

Entrepreneurship and China: History of Policy Reforms and Institutional Development

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"The storm center of the world has shifted . . . to China, whoever understands that mighty Empire . . . has a key to world politics for the next five hundred years."

--U.S. Secretary of State John Hay, 1899

China is like a sleeping giant. And when she awakes, she shall astonish the world.

--Napoleon Bonaparte, 1803

One of the greatest untold secrets of history is that the 'modern world' in which we live is a unique synthesis of Chinese and Western ingredients. Possibly more than half of the basic inventions and discoveries upon which the 'modern world' rests come from China. And yet few people know this. Why?

--Robert Temple - *The Genius of China: 3,000 Years of Science, Discovery and Invention*, 1986

Four thousand years ago, when we couldn't even read, the Chinese knew all the absolutely useful things we boast about today.

--Voltaire: *The Philosophical Dictionary*, 1764

Introduction

Why is it that we see one country create numerous R&D intensive companies and start-ups while another remains full of farmers, and a third is full of small proprietors, cottage industries, and retail firms? Why do countries follow such divergent development paths and how do individuals' occupational choices interact with government policies and institutional reform? These are large questions which will likely occupy sociologists, economists, political scientists, and politicians for decades to come. This paper has a more modest goal of tracing the evolution of China's transition from planned to market economy by examining the institutional and policy reforms believed to have had an impact on private business over the years. Rather than the traditional route of first discussing theories and then the empirical results attempting to adjudicate among

them, I first lay out the history and more recent changes in China related to innovation and entrepreneurship in particular. Then I focus more on theoretical frameworks which can help guide our thinking about explaining the forces in the environment impacting Chinese private entrepreneurship over time. At this point there is relatively little empirical work in China, but where I can locate empirical tests of the theories, I incorporate them into this section.

Historical Policy Changes and the Impact on Entrepreneurship

Entrepreneurship was all but eliminated after Mao Zedong and the Chinese Communist Party won the Chinese Civil War and founded the People's Republic of China in 1949 (Whyte and Parish, 1984). New opportunities have opened up as China has undertaken the (quickly progressing, but as yet incomplete) shift from redistributive bureaucracy to open markets (Nee, 1996). Entrepreneurs have played a strong role, beyond what reformers may have initially expected, in building the market economy, from breaking state monopolies to supplying new jobs (McMillan & Woodruff, 2002). From 1989 to 2004 the compound annual growth in the number of newly registered private sector businesses in China has been 29% vs. 1% in the United States (State Statistics Bureau). From 1978 to 2004 the number of people employed in private business went up by 300 times in China.

Insert Figure 1 here

Clearly, policies and institutions have been changing rapidly, but relatively little analysis has been done on the impact on entrepreneurship and firm strategy in China to

determine whether China is likely to upgrade to more R&D intensive entrepreneurial activity (Cull & Xu, 2006; Nee, 1998; 1992; 1996; Peng & Heath, 1996; Steinfeld, 2007).

Two general features of China's reform have been gradual, local and sectoral experimentation along with partial reforms or what has been referred to as a dual-track approach (Gregory, Tenev, & Wagle, 2000). The Chinese economy was organized regionally (as opposed to centrally like the Soviet Union) since about 1958. Due to the regional nature of China's political system and reforms, institutional change and economic development has not been uniform across China (Nee, 1996). Since 1980, promotions and tax revenue were tied to local economic development ("eating from separate kitchens", or *fenzao chifan*), government officials at the local level had strong incentives to bend the rules and become creative with local policy towards private firms. Thus, a reform may be tried out in one province and years later be copied in other provinces or adopted centrally. Certain geographic areas, such as Zhejiang and Jiangsu provinces have a long history of private enterprise and as discussed below, certain areas were targeted for early experiments in market reforms. The details varied by province, but one example of a revenue sharing agreement with the central government that provided incentives for experimentation in local policy was that after Guangdong province paid a fixed amount (perhaps 1 billion yuan) to the central government, it could keep the rest, making local governments residual claimants on any local economic development. Contracts of this form became widespread after 1988 and were expanded to sub-provincial governments as well (Qian, 1999). While this set-up led to incentives for local government officials to experiment and to bend the rules, it also fragmented the Chinese market for firms by largely preventing trade and economic ties between regions.

Local governments had apparent incentives to keep all business and suppliers local rather than cooperating with other regions.

The dual-track approach began in 1979 in the rural areas with two-tier pricing. It has since been extended to other sectors through various forms as a reflection of the early belief that private business served as a complement to state-ownership as a way to deal with unemployment. The dual-track policies also satisfied the central government's concern that development proceed in a way so that protests would not endanger its political survival. The view of politicians was to develop in a way that would "leave no one worse off than before" (Shirk 1993, pp. 130, 137, 334; Laffont and Qian 1999; Lau, Qian, and Roland 1997). However, this approach may have also stunted the growth and development of the private sector by continuing to protect the interests of state-owned enterprises. Thus, the transition from a planned economy to a more open market economy has been gradual with certain punctuated periods of significant progress.

Deng Xiaoping issued a reform report in 1975. In 1978, Deng launched the 'Four Modernizations' reform program to deal with the economic crisis after the Cultural Revolution by stimulating economic growth.¹ Market oriented reforms in China began in earnest in December of 1978 with the Third Plenum of the Chinese Communist Party's 11th Central Committee (Gregory, Tenev, & Wagle, 2000). In July of 1979, commune and brigade enterprises were allowed to enter non-agricultural industries. The State Council permitted these activities under the "Regulation on Some Questions Concerning the Development of Enterprises Run by People's Communes and Production Brigades," which also granted provinces the right to give 2-3 year tax holidays for new commune

¹ See Young (Young, 1995) for a comprehensive background on private business and economic reform in China from 1978 to the mid-1990s.

and brigade enterprises. As a result, light industry grew extremely rapidly from 1979 up through 1984 (Wong, 1988). Private entrepreneurship began to re-emerge in China with the legitimization of township and village enterprises (TVEs) to de-collectivize agriculture. The vast majority of TVEs were completely private.² These enterprises were sometimes collectively owned by local governments but primarily had entrepreneurial incentives for their managers who were free to react to prices and choose product lines. Commune and brigade enterprises had long existed prior to this time period in the rural areas and were renamed in March of 1984 as TVEs. By 1988, total rural enterprise output had increased by five times compared to 1983. By 1990, TVEs accounted for 20 percent of China's gross output (Liao and Sohman, 2001).

From 1978 to 1988, the Chinese government began to allow the entry of foreign invested firms along with opening to foreign trade and investment. One stream of literature has examined the institutional drivers of FDI and some of its unintended economic consequences within China (Huang, 2003; Huang, 2004a; Huang, 2004b; Huang, 2006). Some scholars argue that financial integration and particularly foreign direct investment (FDI) is another mechanism that contributes to economic growth in developing countries (Alfaro & Charlton, 2007). Investment by “co-ethnic networks” appear to have been particularly large over the years, with 59% of the entire stock of FDI between 1978 and 1999 being supplied by three ethnically Chinese economies – Hong Kong, Macao, and Taiwan (Huang, Jin, Qian, 2008). Besides providing capital, these ethnic ties can also perform institutional functions which would otherwise be performed by a government in a more developed country, but are typically lacking in developing

² Confusion has arisen since the Chinese definition of TVEs is as rural firms, whereas Western academics assume the term refers to ownership (Huang, 2008).

economies. These institutional functions include contract enforcement and dispute resolution (Huang, 2008; Tong, 2005).

Despite this opening of the economy to foreign trade and investment, domestic private enterprises were still subject to ideological biases which largely limited them to rural areas only (Qian, 2000). For many years that focus on FDI led to a consequent discrimination against domestic private firms, which increasingly were allowed to exist, but whose growth was stifled by various practices. Initially, the private sector in China almost solely consisted of individual businesses, employing seven people or fewer (the same as in the European Communist countries), referred to in Chinese as *getihu*, which were unregulated. On April 12, 1988, entrepreneurship became legal again in China. The First Plenary of the Seventh People's Congress approved Article 11 of the 1988 amendment to the Constitution of the People's Republic of China, which "permits the private sector of the economy to exist and develop within the limits prescribed by law." Three additional regulations were issued by the State Council providing protection for the private sector and specifying rights and obligations (Zhang and Ming, 2000). In June of 1988, the government issued the Tentative Stipulations on Private Enterprise (TSPE) stating that a unit with privately owned assets that hired more than eight employees was regarded as a private enterprise (*saying qiye*). This document officially permitted entrepreneurs to hire more than eight employees. The cutoff of eight employees is said to have come from Marx who theorized that a business at that size could support an owner who can begin to exploit labor (Whiting, 2001 Power and Wealth in Rural China). Large private firms had existed as early as 1981, however it was impossible for the party leadership to officially recognize them at that time (Young, 1995). After June of 1988,

firms could either register as *getihu*, and be given permission to employ more than eight people, or they could pay an administration fee and obtain a collective license to a state or collective unit. The latter category were called “red hat” firms since to avoid harassment, they put on a hat of collective ownership, even though they were essentially privately owned (Gregory, Tenev, & Wagle, 2000). Red hat firms continue to exist to this day in China, making interpretation of government issued statistics difficult. Using a sample of 300 villages surveyed, it’s estimated that there were 500,000 *getihu*, or private firms at the end of 1988 (Zhang & Liu, 1995).

Economic reform was put on hold in 1989, however. Inflation and corruption as well as the political uproar from the Tiananmen Square incident allowed conservatives to gain more power and to implement from 1989-1990 an “austerity program” throughout much of the country. Credit was sharply cut to rural enterprises and total employment in TVEs fell by 3 million between 1988 and 1990 (People’s Daily, March 23, 1990). There was relicensing of private operators and a major tax collection drive among private enterprises. There was even discussion of recollectivizing agriculture and recentralizing financial power and investment away from the provinces and local governments. Debate within the country grew as jealousy and outrage emerged over the high incomes of business owners and the exploitation of workers (Young, 1995). The new boom period of private sector development in China began after Deng Xiaoping’s “South Touring Talk” in early 1992. Motivated by the economic slowdown (4.4% and 3.9% GDP growth in 1989 and 1990) and the gridlock within the central government, Deng Xiaoping made stops in several special economic zones, which would be sympathetic to his views in the Southern part of the country, to give speeches about further economic reforms. It worked

and economic reforms were re-started beginning with the removal of price caps on the Shanghai Stock Exchange in May of 1992. Interviews suggested that many were inspired after these talks that as Deng reportedly said, “it is glorious to be rich” and decided to try to get rich quick through entrepreneurship. Other sources deny that the “glorious to be rich” part of the speech was ever actually made. Up to this time, economic activity between businesses and with the government was done primarily by “particularistic contracting” on a one-off fashion. The government had largely failed to establish a rule-based market system, and up to now had not addressed ownership and property rights issues (Qian, 1999).

