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“Endogenous Institutional Change and Dynamic Capitalism”

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Abstract

State-centered theory asserts that political institutions and credible commitment by political elite to formal rules securing property rights provides the necessary and sufficient conditions for economic growth to take place. In this approach, the evolution of institutions favorable to economic performance is a top-down process led by politicians who control the state. Hence, in less developed and poor countries, the counterfactual is that if formal institutions secure property rights and check predatory action by the political elite, then sustained economic growth would follow. The limitation of state-centered theory stems from the problem that behavioral prescriptions—formal rules and regulations—that reflect what politicians prefer can be ignored. In contrast, we lay out the bottom-up construction of economic institutions that gave rise to capitalist economic development in China. Entrepreneurship in the economically developed regions of the coastal provinces was not fueled by exogenous institutional changes. When the first entrepreneurs decided to decouple from the traditional socialist production system, the government had neither initiated financial reforms inviting a broader societal participation, nor had it provided property rights protection or transparent rules specifying company registration and liabilities. Instead, it was the development and use of innovative informal arrangements within close-knit groups of like-minded actors that provided the necessary funding and reliable business norms. This allowed the first wave of entrepreneurs to survive outside of the state-owned manufacturing system. This bottom-up process resembles earlier accounts of the rise of capitalism in the West.

Endogenous Institutional Change and Dynamic Capitalism

1 Introduction

The success of state-guided economic development in China underscores the need to explain the role of the state in giving rise to sustained economic growth. In 2008, despite the most serious global economic downturn since the Great Depression, China's economic growth was sustained at 8 percent per annum, the only major economy that avoided the severe economic downturn. Its economic growth continued to gather momentum amidst the global economic crisis. Why and how was the very same state that presided from 1953 to 1978 over a command economy, radical redistributive policies, and poor economic performance then capable of guiding transformative capitalist economic development in another era?

With respect to the role of the state in China's economic miracle, two distinct approaches have emerged in the sociology of development, reflecting contrasting views of the role of the state in market-oriented economic growth. State-centered accounts attribute China's economic success to the organizational capacity of local government to monitor and intervene to promote the development of township and village enterprises (Oi 1992; Walder 1995; Whiting 2000; Huang 2008). The market transition approach takes issue with the top-down approach that focuses only on the "helping hands" of political actors (Frye and Shleifer 1997). It instead emphasizes the causal effect of change in the relative power of political and economic actors, and a corresponding change in the role of the state through incremental shifts away from direct interventions in micro-

managing the economy (Nee 1989, 1996). By investing in the construction of an elite, rational-legal bureaucracy, the central government gradually has made the transition to a regulatory role through shaping macroeconomic policies and enacting new formal rules governing markets (Nee and Oppen 2007). We contend that the limitation of the state-centered perspective is that it is unable to explain the bottom-up dynamics of emergent capitalist economic development in China.

A focus on China as a study of robust entrepreneurial action and capitalist economic development was not predicted. The consensus view of Western economists was that Eastern Europe and the former Soviet Union would be most likely to make an early and successful transition to market capitalism. After all, these were industrial economies with highly developed human capital and large urban populations. In 1978, China was an impoverished agrarian economy with 80 percent of its population in subsistence agriculture, with a per capita investment in education at the same level as that of Bangladesh. Not only were the new political elites of Eastern Europe and the former Soviet Union supportive of the “big bang” approach designed by economists, but they also adopted the entire tool kit that combined economic and political reforms into the same institutional design of top-down rapid transition to capitalism. Not expected was the opposite outcome, as Stiglitz’s (2002: 6) underscores: “While in 1990 China’s gross domestic product (GDP) was 60 percent that of Russia, by the end of the decade the numbers had been reversed. While Russia saw an unprecedented increase in poverty, China saw an unprecedented decrease.” According to the United Nation’s assessment, from 1978 to 2005, China experienced an unprecedented decline in absolute poverty, the largest and most rapid in human history, with more than 340 million people shifting out

of subsistence agriculture into market-oriented productive activity. Concomitantly, a newly affluent parvenu stratum of entrepreneurs and professionals has arisen to form a new class whose wealth is rooted not in the political order—as with the old state socialist redistributive era elite—but in the rise of a market capitalist economy.

