989), argues that enterprise managers in China often have a "mayoral quality". They are responsive to social demands because of the communal nature of their job and because their performance assessment depends on the level of cooperation they receive from subordinates and constituents, which is related in part to their ability to provide for the communities and enterprises they lead. Likewise, Lin Shenmu (former director: Investment Research Institute, State Planning Commission) has suggested that welfare distribution is often a stronger motive than efficiency in the investment activities of state-held enterprises.

Nonetheless, we find such "mayoral" behavior of managers puzzling because productivity, efficiency and social objectives could all be better met if some managers, engineers and some types of laborer were paid to "stay home". That is, overall production - the size of the pie - would increase if managerial and administrative effort is reduced for enterprises where these types of labor effort are in "Stage 3" of the production function. These observations go back to the "Separation Theorem" of economics where efficiency is better served and the individual, enterprise, and society are made better off by a separation of production and consumption decisions.

Managerial effort and administrative labor are more than just production inputs. Managers and administrators in most instances are those who make critical decisions regarding outputs, inputs, and even income and wage distribution decisions. China's reforms have lead to greater decentralization, autonomy in decision-making and heightened contestability. Nevertheless, it appears that the (i) institutional environment, (ii) economic and social incentives, and (iii) educational and work experience, aptitudes and inclinations of many managers are all such that many enterprises at intermediate stages in the value chain remain "Over Administered and Over Interfered". As border measures decline and is liberalized further, these sectors will be forced to significantly improve their efficiency and commercial orientation. If they continue to enjoy the support and protection of the state, it will handicap the primary sector and retailers as they compete with foreign products in China's markets and elsewhere because inefficiencies at intermediate stages will be conveyed up and down the value chain. Of course, managers within these sectors and enterprises are aware of the effects trade liberalization might have on their income, job security, and social status and can be expected to use whatever means are at their disposal to protect their interests.

China's historical experience and institutional context suggest that enterprise managers in industries deemed as "strategic" or "pillars" feel less motivated to embrace cost-saving technologies and management techniques. This is because their enterprise's survival does not rely on profits, productivity or efficiency per se but are based more on social and political factors. Analysis indicates that China's farmers, retail food sector and some food processing sectors are less prone (but not immune) to this problem than other sectors. Unfortunately, management problems of state-linked enterprises at intermediate stages in the value chain and in agri-food transportation and handling are more acute. For this reason, it is of great importance that China's leaders ensure that jurisdictional mandates are removed, transport bottlenecks alleviated, and promote greater pluralism and competition -- fostering greater efficiency and dynamism and causing "over administration" and "over interference" to decline.



## 5. Summary and Closing Remarks

**Demographic Drivers.** We began our discussion with a review of two major demographic phenomena in China: (a) the movement of people from rural to urban areas; (b) the expiry of China's "demographic dividend" in the late 2020s. These phenomena precipitate and respond to developments elsewhere in China's economy and society.

Increased urbanization implies that China's economy must continue to evolve from a subsistence economy to an integrated economy, exploiting local, regional and national comparative advantages. If this goal is to be achieved, however, the prerequisite and enabling transportation and handling infrastructure must be put in place.

It is also the case that institutional reforms and incentive systems must continue apace to compensate for a declining "demographic dividend". Moreover, they should put in place sooner rather than later (i.e. before 2020) if China is to reach its goal of being middle income developed country by 2050. Otherwise, China may not be able to fully exploit the synergy of its "demographic dividend" and ongoing institutional reforms and liberalization.

**Transportation Infrastructure.** Transportation and handling infrastructure are critical to the development of China's economy and agri-food sector. If China's markets are to serve their roles as scarcity indicators and in allocating resources, goods and services must be able to move across geographic boundaries. China's ports, rail, road and inland waterway networks are the most important means through which arbitrage and access to goods and services occurs. Road, waterway and railways will also be fundamental to the development of China's interior provinces.