After Deng Xiaoping’s speeches, the Fourteenth Party Congress in September of 1992 indicated that the goal of economic reforms in China was a socialist market economy. While to Westerners, this may sound insignificant, for China it was a bold statement about the relationship between the state and private sectors. Next, the Third Plenum of the Fourteenth Central Committee issued the “Decision of Issues Concerning the Establishment of a Socialist Market Economic Structure” in November of 1993. The decision moved the country towards a reduction in ownership discrimination between state and privately owned businesses. It also showed the intention to turn large state enterprises into more independently run companies and to sell off the smaller ones, known as grasping the large and releasing the small (*zhuada fangxiao*) (Young, 1995). Finally, this decision emphasized the importance of coordination among reforms to create more of a rule-based system and less particularistic contracting (Qian, 1999). Following this important decision, a series of reforms were passed covering foreign exchange, taxes,

the monetary system, the financial system more broadly, and a streamlining of government bureaucracy (Qian, 1999).

While the intention was announced much earlier, the privatization of state-owned enterprises began on a large scale in 1995.³ By the end of 1996, 11.5 million workers were laid off and 50-70 percent of SOEs had been privatized (Qian, 1999). In September of 1997, the Fifteenth Party Congress made a large rhetoric shift in referring to private ownership as an important component of the economy and state ownership as a pillar of the economy. They also indicated that public ownership could be realized through joint stock corporations with many owners investing. Through a twist of careful wording, they were essentially condoning the private ownership of corporations.

The Chinese Academy of Sciences (CAS), like the U.S. National Academy of Science, is the country's most prestigious research institution. The objective of the Knowledge Innovation Program (KIP) program was to re-create the CAS by redirecting resources towards creating 30 internationally recognized research institutes by 2010. The long term goal was to have five of those research institutes become recognized as world leaders. The Knowledge Innovation Program was passed in 1998 and in order to re-direct resources to create a handful of world-class institutes, between 1998 and 2005 the number of Chinese Academy of Sciences research institutes was scaled back from 120 to 89 (Ma, Dali 2006). While the research institutes were being reformed, changes were also occurring to build venture capital as a financial intermediary. Much of this occurred due to the influential role of Deng Nan, the daughter of Deng Xiaoping, who was the number two official in the CAS. Her visits to the U.S. and to MIT in particular, exposed

³ Transformation of ownership (*zhuanzhi*) or "restructuring of ownership" (*suoyouzhi gaizao*) are used in China in place of the term "privatization" (Qian, 1999)

her to high levels of institutionally encouraged technological entrepreneurship, which she hoped to emulate in China (Roberts, 2009).

The development of venture capital in China is discussed in further detail in the section on reforms in the financial system. Without repeating that section, it is worth noting that also in 1998 reforms were passed promoting venture capital and private equity investment. The State Council approved a government document, *Several Opinions on Establishing a Venture Investment Mechanism*, released November 16, 1999 jointly by the Ministry of Science and Technology and the State Development and Planning Commission. The document offers guidelines for venture capital regulation in China and states that: “A healthy venture capital investment system is important to propel the establishment of a country’s technology innovation system, promote national economy and comprehensive national capacity, and realize leapfrog development for China.”

Since 1998, the Chinese government has invested more than \$16 billion of its funds in state-owned venture capital funds. The local governments in Shenzhen and Guangzhou, have passed regulations granting favorable conditions for venture capital. The Ministry of Foreign Trade and Economic Cooperation has also eased the entry of international venture capital firms.⁴

Building on the statements issued in 1997 redefining the relationship between the state sector and the private sector, on March 15, 1999, the Second Plenary of the Ninth People’s Congress approved an amendment to the Constitution. The Amendment put the private sector on the same legal footing as the public sector for the first time. It was

⁴ In February of 1996, Sohu.com launched the first internet search company in China. It is also reported to have been the first internet company funded by venture capital (http://en.wikipedia.org/wiki/Charles_Zhang accessed 4/17/2009). The rise of Sohu and its listing on the NASDAQ along with the U.S. dotcom boom was noted in several of my interviews with entrepreneurs as a source of inspiration for their own ventures.

reported that immediately after the amendment, local governments started to relax restrictions on private enterprises (People's Daily, April 9, 1999). The Innovation Fund for Technology Small and Medium Enterprises (SMEs) was passed in 1999 to provide a new mechanism of funding to encourage the development of technology-based entrepreneurship. A significant landmark occurred when China joined the World Trade Organization (WTO) in 2001. It is not clear, however, the impact that this particular event may have had for entrepreneurship in the country. Most likely, the most direct effect may have been a signal of improved intellectual property protection in the coming years. The broader economic impacts were more diverse since many reforms led up to the admission into the WTO and many reforms followed that on the whole appear to have boosted trade and economic growth. This increased economic activity would indirectly aid entrepreneurs.

The pre-1999 time period can be characterized by an institutional environment that begins to support entrepreneurship via legitimization, less stringent discrimination against private ownership, economic zones with lower tax rates and foreign investment reform⁵ and privatization of SOEs. One exception to the claim that the earlier period focused on providing legitimization is that it was only in 2002 that the 16th National Congress of Communist Party of China allowed private entrepreneurs to join the Communist party.

During the more recent (post-2000) period, the institutional environment can be characterized as one that more directly supports the growth of start-ups, particularly those that have the potential to be high growth and are technology-based. The changes in the

⁵ Foreign investment would have gone mainly to state-owned enterprises (SOEs) rather than to start-ups.

institutional environment in this period are distinguished by the proliferation of science parks and technology business incubators as well as associated tax incentives for R&D and licensing activities. Overall, there is an emphasis on reforms in the tertiary education system with the stated long-range goal of an economy driven by advances in science and technology.

For example, in 2006, the government adopted the Medium and Long Term Science and Technology Strategic Plan to plot the course of science and technology policy in the coming years (OECD Review, 2007). Overall, there is a dearth of scholarly work (in the English language journals) on the more recent reforms related to entrepreneurship in China since 2001. In many ways this is a shame since many diverse programs and changes appear to be occurring. For a review of 68 English language articles published on entrepreneurship in China, see work by Yang and Li (2008). Rather than continuing with the details of the most recent reforms, I next turn to several more specific, but important topics: regional differences, science policy, higher education and the financial system, before discussing relevant theoretical lenses.

Regional Differences: Coast/Inland, Special Economic Zones and Science Parks

Scholars have produced a large literature on the economic geography of China, particularly the coast-inland regional disparities. Much of this work portrays China as being a highly fragmented regional market (Young, 2000). More recently, Naughton (2003) has used interprovincial commodity trade data to show that the regions are more economically integrated than expected and rapidly growing more so. It is true that Guangdong and Fujian have enjoyed special treatment due to their geographical location dating back to 1979 when they were permitted to open up and reform ahead of other regions within China. The central government established Xiamen in Fujian Province,

Shenzhen, Zhuhai, and Shantou in Guangdong Province (near Hong Kong) as special economic zones in 1980 (Qian, 2000). Essentially, these zones were allowed to become market economies while the rest of China maintained central planning. The special economic zones had a special policy (*teshu zhengce*) and institutional environment more conducive to free markets, such as the authority to approve foreign investment projects up to \$30 million, lower tax rates, and the encouragement of private entrepreneurship. In 1992, special privileges were extended to most cities along the Yangtze River. Even inland cities that did not have special economic zones created “development zones” and granted them tax benefits (sometimes without central government approval).

In his book on IT enterprises in China, Segal (2002) studies the four cities: Beijing, Shanghai, Xi’an, and Guangzhou. He notes that differences in the relationship between the local governments and the private or hybrid quasi-private enterprises were the drivers of growth in the IT sectors. In the cities where state-owned and foreign companies successfully won the attention of the local government, the private firms and thus the overall IT industry in those cities suffered. On the other hand, when local policies were favorable for indigenous private firms, conditional on past institutional arrangements (to be discussed further below) they tended to prosper.

To encourage the entry of high-tech firms and spur innovation, local and national governments in China have developed an extensive number of science and industrial parks. China currently has six thousand industrial parks and 58 national-level science parks (Cai, Todo, and Li-An Zhou, 2007). Established in the geographic area of Zhongguancun in the northwestern section of the Haidan District in Beijing, the Zhongguancun Science Park (the Z-Park) was the first of many science parks now set up

throughout China. The Z-Park was established in 1988 and is today the largest national science park in China. It is affectionately known as China's "Silicon Valley," and in 2003 contained over 12,000 firms, and a total employment of 480,000. Many high-tech multinational enterprises (MNEs) such as Google, Panasonic, Motorola, IBM, Microsoft and Nokia have offices in the Z-Park and MNEs accounted for 12 percent of the firms in the park in 2003 (Cai, Todo, and Li-An Zhou, 2007). The majority of construction was finished on the Tsinghua Science Park (affiliated with Tsinghua University) by 1999 and it was one of the first national university science parks in China.

As an example of the type of benefits and incentives to locating in these science parks, the government offers Z-Park firms several advantages. One is that corporate income is taxed at 15 percent instead of the normal rate of 33 percent (but now only for a limited time period). For the first three years new entrants are exempt from corporate income tax altogether. In addition, traditionally in China a system of household registration (*hu kou*) has been enforced for regulating the mobility of people across locations. School and housing subsidies are not available for a person who does not have *hu kou* in a locality. However, to attract talent from other parts of China and back from overseas, the government allows employees in the Z-Park to obtain Beijing residence. Even more preferential policies were granted in 1999 by the government. These included reduction of sales taxes on technology transfer, R&D expenditures, services, and consulting activities.

One should not get the idea that all of the regional policies in China have been conducive to entrepreneurship of course. A strong industrial policy adopted in Shanghai in the mid-1980s appears to have largely suppressed the long history of entrepreneurship

in that coastal city and economic hub (Huang, 2008). Shanghai illustrates the complexity of entrepreneurship as it had many aspects going for it, including a highly developed legal system (Guthrie, 1999). However, under mayors Jiang Zemin (who became Premier of China) and Zhu Rongji, (who was Minister of Industry) from 1985 to 1991, the city embraced a development plan starting in 1987 which put restrictions on private businesses and directed investment towards foreign-invested and state-owned firms. The result of this policy is one of the lowest rates of entrepreneurship and smallest levels of household business income across China (Huang, 2008 Working paper).

History of China's Science Policy

After the founding of the PRC in 1949, China adopted a Soviet style public research institute-centered innovation system where firms concentrate on production and public research institutes (PRI) focus on science and technological innovation with transfers between the two coordinated by government bureaucrats at various levels (Law, 1995; Xin & Normile, 2008). The Chinese Academies of Science, local governments, and various industrial ministries oversaw research in China via the state research institutes (Liu & White, 2001). In general terms the OECD has claimed that roughly four eras of Science and Technology policy reform have elapsed since the “open door policy” began in 1978. Overall, China’s science and technology reforms can be viewed as moving away from a PRI-centered system to more of a firm-centered innovation system (OECD Review, 2007). Scientific research was dramatically affected by the Cultural Revolution, however, and order was not restored until 1978 when the national science congress in Beijing announced a development guideline for science and technology (Hong, 2008). In 1984, the Chinese patent law was enacted and the Chinese Intellectual Property Press began keeping a dataset of patent information since 1985. 1985 was a key

year for Chinese science and technology reform. The Central Committee of the Communist Party passed a resolution on structural reform of the science and technology system and indicated the move away from the former Soviet system (Motohashi & Yun, 2007). After this reform, in the mid-1980s in order to push research units and universities toward serving the market and economic results, government research funding was significantly cut. Cutting the budget continued from 1986 to 1993, when there was an annual decrease of 5% per year in government research funding (Zhou, Li, Zhao, & Cai, 2003), p. 24). As a result of this decline in funding, some universities started their own enterprises as a source of funding. In 1991, the central government made this practice official, even though university-owned start-ups generated 1.8 billion RMB in sales that year. That number increased to 37.0 billion RMB by 1999 (Zhou, Li, Zhao, & Cai, 2003).