China's ambitious economic reform relied on a mix of top-down and bottom-up processes of institutional change while largely ignoring the advice of economists affiliated with the International Monetary Fund and World Bank, some of whom had drafted the blueprint for capitalist transition in Eastern Europe and the former Soviet Union.

Several observations are in order. First, China's explosive economic growth has the self-reinforcing endogenous dynamics of sustained economic development. In 2010, China's GDP surpassed that of Japan's to become the second largest economy in the world. With the huge economic stimulus channeling \$685 billion to fund ambitious infrastructure projects and state-owned enterprises, economic recovery and growth in China has become an indispensable economic engine of global economic recovery. Not surprisingly therefore, international economic institutions now view China as the latest entry in the pantheon of successful developmental states, along with South Korea, Taiwan, Singapore and Japan (Stiglitz 2002).

Second, China's policy model clearly resembles core features of the developmental state in East Asia (Hamilton and Biggart 1988, White and Wade 1988), building on a strong authoritarian national leadership and an elite state bureaucracy pursuing developmental goals and industrial policy (Wade 1990). It is not however, well understood which type of state action has actually given rise to transformative economic

development. In this sense, as Wade (1990: 26) rightly criticizes, developmental state theory has little to say “about the nature of policies and their impact on industrial performance.”

Is China’s economic success really due to the government’s organizational capacity to monitor and intervene in the firm’s decisions? According to Walder (1995), when government has clear incentives and the ability to monitor firms and enforce their interests as owners, government officials can replace the entrepreneur as the mechanism driving gains in productivity and sustained market-oriented economic growth. Or is entrepreneurial success in China, quite to the contrary, built on bottom-up innovations giving rise to the construction of informal economic institutions and the government’s liberalization of product and labor markets, ambitious investments in infrastructure (i.e. transportation, education, regulatory apparatus) and institutional change, leading to more secure private property rights and incentives for economic actors to innovate as a means to secure improvements in economic performance and competitive advantage?

2 Limits of top-down approaches to economic development

Building on the view that the polity, as the enforcer of the rules of the game, is “the primary source of economic performance” (North 2005: 57), state-centered theory underscores the role of political actors. The idea that politicians play a key role is substantively undeniable and intuitively appealing. With its comparative advantage in violence, the state operates as a monopolist that enjoys substantial cost advantages in institutional change. By contrast, a free-rider dilemma constrains the ability of economic actors to assume the cost of collective action to establish and enforce the rules of the

game. Thus it follows that “institutional innovation will come from rulers rather than constituents since the latter would always face the free-rider problem. The ruler will, on his side, continue to innovate institutional change to adjust to changing relative prices since he has no free-rider problem” (North 1981: 32).

The problem with the top-down approach is that it cannot explain the self-reinforcing, endogenous rise of China’s private enterprise economy, which is the very foundation of capitalist economic development driving private wealth accumulation. During the first decade of reform, the central government explicitly outlawed private enterprise as an ownership form in the transition economy. Reform leaders not only enforced rules against private enterprises, but predatory taxes and expropriation by local government of assets and wealth of peasant entrepreneurs highlighted the problem of insecure property rights for privately owned assets and wealth. It was not until a decade after the start of economic reform, when the private enterprise was already growing rapidly, that the first constitutional amendment in 1988 eventually conferred legal status to private firms. The corresponding law—“The Temporary Regulations of Private Enterprise” (July 1988)—governing private firms with more than seven wage laborers (*siying qiye*), however, still reflected the government’s intent to limit the private sector to a subordinate, if not inferior, role.

Private firms make up the largest and most dynamic sector; yet the formal rules crafted by the political elite continue to favor state-owned enterprises and state-controlled corporations. This is seen clearly in the lending policy and practices of China’s state-owned financial institutions, which were a key feature of an institutional design to deter, if not entirely block, the rise of the private enterprise economy. In 2008, the central

government announced a massive economic stimulus program of USD 585 billion. A rapid decline in global consumer demand affected all sectors of the industrial economy. Relative to China's gross national product, the stimulus program was the largest of the major economies. The government channeled the stimulus money to state-owned banks, which in turn extended a torrent of low-interest credit to local governments to support mega-infrastructure projects and to state-owned enterprises. Despite official figures showing that small- and medium-sized firms employed 75 percent of China's workers and produced 68 percent of the gross industrial product in 2008, private firms have been virtually excluded from direct support in the form of preferential access to low interest loans. Though private firms sought economic stimulus money, state-owned banks routinely rejected loan applications submitted by private firms. Instead the massive economic stimulus has provided a huge subsidy to local governments and large state-owned enterprises and public corporations.