Failure to reduce transport and intermediary costs increases regional income differentials. When such costs are high, it is difficult for farmers in inland provinces to compete with suppliers elsewhere. Continued bottlenecks in the country's domestic transportation infrastructure and inefficient logistics and value-added marketing industries in the near term will make it difficult for inland Chinese producers to compete with producers in coastal provinces and overseas for the growing coastal China market and in neighboring Asian countries. Unless inland transport systems improve significantly, more livestock production is likely to take place closer to affluent coastal areas, particularly in provinces with ready access to both foreign and domestic feed sources. This will reduce difficulties both in the transport of inputs and in the transport of the perishable livestock products. If moving inputs to the place of production is difficult, the place of production may well move to where inputs are more accessible.

Highway and vehicular infrastructure has shown the most growth of all modes of transport. They have also been a catalyst for more competitive behaviour and improvements in efficiency and responsiveness elsewhere. China's waterways are improving, but still operate well below capacity. China's railways have arguably been the least responsive transportation mode and it is important that they become more responsive to commercial incentives. It is important that access to transportation facilities and services not be rationed based on the type of ownership of the freight or the vehicle. Likewise, fees or tariffs for freight should not vary according to the freight's ownership.

China's emerging comparative advantage in the agri-food sector appears to be in higher value perishable products. But it has not been able to fully exploit its comparative advantage because its cold chain infrastructure and management thereof is under-developed. This raises the risk of food related illness in China and contributes to problems in gaining market access elsewhere.

**The Agri-food Value Chain.** China's primary agriculture and retail sector are increasingly competitive and responsive. This is partly attributable to the large number of market participants and limited jurisdictional curbs on competition among participants. But farmers and retailers have been handicapped by transportation bottlenecks, jurisdictional fiefdoms of intermediaries and perverse incentives. These tax producers, retailers and consumers alike, reducing what producers receive and increasing consumer prices, while also lowering choice.

China's primary agriculture has proven highly responsive when given opportunities. Ministries need to relinquish their commercial roles at intermediate levels of the value chain and focus instead on providing the infrastructure, research, agricultural extension, and other services the agriculture sector requires. Likewise, China's retail sector is quite responsive. Pressures from consumers and competition from different outlet types mean that the sector will continue to discipline itself -- provided the government does not play favourites. The retail sector is due for an extended period of consolidations, mergers, and upheaval, but the end result will be a more efficient and responsive sector, providing consumers with a greater range of products and services to choose from. For both primary agriculture and the retail sector, emphasis should be on removing obstacles to further development and adjustment.

Evidence is that historical levels of protection have contributed to overly administrative and less responsive behaviour at intermediate stages of China's agri-food value chain. Enterprise managers do not always focus on efficiency and profits but, instead, are distracted by communal, social and political considerations. The terms of China's WTO accession mean that China must open these industries to foreign competition and competition from non-incumbent enterprises. China's leaders must resist the temptation to intervene in other ways to protect these enterprises and industries; historical experience and empirical analysis suggest that enterprises and industries that are protected because they are deemed "strategic" become unresponsive and inefficient. If commercial enterprises in China's agri-food value chain improve their efficiency and responsiveness, not only will they gain significant market share and improve welfare within China, but they could expand their presence in overseas markets as well.

Under current conditions, bottlenecks in the country's domestic transportation infrastructure and jurisdictional fiefdoms among intermediaries contribute to inefficiency and unresponsive behavior. These inefficiencies and costs currently make it difficult for inland Chinese producers to compete with producers in coastal provinces and overseas for the growing coastal China market and in neighboring Asian countries. In the medium term, however, competition will and must intensify as foreign companies and non-incumbent domestic interests will be allowed to enter the service sector as well as operate their own transportation networks. With government involvement in commercial areas in decline and the efficiency of intermediaries on the rise, China's agri-food sector will become more internationally competitive for at least the next 15 years -- especially for labour intensive products.

Empirical analysis and historical experience, both in China and elsewhere, show that industries and sectors that have been protected or coddled as a result of being designated a pillar of the economy are less efficient and responsive than those that are not afforded such protection. Overall, efforts to promote pluralism and choice for producers and consumers and encourage competition across geographic boundaries and institutional jurisdictions will foster growth and improve welfare, particularly in interior provinces. For China's leaders, it will be important to identify bottlenecks - whether physical or institutional - and resolve them before they can be exploited by vested interests.

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