Other significant reforms in the mid-1980s were the passing of the National Key Technology R&D program in 1984, and the creation of the National Natural Science Foundation in 1986. In 1986, a group of scientists convinced the state that China was missing out on scientific and technological commercialization opportunities and the central government passed the 863 Program to encourage entrepreneurship through technology development zones (Zhang, Li, & Schoonhoven, 2008). During the 1990s the special privileges associated with these zones spread to most cities along the Yangtze River and beyond to the coastal provinces. Essentially, these zones were allowed to become market economies while the rest of China maintained central planning. The special economic zones had an environment more conducive to free markets, such as the

authority to approve foreign investment projects up to \$30 million, lower tax rates, and the encouragement of private entrepreneurship.

Higher Education

China differs from other low wage countries in focusing on tertiary educational development rather than primary or secondary education as a development strategy. Initially, Chinese universities were set up Soviet-style, such that different universities specialized in different areas (e.g. life sciences, engineering), rather than the system we are accustomed to in the West where each university has almost every academic department (Law, 1995; Xin & Normile, 2008). In the 1960s, the Cultural Revolution shut down higher education altogether and universities only opened again in the late 1970s. In June of 1981, to develop and increase enrollment of science and engineering students at 26 leading universities, the World Bank approved a \$100 million loan to China and the University Development Project (part of the International Development Association) made another \$100 million credit available (NY Times, June 25, 1981).

While the details of history are often more complicated than the narratives which get retold, it may be helpful in this case to paint a finer-grained picture of what China's universities and science policy environment were like leading up to 1999 and in the period since then. The 1990-1999 period can be characterized by an institutional environment that supports entrepreneurship via lowering barriers to entry including legitimization, economic zones with lower tax rates and reform and privatization of SOEs.

Over the past ten years, the major trends in higher education in China have been merging universities and expansion of enrollment, decentralization, diversification and moves to establish world class universities, privatization, and internationalization.

University enrollment (broadly defined by the Ministry of Education Statistics) has ballooned from under three million in 1995 to over 18 million students enrolled in 2007 (Figure 2). According to the National Bureau of Statistics of China, restricting the definition to four year colleges and universities, the total number of graduates has gone from 830,000 in 1998 to just over three million in 2005. Since 1999, the number of undergraduate and graduate students has grown at nearly 30% per year. However, evidence indicates that quantity has been expanded at the expense of the quality of the graduates (Gereffi, Wadhwa, Rissing, & Ong, 2008).

Insert Figure 2 here

Ministry of Education of China; National Bureau of Statistics

The Chinese government appears to be using education policies as a mechanism to maintain high economic growth via skill upgrading (Li, Whalley, Zhang, & Zhao, March 2008). A national forum decision to encourage the consolidation of institutions and decentralization in December of 1994 caused another wave of change in the universities. The percentage of national universities went from 51% to 9% between 1995 and 2002 as decentralization moved centrally controlled universities to the jurisdiction of local governments (Zhou, Li, Zhao, & Cai, 2003). Consolidation was particularly rapid between 1999 and 2006 when 60% of the 431 consolidations between 1990 and May of 2006 occurred (Li, Whalley, Zhang, & Zhao, March 2008). For example, in major cities, four or five smaller universities could move to improve their ranking by consolidating into a single university. Beijing Medical University was incorporated into Peking University in 2000 and the Central Arts and Design College was incorporated into

Tsinghua University. The State Education Commission (SEdC) launched the "Reform Plan of Teaching Contents and Curriculum of Higher Education Facing the 21st Century" in 1994, establishing 211 large projects and nearly a thousand sub-projects to improve teaching and curriculum in higher education institutions. In 1995, Phase I of "Project 211" was initiated and since then \$2.3 billion has been spent on Project 211 mainly for infrastructure and curriculum development with the goal of identifying 100 top educational institutions in China for improvement. The plan covers infrastructure and teaching ideology, content, curriculum structure and methodology. In 2000, Phase II of Project 211 was launched, and Phase III is planned for 2008.

Another active year for new science and technology programs was 1998. This was the year when the ministry of education devised Project 985. The plan was originally targeted at Peking (Beida) University and Tsinghua University in order to strengthen existing research and to catalyze new areas for research. Phase I of Project 985 began in 1999 (with funding grants to Peking, Tsinghua, Fudan, Zhejiang, and Nanjing Universities) and was expanded to over 30 universities. Tsinghua University and Beida University each received \$225 million and Beida used these funds to establish its Institute of Molecular Medicine (Xin & Normile, 2008). Phase II of the project was approved to run from 2004-2007 and Phase III begins in 2008. As mentioned earlier, the Knowledge Innovation Program was passed in 1998. In the following years, this reform resulted in over 14,000 new academic appointments as the Chinese Academy of Sciences was reformed and established as the backbone of the innovation system with the goal of 30 internationally recognized institutes. Also in 1998, the 100 Talents Program was also established to provide incentives for young, talented scientists who were educated abroad

to return to China and also for those in China to remain with the CAS. The last major change was in August of 1999 when a National Innovation Congress, organized by the central government, announced an act promoting high-tech industries and promoting the commercialization of innovation. Local governments also incorporated the promotion of technology commercialization in their local science policies after this act was passed as well (Liu & White, 2001).

During this time period, from 1985 to 2004, analysis of Chinese patent data and co-patenting trends between universities and firms shows evidence of decentralizing of knowledge flows and some localizing trends in the sense of local firms and universities patenting more with each other than only with universities in Beijing (Hong, 2008). Hong (2008) interprets this finding as resulting from decreased central planning and coordination across regions by the central ministries as greater levels of control were released from central ministries to local governments and their universities. Li and coauthors claim that pre-1999 there was a focus on increasing the quantity of enrolled students, whereas post-1999 there has been an increased emphasis on quality of research and teaching (Li, Whalley, Zhang, & Zhao, March 2008). Since 1999, there have been changes not only in the enrollment and funding levels for universities but also in the academic contracts. New academic contracts tend to use annual publication quotas and not to offer tenure (Li, Whalley, Zhang, & Zhao, March 2008). Often faculty members are required to publish three articles in international journals each year and their employment can be terminated if this goal is not met. Citations to articles as well as international rankings and cooperative projects are also tracked and these are sometimes tied to funding at the university or department level.

Government funding for higher education is program based and heavily skewed towards the top ten universities. Since 2001, tuition and fee payments (not government funding) have provided over 50% of total education expenditures.⁶ In absolute levels, the amount of funding for education has increased significantly over the past 10 years (from RMB 226 billion in 1996 to RMB 981 billion in 2006). The top 11 universities that were funded in the first phase of Project 985 received over 17 billion RMB in government funding in 2004 (Li, Whalley, Zhang, & Zhao, March 2008). However, when scaled as a percentage of GDP, it has remained constant at just under 3% and when normalized for the large increases in enrollment, it has actually declined to \$672 per student in 2005 (from \$847 per student in 1998) (Xin & Normile, 2008). The result is that universities have been forced to borrow large amounts of money from the banks. A report in 2007 indicated that 72 top national universities have \$4.5 billion in outstanding loans. Exacerbating the situation, many local governments have reportedly failed to match central-government funding as they are required to do. Another source of funding for higher education in China has been commercial activities organized by the universities themselves. While the total number of these university-owned firms has decreased, their profits have increased and the amount of funding flowing back to the universities has increased slightly from 1.5 billion RMB in 1998 to 1.75 billion RMB in 2004 (Li, Whalley, Zhang, & Zhao, March 2008). In an effort to remedy what is seen as a short-term problem of funding shortfalls, the ministry of education has limited growth in admissions to 5% each year. In order to address the problem, the government has returned to the prior approach of sending graduate students overseas. The China Scholarship Council was established in 2007 and funded with \$1.3 billion to pay for

⁶ National Bureau of Statistics of China (2005)

5,000 scholarships to Western universities a year for Chinese students, with the requirement that they return to teach in China.

In 2006, the 11th 5-year plan set goals to improve the quality assurance system, improve the national college entrance exam and recruitment, stabilize admissions and make the funding system sustainable, as well as to strengthen Projects 211 and 985 (Whalley & Zhou, 2007). On Sept. 11, 2006, China adopted Project 111, which aims to recruit 1,000 prominent academics from overseas to help create 100 “subject innovation centers” in China.⁷ As further targeting of the development of a select group of world-class universities, only those universities which were included in Project 985 and 211 may participate.

In general, much has been made of the amount of money being spent and the goals to create world-class universities in China. Since 2000 there has been a strong increase in academic hiring efforts, wages and an overall upgrading of equipment and facilities in the top Chinese universities. However, pinning down exact numbers and digging deeper, one can see that there are still large financial hurdles to be overcome.

Intellectual Property

It has been estimated that in the late 1980s and early 1990s, the United States lost \$2 billion of revenues due to intellectual property violations in China.⁸ In 2006 alone copyright piracy in China resulted in \$2.2 billion of US trade losses (International Intellectual Property Alliance, 2007, p96). Thus, intellectual property protection disputes

⁷ <http://english.hanban.edu.cn/english/China/181075.htm>

⁸ Seth Faison, China Turns Blind Eye to Pirated Disks, N.Y. TIMES, Mar. 28, 1998

and negotiations between the U.S. and China have been contentious and spirited (Yu, 2006).

As mentioned earlier, the Chinese patent law was enacted in 1984 and the Chinese Intellectual Property Press began keeping a dataset of patents since 1985. Figure 3 shows the growth in domestic patent grants up to 2007 (National Bureau of Statistics, China). In 1993, China passed a patent law bringing it into compliance with the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), however, enforcement has been up to local officials and has been a different matter. By the late 1990s, the Chinese central government had realized the positive effects of the U.S. Bayh-Dole Act (Mowery, Nelson, & Sampat, 2001), and was under pressure to improve intellectual property rights in order to join the World Trade Organization (WTO). The Ministry of Education announced in April of 1999 a Chinese version of the Bayh-Dole Act, allowing universities to own patents on inventions resulting from government funding (Ministry of Education, 1999; Hong, 2008). Nonetheless, intellectual property rights enforcement has been singled out by the American Chamber of Commerce in China as an exception to the otherwise strong implementation of World Trade Organization (WTO) obligations in China (Branstetter & Lardy, 2006).

Figure 3 here

Effects of Multinationals

One concern about the large amount of FDI in China is that multinationals and foreign-invested firms might be crowding out domestic entrepreneurial firms (Backer & Sleuwaegen, 2003; Huang, 2003). Cai, Todo, and Li-An Zhou (2007) suggest that the R&D done by multinational firms in China has stimulated the entry of domestic firms.

The authors interpret their findings to show that potential indigenous entrepreneurs benefit from the diffusion of multinationals' advanced knowledge and technology by providing evidence that domestic firms do more R&D as a result of knowledge spillovers. Increases in domestic entrepreneurship in their dataset do not appear to be tied to multinationals' production activities or domestic firms' R&D activities. The authors are careful to correct for endogeneity concerns through use of system generalized method of moments (GMM) estimation. However, their estimation relies on the assumption that the lagged regressors can be used as instruments since they are predetermined and should not be correlated with the contemporaneous error term. This assumption is tenuous if there is autocorrelation between the lagged and contemporaneous regressors. While the data have the advantage of the detailed records of the Zhongguancun Science Park (the Z-Park), this is the largest and oldest science park and may not be representative. Nonetheless, the results do concur with prior studies (Backer & Sleuwaegen, 2003; Gorg & Strobl, 2002). In particular, the results also are supported by the case studies of Taiwan, Israel, and Ireland reported in Breznitz (2007) that countries can effectively pressure MNCs to locate R&D activities within the country.

China's Technical and Entrepreneurial Labor Market

Despite the fact that the U.S. share of the world's science and engineering graduates is rapidly declining (the U.S. share is expected to drop to 15% of the world share by 2010) and the greatest growth is in China, the vast majority of the related literature on entrepreneurship and innovation focuses on the U.S. and Europe (Freeman, 2005).⁹ Further, it is clear from work in institutional economics and cross-cultural

⁹ In 1966, 71% of science and engineering PhD graduates were U.S.-born males, 6% were U.S.-born females, and 23% were foreign born (Freeman & Shen, 2004).

psychology that the levels and modes of entrepreneurial activity should be affected by the surrounding institutions, norms, and legal systems (Busenitz, Gomez, & Spencer, 2000; Licht & Siegel, 2006). High-tech entrepreneurship and innovation in transitional and developing countries are rarely part of the scholarly dialogue of the field (Lu 1997, Lu, 2000 are notable exceptions). Puga and Trefler (2005) in the course of their discussion on the rise of incremental innovation in low-wage countries point out that much of our current thinking is influenced by Vernon's (1966) product-cycle model where products are developed in rich countries and moved off-shore to low-wage countries. However, massive changes are under-way in international trade and development. China went from almost no science and engineering doctorates in 1975 to over 9,000 science and engineering PhDs in 2003 (Freeman, 2005). However, once the quality of the engineering graduates is taken into account, these numbers may be much lower or less comparable to U.S. numbers (Gereffi, Wadhwa, Rissing, & Ong, 2008). Nonetheless, at that rate of growth, by 2010 China will produce more technically-trained doctorates than the U.S. So while the current state of scientific research in emerging disciplines such as stem-cell research may be marginal, China is an up-and-coming player with a burgeoning pool of talent even in areas that are cutting-edge in the U.S. (Murray & Spar, 2006). Nonetheless, in the short term, the massive expansion of university graduates, especially since 1999 has led to a sharp increase in individuals with high educational levels relative to the number of job positions (Li, Whalley, Zhang, & Zhao, March 2008). This has created problems in absorption and unemployment which some speculate has led to the efforts to expand graduate education enrollment to prevent protests over high unemployment levels.

In the 1980s many SOEs fired or let go significant numbers of employees to privatize or create new firms since they could no longer financially support them (Steinfeld, 1998; Young, 1995). Many of these employees were in sales and marketing functions. In addition, reforms in the 1980s aimed to develop mechanisms to link managerial careers in SOEs to firm performance and to enhance the authority of SOE managers (Groves, Hong, McMillan, & Naughton, 1995; Naughton, 1995). These reforms created a managerial labor market where managers in poorly performing firms were more likely to be replaced and auctions were used to find new managers whose pay was linked to sales and profits (Groves, Hong, McMillan, & Naughton, 1995). A bankruptcy law for SOEs was passed in 1986 to provide, for the first time, a path for SOEs to declare bankruptcy and a path through which they could go out of business rather than being continually supported by the state.

Such changes are happening rapidly especially in China's policies regarding property rights and institutions with important and as yet rarely documented implications for firm strategies, innovation and entrepreneurship (Cull & Xu, 2006; Nee, 1998; Nee, 1992; Nee, 1996; Peng & Heath, 1996; Steinfeld, 2007). Interestingly, China's new private entrepreneurs appear to have different values (Holt, 1997) and some influence on the political process and debate within the country (Roberts, Unpublished doctoral dissertation, 1997). Greater property rights protection and greater fairness (less corruption) in 33 emerging markets in Europe has been found to increase new firm founding and firm growth rates (Desai, Gompers, & Lerner, 2003). However, their analysis shows that the institutional effects appear to be of second order in more developed economies. In post-Soviet and formerly-Communist countries, insecure

property rights have been argued to be more inhibiting to entrepreneurship than capital constraints (Frye & Shleifer, 1997; Johnson, McMillan, & Woodruff, 1999; Johnson, McMillan, & Woodruff, 2000; Johnson, McMillan, & Woodruff, 2002; Shleifer, 1997). Chinese entrepreneurs have been shown to use specific strategies such as political participation and philanthropy to overcome limited property rights protection and constrained access to bank loans (Bai, Lu, & Tao, 2006). Obukhova (2007) finds that depending on their training and overseas work and educational experiences, Chinese entrepreneurs engaged in two different entrepreneurial strategies which she terms technological entrepreneurship and network entrepreneurship. These strategies for firm formation which hinge on whether innovation or the individual's business network is driving performance, she argues, resulted in important implications for the performance of these firms over time.

As in the U.S., there are various routes to entrepreneurship in China and these have likely changed over the years as changing institutions signal the appropriate ways of getting ahead (Baumol, 1990). Particularly in more recent years there has been a government path to entrepreneurship where higher ranking government officials have opted to either formally or informally leave their posts and found private firms or reconstitute cooperative companies as limited liability corporations (Wank, 1999). The connections built up through prior government service provide these entrepreneurs with advantageous access to both information and resources. Also, within China where education is highly valued, academic jobs have been prestigious positions and we should expect that those who have worked in academia may have access to opportunities that are less available to others. Our interviews indicated that traditionally, as with the graduates

of the French Ecole Polytechnique, the most talented Tsinghua University alumni often took prestigious positions within the Chinese central government. Some Chinese took opportunities to study overseas and gain stable work with large and multinational corporations. Until the most recent generation, these large firm and government opportunities were seen as the reward for persevering through years of competitive schooling to attend a prestigious university.

However, as noted above, innovation and high-tech entrepreneurship are rarely part of the discourse in relationship to China (for exceptions, see Tan, 1996; Tan, 2001; Tan, 2007). Widespread entrepreneurial activity began with the economic reforms that started in the late 1970s and high-tech entrepreneurship blossomed in the mid-1980s in the IT field. To the extent that resources and institutional infrastructure for entrepreneurship has been lacking in China, work experience and the accumulation of social and financial resources may be relatively more important for entrepreneurs. Our interviews suggest that investors in China see fewer experienced entrepreneurs and must rely more on pre-founding work experience outside of an entrepreneurial context to judge the quality of entrepreneurs.

Financial System

Many authors argue that the state-dominated financial system in China retards efficient allocation of capital (Boyreau-Debray & Wei, 2005; Chow & Fund, 2000; Steinfeld, 1998). Bank loans are most often reserved only for state-owned enterprises and so private entrepreneurs are often denied loans (McMillan, 1997; Nee, 1992). For decades, the central government controlled all capital allocation by keeping all banks as state-owned and then directing bank loans towards state-owned enterprises, which were then taxed and received loans again in a closed-loop system, distorting incentives for all

involved. Private capital may be acting to undo some of the inefficiency; however to know the true extent of the inefficiency result from state intervention in the financial system would require systematic data on private capital (business angels, or venture capital) invested. In March 1998, the PRC implemented a number of policies to promote venture investments (Batjargal & Liu, 2004). The initial venture capital funds within China were backed by the government, however, and had both policy as well as financial objectives. These initial government-venture capitalists often lacked the business experience necessary to pick good investments and these funds are widely seen as having had very poor performance. A handful of non-government backed private equity firms began entering the China market in the 1980s. It was not until after 1992 that economic reforms began to encourage significant numbers of private equity firms to enter the market (Bruton & Ahlstrom, 2003). Total venture capital investments in China grew from virtually nothing in 1990 to \$858 million in 2000. In the early 1990s, 90% of VC-backed firms were SOEs. In contrast, fewer than 10% of the VC-backed firms were SOEs in the late 1990s (Zeng, 2004). By 2001 there were 180 venture capital firms in China, many of them with overseas ties, some of these as joint ventures with Chinese government organizations, and \$1.87 billion under management (Batjargal & Liu, 2004). In 2007, \$2.49 billion was invested in 241 deals, according to the China Quarterly Venture Capital Report released by Dow Jones VentureSource) China's business/consumer/retail industry saw a record \$1.25 billion invested in 94 deals in 2007, up 83% over the \$682 million invested in 2006. The most popular segment within this industry was consumer/business services, which accounted for 48 deals and \$761 million in 2007—61% of the industry's investment total. Elsewhere, 110 information technology

(IT) companies in China received \$992 million in venture funding in 2007. Healthcare had 21 deals and \$175 million invested. Six deals were completed in clean energy and some \$31 million invested in 2007, a big drop-off from the \$421 million invested in 14 deals in 2006.

Theoretical Frameworks

Having finished a high-level overview of the historical perspective on the re-birth of widespread entrepreneurial activity in China, it is worthwhile to pause for a moment's reflection before diving into the various theoretical frameworks which may guide more analytical and generalized thinking about entrepreneurial development and market reform. It would be a mistake to simplify the past three decades as a story of the rise of private entrepreneurship and venture capital only. Indeed, the state-owned sector grew as well and may have even supported reform efforts (Naughton, 1994b). A complex array of policy reform, macroeconomic conditions, institutional entrepreneurship and individual behavior intertwined to produce the outcomes. Yet the international literature has characterized the process as 1) economic reform without political reform, 2) incremental, 3) beginning with agriculture, and 4) as regionally differentiated (Naughton, 1994b).

Most scholarly studies of the transition from command economy to markets and entrepreneurship have debated mainly issues of the optimal pace of reform or financial liberalization, institution building, and property rights arrangements. The authors have drawn largely on various sociological and economic theories, but made the assumption that transition from the starting point of a socialist, planned economy to a capitalist system is a unique and singular phenomenon (Steinfeld, 2002). However, a different

viewpoint and set of theoretical lenses becomes available when one views the economic problems of countries like Korea or China as similar to the typical economic challenges of capitalist economies (e.g., corporate governance, soft-budget constraints, information asymmetries), rather than as totally different phenomena. So, expanding beyond the particulars of China's market reforms, what are the theoretical frameworks which should guide deeper exploration of the emergence of entrepreneurship? In my view, we are not trying to perfect our knowledge of "how to transition from socialism to capitalism" as (unless some alien socialist planet is discovered, which seems unlikely) there are no large centrally planned economies left to transition (Steinfeld, 2002). Instead, I believe the goal is, or should be, to use the special conditions of economic transition as a laboratory for testing theories and learning things about the economic and sociological underpinnings of management, entrepreneurship, and strategy for which these settings provide a unique perspective not available to scholars examining developed economies or while keeping the set of institutions and corporate governance structures relatively constant. Some scholars argue that Western conceptions can only take us so far in analyzing the emerging economic order in non-Western countries (Boisot & Child, 1996). The next generation of organizational scholars should step up to this challenge of testing theories and addressing global differences, not only in marketing, strategy, or manufacturing, but also in entrepreneurship.

Four Levels of Social Analysis

When naively thinking about the various factors that may lead to international differences in the entrepreneurial process and outcomes or performance of start-up foundings, a host of variables come to mind (Begley & Tan, 2001). One could think about the culture, religion, risk tendencies, or about the governance and property rights

institutions, policies, or even about the material costs and labor market conditions.

Without a general conceptual framework, it is easy to get mired and confused in the myriad possible drivers and mediating factors. Williamson (2000) attempts to provide a conceptual framework of four levels of social analysis to begin to classify the various perspectives on why different countries wind up with different economic outcomes and industrial structures. Of course this is only one view, but it provides a nice starting point for taking a broad perspective.

Williamson refers to the first level as the *social embeddedness* level. It is at this level that culture and religion have their impact and this is the field in which a few economic historians, many anthropologists and some sociologists work. Factors at this level can be thought of as relatively stable and slow to change.

Second is the *institutional environment*. These are the “rules of the game” such as constitutions, how the judiciary process works, the organization of the political system. Political scientists and institutional economists or sociologists work on analyses of this level of society. The third level is that of *governance*. The governance level is concerned with contracts (Baker, Gibbons, & Murphy, 2002; Grossman & Hart, 1986; Hart, 1995; Hart & Moore, 1988; Hart & Tirole, 1988; Williamson, 2002 Holmstrom, Hart, Moore), information economics (Bolton & Dewatripont, 2005), transaction cost economics (Holmstrom & Roberts, 1998; Teece, 2000; Williamson, 1981), and the theory of the firm (Coase, 1937). In recent years and looking forward, this is a high growth area in terms of economics research. Sociologists and management theorists have also provided alternative frameworks at this level. Linking this area with the institutional environment, Lerner and Schoar forthcoming) analyze 210 developing country private

equity investments and find that transactions vary with the legal enforcement in the country. They find that private equity groups in low enforcement nations rely more heavily on ownership rather than contractual provisions resulting in lower valuations and returns.

Finally the fourth level is referred to as the *resource allocation* level. This is the domain of neoclassical economists who concern themselves with incentive alignment (Grossman & Hart, 1983), production functions, quantities, and prices. Having set the stage with an image of these four levels of analysis of a society, Williamson goes on to argue that clearly these four levels interact with one another, but primarily in the order in which they have been laid out. The culture and religion in a country largely constrain the choices as to the form of the constitution and the institutions that are set up to guide behavior. Similarly, the institutional environment serves to enable in some directions and constrain in others the governance structures and types of contracts that can be written or enforced in the economy. In the same way, the governance level and the choices available there will constrain actors as they solve the pricing, quantity and incentive alignment problems at the level of resource allocation within and between firms as well as individuals.

The remainder of the paper will have more to say about the institutional level in particular as well as the governance level since justifiably, these are a major focus of recent work in understanding the international differences in economic growth and in entrepreneurship. Yet, first I should note that one can easily quibble with this framework, particularly concerning directions of causality and co-evolution or feedback between different levels. Along these lines, it could be that it is economic development

which provides the wealth necessary to build better institutions. The framework also lacks emphasis on psychological and some sociological factors. Nonetheless, it provides a good overview of relevant factors, and it is difficult to come up with a comprehensive alternative framework.

Some scholars have argued that certain components in the above framework are not appropriate for the conditions of developing economies. Theoretical work shows that occupational structure can be shown to depend on the wealth distribution. Only with a certain level of inequality in wealth does one start to see employment contracts used by employers (Banerjee & Newman, 1993).

In a reaction against the transaction cost economics framework of corporate governance mechanisms, Boisot and Child (Boisot & Child, 1988) propose an information based theory. In their theory, the twin factors of information codification and information diffusion determine the organizational structures that will dominate in a society. According to their argument, only in societies with high information diffusion and high information codification do we see market-based capitalism because only there is the information environment such that it will support such a system of large firms and mass-produced goods. They develop a matrix of other alternative arrangements including fiefs and clan structures which result from lower levels of diffusion or codification.

National Innovation Systems

The literature on national innovation systems also highlights the role of governments and institutions in enhancing innovation and research activities by coordinating local knowledge transfers and spillovers between universities and firms (Freeman, 1987; Nelson, 1993). While the term refers to an overall system, which could encompass government policies, large firms, start-ups, universities, and public research

institutes, mostly, U.S. authors in this stream have placed weight on spillovers of commercially relevant knowledge from universities to firms. European authors have tended to emphasize the role of sophisticated users in the innovation system and the information flows from producers back to suppliers (Breznitz, 2007). More recent work has applied the innovation systems framework both more at the regional level and also to countries outside of the U.S. and Europe but similarly stressing university/industry interfaces (Motohashi, 2005). As discussed earlier, work tracing joint patent applications between firms and universities in China appears to show a decentralizing and at the same time localizing trend in knowledge flows from university to industry from 1985 to 2004 (Hong, 2008). Other authors have used a national survey of 22,000 large and medium sized manufacturers to track science and technology activities and linkages from 1996 to 2002 (Motohashi & Yun, 2007). The national innovation systems literature can be seen in many ways as a variant or subset of the varieties of capitalism idea that different institutional maps or structures can lead to different economic outcomes (Breznitz, 2007).

Building on the work on national innovation systems and on macroeconomic growth, Furman and colleagues (Furman, Porter, & Stern, 2002; Furman & Hayes, 2004) have developed a conceptual framework for a country's national innovation capacity, which is a combination of policies supporting innovation and investments in innovation through R&D expenditure and personnel. Their empirical work suggests that while many countries have adopted policies and institutions supporting innovation, those that have had greater growth in innovative performance have managed to make much greater investments in R&D in addition to adopting supporting policies.

Institutional Perspectives

Such alternative conceptions provide contrasting views, rich detail, and ways to think outside of more traditional frameworks, but have yet to be built upon or empirically tested extensively. On the other hand, neoclassical economics is built largely on a foundation which has abstracted away from institutions and the political, legal, and financial rules and structures within which pricing and quantity decisions are embedded. However, these institutions have not been neglected by sociologists and political economists and increasingly economists are paying heed to institutional frameworks as well. In institutional economics, the social institutions are defined as the laws, norms, and beliefs which form the written and unwritten “rules of the game” (North, 1990; Williamson, 2000). Institutions can help alter the constraints and structure of incentives in a society to direct self-interested behavior towards either more or less economically productive activities (Baumol, 1990; Nee, 1996). One complaint against the early institutional work done by many has been that institutions seem at once to be the heroes of economic development, doing countless jobs, yet the definition bundles together many seemingly disparate organizations, laws, and traditions. Yet over two decades ago a contract theory and a “predatory theory” of the state were distinguished (North, 1981). More recent work distinguished property rights institutions and contracting institutions. The former can be thought of as vertical, that is, protecting citizens from expropriation from government elites, while the latter can be thought of as horizontal in nature, protecting citizens and economic organizations with enforcement when they write contracts between each other. Empirical work appears to provide evidence that various measures of property rights appear to be more important for long-run economic development than contracting institutions (Acemoglu & Johnson, 2005). The explanation

given is that it is easier to find informal and alternative mechanisms or second-best solutions to limited contracting institutions than it is to find informal mechanisms to protect citizens from weak property rights institutions. Yet, other work has shown that informal property rights protection mechanisms do exist and can work (Bai, Lu, & Tao, 2006).

In recent years, there has been a fascinating, growing debate regarding the role of state intervention in developing economies. One view, which some have called the “Washington Consensus” for its widespread acceptance has advocated market liberalization including property rights, financial liberalization, and in general giving greater autonomy and control over prices and residual rights to private firms to allow markets to form (Johnson, McMillan, & Woodruff, 2000; Johnson, McMillan, & Woodruff, 2002). This view argues that there is very little role for the state in development and demonizes the state and government intervention while arguing for the great power of free markets and the “invisible hand” to allocate resources to their most productive uses. On the other hand, some sociologists and economic historians have argued for the important influence of what has been termed the “developmental state,” which calls for government intervention to generate economic growth. The pioneers in this field saw economic development as part of the national building project and that government attention to the development of the economy was needed to preserve independence (Gerschenkron, 1962). Gerschenkron (1962) argues that certain characteristics of less developed countries actually allow for more rapid economic development since existing investments do not act as barriers and a certain map of technological development has been shown by the more developed economies. In more

recent years, scholars have taken the examples of the success of Japan, Korea, and Taiwan to argue for aggressive state intervention in developing economies (Amsden, 2007). At times, these scholars raise the state to a heroic level, arguing that in developing economies, only governments have the resources, talent, patience, and long-term vision to build the core industries that will drive the growth of the economy. The perspective often builds on the ideal of a Weberian bureaucracy with career bureaucrats trained from within for their positions. They argue that relative failure has occurred in many economies in South America and Russia that have tried aggressive privatization and free market, *lassie-faire* approaches. Instead, developmental state proponents advocate government support to select a few key industries, generously support several large, nationally-owned firms, and protect these “seedlings” with trade tariffs, tax credits, and government subsidies until they grow to a point where they are strong enough to conduct their own R&D and support suppliers and related industries (Amsden, 1989). Theories in this vein talk about the challenges of import-substitution and upgrading from manufacturing and low-value added activities to do more innovation and higher margin activities (Amsden, 2003). They tend to ask how latecomers compete and how can developmental governments intervene in the markets to support them.

A typical successful example given of the effectiveness of the developmental state is that of Taiwan’s semiconductor industry which was dominated by foreign firms in 1975. One company, Tatung managed to grow larger in size which enabled it to enjoy economies of scale and more optimal-sized plants (Amsden, 2003). The growth also allowed the company to develop managerial skills such as large project management among employees. This virtuous cycle then allowed for the capabilities for outsourcing

manufacturing to lower-cost facilities in China. The Taiwan government had policies to support such large, national firms and gave subsidies for R&D and facilitated networking between Tatung and those who could help continue its growth. Stories like this and the case of Japan's rapid development via government-led efforts have had a strong impact on leaders in China's central government. On the other hand, the critique of this viewpoint, often from proponents of liberalization policies, is that it is precisely too much government intervention and skewed market incentives which were the problem for planned economies in the first place. The argument here is that we want firms to be investing more in R&D, operations, and marketing rather than in building political connections and currying favor from government bureaucrats.

Instead of taking sides in this debate of aggressive market liberalization vs. aggressive state intervention, other scholars have questioned whether there is not more of a middle road and if the historical examples cited have relevance for today's world economy. This more recent area of literature has become known by various names include the neo-developmental state or the networked developmental state. Other authors have merged in observations related to globalization and global production network theories. Steinfeld (2004) makes the argument that what is different today is that because of technological progress and the ability to transfer codified knowledge via information technology, firms have more networked production and manufacturing, marketing, and design can be spread across geographic locations. Industries are spread across locations rather than the entire production chain existing in single location (Sturgeon 2000, 2002, 2003). This argument is closely related to the work on global production networks and the global commodity chains perspective (Gereffi, 1999). The global commodity chains

perspective has examined patterns of international trade and industrial upgrading and looks at mechanisms of organizational learning within trade networks, organizational conditions facilitating upgrading, and the trajectory from assembly to higher value activities such as original equipment manufacturer (OEM) and original brand name manufacturing. In the past, it was more appropriate to promote certain industries, but these changing in networked production have caused China to become very integrated into the world economy, but only in terms of low margin manufacturing activities. Instead of market liberalization and decentralizing authority and property rights to firms, Steinfeld argues, what is needed is a clamping down and constraints-based approach to make the basic selection mechanisms of the market work in a developing economy. Ownership doesn't matter until the basics of markets are put in place and soft-budget constraint problems are solved (Steinfeld, 1998).

Dating back for many years, some scholars have advocated that the highest economic growth can be achieved by balancing the trade-offs between state planning and the efficiency of market competition. Of course, Japan experienced a wave of tremendous economic growth and with that a flurry of scholars wrote about various mechanisms through which the "Japanese Miracle" occurred. A similar flurry of writing can be said to be occurring with China's rapid growth, however, with the benefit of history, one can plot the economic growth of China's GDP against that of South Korea, Japan, and Taiwan and see that in comparison it is exemplary perhaps in terms of entrepreneurship, but not necessarily in terms of overall economic growth when comparable starting points are used. Johnson's (1982) detailed review of Japanese industrial policy argues that it was a highly trained and experienced bureaucratic

leadership at the Ministry of International Trade and Industry (MITI) coupled with a national priority of economic growth and skillful implementation of a cooperative industrial policy which effectively balanced state planning and competition to achieve high growth.

As discussed above, the example of the IT industry in Beijing, Shanghai, Xi'an, and Guangzhou has been used to argue similarly for the positive impact of local government policies and help directed at indigenous private or quasi-private enterprises (Segal, 2002). In Segal's study, many of the top IT firms were spin-offs from government agencies and academic institutions. He does not argue that the contribution of the state is always positive, but rather that it is conditional on past institutional structures. The other areas appear to lag behind since Beijing offered support for smaller private enterprises but did not have a history of having large government resources available to distort incentives away from market-based competition.

The latest version of the developmental state (or networked state or neo-developmental state) combines the perspectives of national innovation systems, global networked production, and the neo-developmental state framework (Breznitz, 2007). Breznitz (2007) argues that we need a more realistic story that views the state not as a single monolith, but rather as separate departments that bring in political choices, allowing for a cohesive story about why in a single country, one innovation-based industry can fail while a different one succeeds. He builds a framework where there are choices for the politicians to make in the character and direction of development. For Breznitz, the state's role is to initiate and encourage a set of actors to enter into innovation-based industries and then to step back and act more as facilitator and network

broker both internally among the firms and between the firms and multinational corporations or international financial systems. He emphasizes that in a world of fragmented production, it is not the state's role to dictate and determine industries to focus on, but rather to allow participants to sort out where to link into global production chains and to become networked with the industry enough to be able to respond to needs quickly and in a targeted manner. His work argues that the route that the state takes to becoming embedded with industry is as important as the state's structure and that there is no one optimal choice.

As an empirical test of the idea that supporting institutions impact the innovation strategy and performance of entrepreneurial firms in China, Li and Atuahene-Gima (2001) examine 184 firms located in the Beijing Experimental Zone science park. They use resource dependency theory and argue that their results show that there are contingent effects of institutional support and environmental turbulence for product innovation strategy and performance of technology ventures in China. Their findings indicate that product innovation strategies are more effective in high turbulence environments and when the CEOs perceive institutional support to be higher. However, their study design has clear problems with endogeneity in the effects of performance on the perception of institutional support, and since the only variance among the firms in the environment they actually faced would be the industry, their results are also confounded with industry effects.

Another view which steps outside of this debate to take an even broader view of the relationship between non-market institutions and market forces argues against the idea that there is a single optimum institutional "blueprint" for economic development. A

common element among the more recent, neo-developmental state writing has been a move away from the idea that economic development and the emergence of rapid innovation-based industries follows a linear trajectory with a single optimal set of institutions for growth (Breznitz, 2007). Some have argued that democracy is a type of meta-institution which allows for the aggregation of local knowledge and the development of the particular ecosystem of non-market institutions best suited for growth in a particular country (Rodrik, 2000). This argument alludes to literature on varieties of capitalism which argues that while some capitalist economies are organized for radical innovation and high growth (U.S.), others are better at other outcomes such as equality or incremental innovation (such as the EU, Japan) (Hall & Soskice, 2001). There is some support for this theory in the literature on China's development in the sense that some practices, unexpectedly, worked in China due to its particular history and environment. For example, Naughton (1994a) argues that the collective ownership form common for China's township and village enterprises (TVEs) leads to uncertainty about ultimate property rights. Proponents of the role of property rights institutions in economic development might argue that this should have dulled incentives to invest and thus entry and growth. However, as indicated above, TVEs were remarkably successful and appear to have grown rapidly. This may have been because TVEs were an effective adaptation to the particular economic environment in China at the time (Naughton, 1994a). Product markets and demand for consumer goods was high, but markets for factors of production or assets and financing were not well-developed. TVEs may have been an organizational form that was flexible enough to be effective in that environment. While it's very hard to imagine that "local knowledge" anticipated that this would work well, it does lend

credence to the idea that perhaps no single blueprint can foresee all the important environmental contingencies and adaptations.

Still another view is that whatever the government may do, legal systems and institutions are difficult to change or strengthen in the short to medium term, and so the main challenge for entrepreneurs in emerging economies is in finding informal and clever ways to overcome weak institutions and limited resources. Overseas Chinese networks have been shown to help in this regard, both with providing financing and also contract enforcement (Huang, 2008; Tong, 2005). The preceding line of work has led many authors to question whether in emerging economies, during liberalization, if it is better for resource-constrained entrepreneurs to invest in political networking or in R&D, operations and marketing (Guthrie, 1999; Rona-Tas, 1994). Political investment confers status and reputation, access to timely market information, and politicians still control critical aspects such as tax policy and banking regulation. However, with liberalization, one may no longer need officials to bring resources or remove bottlenecks. Plus, using connections may be more dangerous as law enforcement is strengthened. Siegal (2007) uses a natural experiment in Korea to examine political connectedness after liberalization and finds that, controlling for R&D and marketing, investments in political connections is one of the strongest determinants of cross-border alliance formation. The results suggest that the effect of liberalization policies is not to decrease the importance of political network investments, but rather to allow entrepreneurs to access new outside resources and partners. The study referred to previously of Beijing science park firms from the late 1990s found no effects for amount of effort spent on political networking on innovation strategy or performance (Li & Atuahene-Gima, 2001). However, the nature of the

location and technology focus of these firms indicates that they were likely the focus of political officials regardless of their efforts to network.

Network theory has been a growing area of inquiry for a long time (Burt, 1992), but particularly in recent years it has been applied in an innovation or entrepreneurial context (Freeman, 1991; Shane & Cable, 2002). Previous work has indicated that while networking is vital in U.S. entrepreneurship, in China *guanxi* or a particular sense of “social connections” (Farh, Tsui, Xin, & Cheng, 1998; Park & Luo, 2001) is particularly important and appears to be a mechanism used to improve firm performance and overcome some of the underdeveloped legal and financial infrastructure in the country (Batjargal & Liu, 2004; Licht & Siegel, 2006; Peng & Luo, 2000; Xin & Pearce, 1996; Zhao & Aram, 1995). Political connections, as measured by affiliation with the ruling Communist Party, have been found to be particularly helpful for firm performance in regions with weak market institutions and legal protection (Li, Meng, Wang, & Zhou). Using a nationwide survey of 2,324 privately owned enterprises conducted by the Chinese Academy of Social Sciences and several other groups (including the United Front Work Department of the Central Committee of the Communist Party of China), Li et al. (2009) find that party-member entrepreneurs are more likely to obtain loans, have more confidence in the legal system, and have higher firm profitability (assuming no systematic differences in reporting), even controlling for human capital. However, party-member entrepreneurs may have been more significant achievers even before becoming party members. There is an on-going debate, however, about the extent to which elites in transitional economies have been able to translate their power into economic benefits and the mechanisms that allow such a transfer (Walder 2002, 2003, Nee 1996).

Conclusion

In conclusion, the laboratory of China's recent economic liberalization and the growth in private entrepreneurial firms offer a unique window on the effects of shifting institutional and political factors on the entrepreneurial process and strategic issues for entrepreneurs and managers. For researchers, it offers an opportunity to examine the effects of aspects of the economic and social structure which are changing rapidly in China, but tend to remain relatively stable in the developed country contexts where entrepreneurship previously has been empirically and theoretically examined.

Institutional frameworks have received increasing attention from scholars in recent years for their roles in supporting R&D along with entrepreneurial activity. The application of these frameworks in the context of technology-based entrepreneurship in developing countries should yield exciting results and new challenges for both empiricists and theoreticians interested in innovation and new business formation.

Figures

Figure 1



(Chinese State Statistics Bureau)

Figure 2

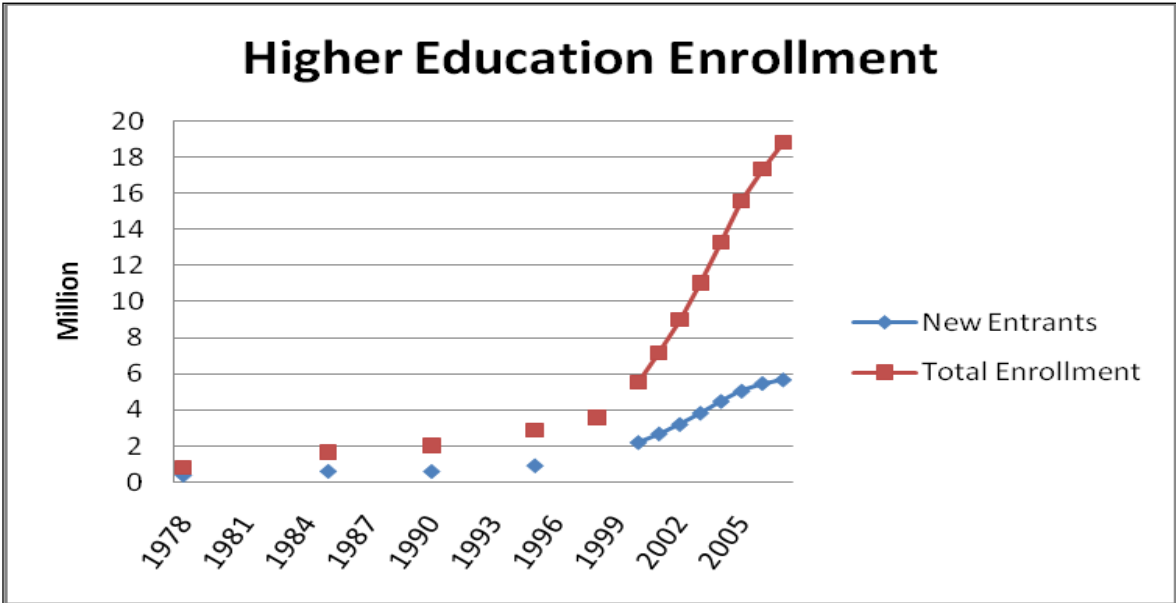
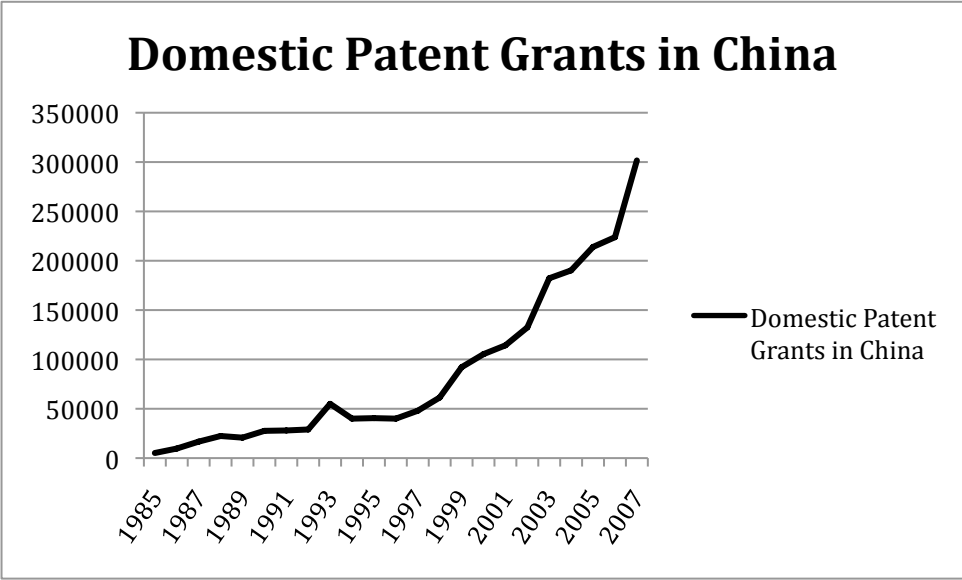


Figure 3



(Source: China Statistical Yearbook)

References

- Acemoglu, D., & Johnson, S. 2005. Unbundling institutions. *Journal of Political Economy*, 113(5): 949-995.
- Alfaro, L., & Charlton, A. 2007. International financial integration and entrepreneurial firm dynamics. *Working Paper, Harvard Business School*.
- Amsden, A. 1989. *Asia's next giant: South korea and late industrialization*. Oxford, UK: Oxford University Press.
- Amsden, A. H. 2003. *Beyond late development: Upgrading policies in taiwan*. Cambridge, MA: MIT Press.
- Amsden, A. H. 2007. *Escape from empire: The developing world's journey through heaven and hell*. Cambridge, MA: MIT Press.
- Backer, K. D., & Sleuwaegen, L. 2003. Does foreign direct investment crowd out domestic entrepreneurship? *Review of Industrial Organization*, 22: 67-84.
- Bai, C., Lu, J., & Tao, Z. 2006. Property rights protection and access to bank loans: Evidence from private enterprises in china. *Stanford Working Paper No. 281*.
- Baker, G., Gibbons, R., & Murphy, K. J. 2002. Relational contracts and the theory of the firm. *The Quarterly Journal of Economics*, 117(1): 39-84.
- Banerjee, A., & Newman, A. 1993. Occupational choice and the process of development. *The Journal of Political Economy*, 101(2): 274-298.
- Batjargal, B., & Liu, M. (. 2004. Entrepreneurs' access to private equity in china: The role of social capital. , 15(2): 159.
- Baumol, W. J. 1990. Entrepreneurship: Productive, unproductive, and destructive. *The Journal of Political Economy*, 98(5): 893.
- Begley, T., & Tan, W. 2001. The socio-cultural environment for entrepreneurship: A comparison between east asian and anglo-saxon countries. *Journal of International Business Studies*, 32(3): 537-553.
- Boisot, M., & Child, J. 1988. The iron law of fiefs: Bureaucratic failure and the problem of governance in the chinese economic reforms. *Administrative Science Quarterly*, 33(4): 507-527.
- Boisot, M., & Child, J. 1996. From fiefs to clans and network capitalism: Explaining china's emerging economic order. *Administrative Science Quarterly*, 41(4): 600-628.
- Bolton, P., & Dewatripont, M. 2005. *Contract theory*. Cambridge, MA: The MIT Press.
- Boyreau-Debray, G., & Wei, S. 2005. *Pitfalls of a state-dominated financial system : The case of china*. Cambridge, MA: NBER.
- Branstetter, L., & Lardy, N. 2006. China's embrace of globalization. *NBER Working Paper No. 12373*.
- Breznitz, D. 2007. *Innovation and the state : Political choice and strategies for growth in israel, taiwan, and ireland*. New Haven, CT: Yale University Press.
- Bruton, G. D., & Ahlstrom, D. 2003. An institutional view of china's venture capital industry: Explaining the differences between china and the west. *Journal of Business Venturing*, 18: 233-259.

- Burt, R. 1992. *Structural holes*. Cambridge, MA: Harvard University Press.
- Busenitz, L. W., Gomez, C., & Spencer, J. W. 2000. Country institutional profiles: Unlocking entrepreneurial phenomena. , 43(5): 994.
- Cai, H., Todo, Y., & Zhou, L. 2007. Do multinationals' R&D activities stimulate indigenous entrepreneurship? evidence from china's "silicon valley". *NBER Working Paper*, 13618: <http://www.nber.org/papers/w13618>.
- Chow, C. K., & Fund, M. K. Y. 2000. Small business and liquidity constraints in financing business investment: Evidence from shanghai's manufacturing sector. *Journal of Business Venturing*, 15: 363-383.
- Coase, R. H. 1937. The nature of the firm. *Economica*, 4: 386-405.
- Cull, R., & Xu, L. C. 2006. Institutions, ownership, and finance: The determinants of profit reinvestment among chinese firms. *Working paper*.
- Desai, M., Gompers, P., & Lerner, J. 2003. Institutions, capital constraints, and entrepreneurial firm dynamics: Evidence from europe. *NBER Working Paper No. 10165*.
- Farh, J., Tsui, A. S., Xin, K., & Cheng, B. 1998. The influence of relational demography and guanxi: The chinese case. *Organization Science*, 9(4): 471-488.
- Freeman, C. 1987. *Technology policy and economic performance: Lessons from japan* Pinter Pub Ltd.
- Freeman, C. 1991. Networks of innovators: A synthesis of research issues. , 20(5): 499.
- Freeman, R. B. 2005. Does globalization of the Scientific/Engineering workforce threaten U.S. economic leadership? *NBER Working Paper No. 11457*.
- Frye, T., & Shleifer, A. 1997. The invisible hand and the grabbing hand. *The American Economic Review*, 87(2, Papers and Proceedings of the Hundred and Fourth Annual Meeting of the American Economic Association): 354-358.
- Furman, J. L., & Hayes, R. 2004. Catching up or standing still?: National innovative productivity among 'follower' countries, 1978–1999. *Research Policy*, 33(9): 1329-1354.
- Furman, J. L., Porter, M. E., & Stern, S. 2002. The determinants of national innovative capacity. *Research Policy*, 31(6): 899-933.
- Gereffi, G., Wadhwa, V., Rissing, B., & Ong, R. 2008. Getting the numbers right: International engineering education in the united states, china, and india. *Journal of Engineering Education*: 13-25.
- Gereffi, G. 1999. International trade and industrial upgrading in the apparel commodity chain. *Journal of International Economics*, 48(1): 37-70.
- Gerschenkron, A. 1962. *Economic backwardness in historical perspective: A book of essays*. Cambridge, MA: Belknap Press of Harvard University Press.
- Gorg, H., & Strobl, E. 2002. Multinational companies and indigenous development: An empirical analysis. *European Economic Review*, 46: 1305-1322.
- Gregory, N., Tenev, S., & Wagle, D. 2000. China's emerging private enterprises: Prospects for the new century.
- Grossman, S. J., & Hart, O. D. 1983. An analysis of the principal-agent problem. , 51(1): 7.
- Grossman, S. J., & Hart, O. D. 1986. The costs and benefits of ownership: A theory of vertical and lateral integration. *The Journal of Political Economy*, 94(4): 691-719.

- Groves, T., Hong, Y., McMillan, J., & Naughton, B. 1995. China's evolving managerial labor market. *Journal of Political Economy*, 103(4): 873-892.
- Guthrie, D. 1999. *Dragon in a three-piece suit : The emergence of capitalism in china*. Princeton, NJ: Princeton University Press.
- Hall, P. A., & Soskice, D. 2001. *Varieties of capitalism : The institutional foundations of comparative advantage*. New York: Oxford University Press.
- Hart, O. 1995. *Firms, contracts, and financial structures*. Oxford: Oxford University Press.
- Hart, O., & Moore, J. 1988. Incomplete contracts and renegotiation. *Econometrica*, 56(4): 755-785.
- Hart, O. D., & Tirole, J. 1988. Contract renegotiation and coasian dynamics. *The Review of Economic Studies*, 55(4): 509-540.
- Holmstrom, B., & Roberts, J. 1998. The boundaries of the firm revisited. *The Journal of Economic Perspectives*, 12(4): 73.
- Holt, D. H. 1997. A comparative study of values among chinese and US entrepreneurs: Pragmatic convergence between contrasting cultures. *Journal of Business Venturing*, 12: 483-505.
- Hong, W. 2008. Decline of the center: The decentralizing process of knowledge transfer of chinese universities from 1985 to 2004. *Research Policy*, 37(4): 580-595.
- Huang, Y. 2003. *Selling china*. Cambridge, UK: Cambridge University Press.
- Huang, Y. 2004a. Ownership biases and FDI in china: Two provinces. *MIT Sloan Working paper*, 4537-04.
- Huang, Y. 2004b. Why more may be actually less? financing bias and labor-intensive FDI in china. In Y. Huang, T. Saich, & E. Steinfeld (Ed.), *Financial sector reforms in china* Harvard University Press.
- Huang, Y. 2006. What is wrong with shanghai. *Working paper*.
- Huang, Y. 2008. *Capitalism with chinese characteristics: Entrepreneurship and state during the reform era*. New York: Cambridge University Press.
- Huang, Y. 2008 Working paper. Is entrepreneurship missing in shanghai? *Paper Prepared for the NBER Conference on "International Differences in Entrepreneurship" Savannah, GA*.
- Johnson, C. 1982. *MITI and the japanese miracle: The growth of industrial policy, 1925-1975*. Stanford, CA: Stanford University Press.
- Johnson, S., McMillan, J., & Woodruff, C. 1999. Property rights, finance, and entrepreneurship. *Working paper*.
- Johnson, S., McMillan, J., & Woodruff, C. 2000. Entrepreneurs and the ordering of institutional reform: Poland, slovakia, romania, russia and the ukraine compared. *Economics of Transition*, 8: 1-36.
- Johnson, S., McMillan, J., & Woodruff, C. 2002. Property rights and finance. *The American Economic Review*, 92(5): 1335.
- Law, W. 1995. The role of the state in higher education reform: Mainland china and taiwan. *Comparative Education Review*, 39(3): 322-355.
- Lerner, J., & Schoar, A. forthcoming. Does legal enforcement affect financial transactions? the contractual channel in private equity. *The Quarterly Journal of Economics*.

- Li, H., Meng, L., Wang, Q., & Zhou, L. in press. Political connections, financing and firm performance: Evidence from chinese private firms. *Journal of Development Economics*.
- Li, Y., Whalley, J., Zhang, s., & Zhao, X. March 2008. The higher educational transformation of china and its global implications. *NBER Working Paper No. 13849*.
- Li, H., & Atuahene-Gima, K. 2001. Product innovation strategy and the performance of new technology ventures in china. , 44(6): 1123.
- Li, H., Meng, L., Wang, Q., & Zhou, L. Political connections, financing and firm performance: Evidence from chinese private firms. *Journal of Development Economics*, In Press, Corrected Proof.
- Licht, A. N., & Siegel, J. I. 2006. The social dimensions of entrepreneurship. In M. Casson & B. Yeung (Ed.), *Oxford handbook of entrepreneurship*. Oxford: Oxford University Press.
- Liu, X., & White, S. 2001. Comparing innovation systems: A framework and application to China's transitional context. *Research Policy*, 30: 1091-1114.
- Lu, Q. 2000. *China's leap into the information age : Innovation and organization in the computer industry*. New York: Oxford University Press.
- McMillan, J. 1997. Markets in transition. In D. M. Kreps & K. F. Wallis (Ed.), *Advances in economics and econometrics*, vol. II: 210-239. Cambridge: Cambridge University Press.
- McMillan, J., & Woodruff, C. 2002. The central role of entrepreneurs in transition economies. *The Journal of Economic Perspectives*, 16(3): 153-170.
- Motohashi, K. 2005. University-industry collaborations in japan: The role of new technology-based firms in transforming the national innovation system. *Research Policy*, 34(5): 583-594.
- Motohashi, K., & Yun, X. 2007. China's innovation system reform and growing industry and science linkages. *Research Policy*, 36(8): 1251-1260.
- Mowery, D. C., Nelson, R. R., & Sampat, B. N. 2001. The growth of patenting and licensing by US universities: An assessment of the effects of the bayh-dole act of 1980. *Research Policy*, 30(1): 99-119.
- Murray, F., & Spar, D. 2006. Bit-player or powerhouse? china and stem cell research. *New England Journal of Medicine*, 355(12): 1191-1194.
- Naughton, B. 1994a. Chinese institutional innovation and privatization from below. *American Economic Review*, 84(2): 266-270.
- Naughton, B. 1994b. What is distinctive about china's economic transition? state enterprise reform and overall system transformation. *Journal of Comparative Economics*, 18: 470-490.
- Naughton, B. 1995. *Growing out of the plan: Chinese economic reform, 1978-1993*. New York: Cambridge Univ. Press.
- Naughton, B. 2003. "How much can regional integration do to unify China's markets?" In Nicholas Hope, Dennis Yang, and Mu Yang Li (Ed.), *How far across the river? chinese policy reform at the millennium*. : 204-232. Stanford: Stanford University Press.
- Nee, V. 1998. Norms and networks in economic and organizational performance. *American Economic Review*, 88(2): 85-89.

- Nee, V. 1992. Organizational dynamics of market transition: Hybrid forms, property rights, and mixed economy in china. *Administrative Science Quarterly*, 37(1): 1-27.
- Nee, V. 1996. The emergence of a market society: Changing mechanisms of stratification in china. *The American Journal of Sociology*, 101(4): 908-949.
- Nelson, R. R. 1993. *National innovation systems: A comparative analysis*. New York, NY: Oxford University Press.
- North, D. C. 1990. *Institutions, institutional change and economic performance*. Cambridge, UK: Cambridge University Press.
- North, D. C. 1981. *Structure and change in economic history*. New York: Norton.
- Obukhova, E. 2007. High-skilled migrant entrepreneurship. *Unpublished doctoral dissertation*, University of Chicago.
- Park, S. H., & Luo, Y. 2001. Guanxi and organizational dynamics: Organizational networking in chinese firms. *Strategic Management Journal*, 22(5): 455.
- Peng, M. W., & Heath, P. S. 1996. The growth of the firm in planned economies in transition: Institutions, organizations, and strategic choice. *Academy of Management Review*, 21(2): 492-528.
- Peng, M. W., & Luo, Y. 2000. Managerial ties and firm performance in a transition economy: The nature of a micro-macro link. *Academy of Management Journal*, 43(3): 486-501.
- Puga, D., & Trefler, D. August 2005. Wake up and smell the ginseng: The rise of incremental innovation in low-wage countries. *NBER Working Paper No. 11571*.
- Qian, Y. 2000. The process of china's market transition (1978-98): The evolutionary, historical, and comparative perspectives. *Journal of Institutional and Theoretical Economics*, 156(1): 151-171.
- Roberts, E.B. 2009. Private conversation, May 19, 2009.
- Roberts, A. L. Unpublished doctoral dissertation, 1997. The political impact of china's new private entrepreneurs. , UC Berkeley.
- Rodrik, D. 2000. Institutions for high-quality growth: What they are and how to acquire them. *Studies in Comparative and International Development*, 35(3): 3-31.
- Rona-Tas, A. 1994. The first shall be last? entrepreneurship and communist cadres in the transition from socialism. *The American Journal of Sociology*, 100(1): 40-69.
- Segal, A. 2002. *Digital dragon: High-technology enterprises in china*. Ithaca, NY: Cornell University Press.
- Shane, S., & Cable, D. 2002. Network ties, reputation, and the financing of new ventures. , 48(3): 364.
- Shleifer, A. 1997. Government in transition. *European Economic Review*, 41(3-5): 385-410.
- Siegel, J. 2007. Contingent political capital and international alliances: Evidence from south korea. *Administrative Science Quarterly*, 52(4): 621-666.
- Steinfeld, E. 1998. *Forging reform in china : The fate of state-owned industry*. Cambridge, UK: Cambridge University Press.
- Steinfeld, E. 2007. Chinese enterprise development and the challenge of global integration. In S. Yusuf (Ed.), *East asian networked production* World Bank.
- Steinfeld, E. S. 2002. Moving beyond transition in china: Financial reform and the political economy of declining growth. *Comparative Politics*, 34(4): 379-397.

- Steinfeld, E. S. 2004. China's shallow integration: Networked production and the new challenges for late industrialization. *World Development*, 32(11): 1971-1987.
- Tan, J. 1996. Regulatory environment and strategic orientations in a transitional economy: A study of chinese private enterprise. *Entrepreneurship Theory and Practice*: 31-46.
- Tan, J. 2001. Innovation and risk-taking in a transitional economy: A comparative study of chinese managers and entrepreneurs. *Journal of Business Venturing*, 16: 359-376.
- Tan, J. 2007. Phase transitions and emergence of entrepreneurship: The transformation of chinese SOEs over time. *Journal of Business Venturing*, 22: 77-96.
- Teece, D. J. 2000. Toward an economic theory of the multiproduct firm. In Joel A.C. Baum and Frank Dobbin (Ed.), *Advances in strategic management*, vol. Volume 17: 29-53JAI.
- Tong, S. Y. 2005. Ethnic networks in FDI and the impact of institutional development. *Review of International Economics*, 9(4): 563-580.
- Vernon, R. 1966. International investment and international trade in product cycle. *Quarterly Journal of Economics*, 80(2): 190-207.
- Wank, D. 1999. *Commodifying communism*. Cambridge, UK: Cambridge University Press.
- Whalley, J., & Zhou, W. 2007. Technology upgrading and china's growth strategy to 2020. : Available at SSRN: <http://ssrn.com/abstract=982232>.
- Williamson, O. E. 1981. The economics of organization: The transaction cost approach. *American Journal of Sociology*, 87(3): 548-577.
- Williamson, O. E. 2000. The new institutional economics: Taking stock, looking ahead. *Journal of Economic Literature*, 38(3): 595-613.
- Williamson, O. E. 2002. The theory of the firm as governance structure: From choice to contract. *Journal of Economic Perspectives*, 16(3): 171-195.
- Xin, K. R., & Pearce, J. L. 1996. Guanxi: Connections as substitutes for formal institutional support. *Academy of Management Journal*, 39(6): 1641-1658.
- Xin, H., & Normile, D. 2008. CHINESE UNIVERSITIES: Gunning for the ivy league. *Science*, 319(5860): 148-151.
- Yang, J., & Li, J. 2008. The development of entrepreneurship in china. *Asia Pacific Journal of Management*, 25: 335-359.
- Young, S. 1995. *Private business and economic reform in china*. New York: M.E. Sharpe.
- Young, A. 2000. The razor's edge: Distortions and incremental reform in the people's republic of china*. *Quarterly Journal of Economics*, 115(4): 1091-1135.
- Yu, P. K. 2006. From pirates to partners (episode II): Protecting intellectual property in post-WTO china. *American University Law Review*, 55: Available at SSRN: <http://ssrn.com/abstract=578585>.
- Zhang, H., & Liu, W. 1995. *China's private economy and private entrepreneurs*. Beijing: Zhishi Press.
- Zhang, Y., Li, H., & Schoonhoven, C. B. 2008. Inter-community relationships and community growth in china's high technology industries 1988-2000. *Strategic Management Journal*: forthcoming.

- Zhao, L., & Aram, J. D. 1995. Networking and growth of young technology-intensive ventures in china. *Journal of Business Venturing*, 10: 349-370.
- Zhou, X., Li, Q., Zhao, W., & Cai, H. 2003. Embeddedness and contractual relationships in china's transitional economy. *American Sociological Review*, 68(1): 75-102.