Consider this counter-factual: If political actors had had their way, the seeds of capitalism, sowed as an unintended consequence of reform policies, would have been contained by state-mandated rules restricting the size of private firms to individual household production. Insofar as the political logic of reform in China was aimed at safeguarding and promoting the public ownership economy, top-down analysis has little applicability in explaining the construction of economic institutions enabling, motivating and guiding the self-reinforcing dynamic rise of the private enterprise economy. State-mandated rules are imposed on economic actors by political actors. As Greif (2006: 40) notes, "identifying institutions with politically devised rules....restricts them to outcomes of the political process."

3 Social mechanisms in bottom-up economic development

We assert that the defining feature of transformative economic development in China is the “bottom-up” construction of informal economic institutions. Our argument is that informal economic institutions enabled entrepreneurs to surmount formidable barriers to market entry and discriminatory policies of the state. From outside the established economic order dominated by state-owned enterprises, entrepreneurs developed economic institutions that enabled them to compete and cooperate in spite of disadvantageous or simply absent formal rules. Further, informal economic institutions opened the way for the rise of a culture of industrial innovation, which is the defining trait of dynamic capitalism.

Where do institutional innovations come from? As Stark (1992: 300) observed in post-communist Hungary, “the introduction of new elements most typically combines adaptations, rearrangements, permutations, and reconfigurations of existing organizational forms.” In North’s (1990: 37) framework, informal institutional elements play a role as the “cultural filter” providing “continuity so that the informal solution to exchange problems in the past carries over into the present and makes those informal constraints important sources of continuity in long-run societal change.” Greif (2006: 9) notes that in North’s framework the stability of institutions is “attributed mainly to frictions in the process of institutional adjustments (e.g., the costs of changing rules) or to the impact of exogenous informal institutions, such as customs and traditions.” In other words, North’s explanation of institutions turns on exogenous factors wherein stability

stems from tradition, and institutional change emanates from purposive action of politicians, but not from shifts in social norms.

Two mutually related mechanisms combine to generate endogenous institutional change: First of all, the replacement of state bureaucratic allocation by market coordination involves a shift of power favoring direct producers relative to redistributors (Nee and Oppen forthcoming). Almost imperceptibly, but accelerating following tipping points, self-reinforcing shifts in the institutional environment cause traditional state-owned enterprises of the old redistributive economy to lose market share to hybrid and private ownership forms. The greater autonomy afforded by decentralized markets enables entrepreneurs to construct informal arrangements that build from ground-up the economic institutions of a private enterprise economy. Second, with marketization, rewards are increasingly based on performance rather than the strength of political connections. The most effective way to stimulate productive entrepreneurial activity is to diminish relative rewards to unproductive or destructive rent-seeking and increase payoffs to productive entrepreneurial action and innovative activity (Baumol 1990).

The bottom-up construction of informal economic institutions has enabled private firms to compete and cooperate in China's market economy. In the Yangzi delta region, the epicenter of market capitalism, a self-reinforcing dynamics of industrial cluster formation is at the root of a cumulative growth process. As new players entered into the market, a self-reinforcing, bottom-up process of specialization and differentiation gives rise to the formation of industrial clusters. In the three provinces of the Yangzi delta region—Zhejiang, Jiangsu and Shanghai—extensive multilateral clusters of private firms self-organized in industrial niches provide the institutional matrix of competitive

advantage. An industrial cluster is a sectoral and spatial concentration of firms connected through vertical or horizontal relations (Porter 1990; Krugman 1991). Firms in such a cluster are interconnected entities that compete and cooperate in spatially proximate locations. Marshall (1920) pioneered the idea that spatial concentration of specialized producers gives rise to endogenous economic growth. First, it ensures a constant market for skilled workers, drawing in and training continuously specialized human capital. Second, agglomeration of productive assets enables individual manufacturers to economize on investments through subcontracting arrangements with specialized subsidiary firms. Third, spatial concentration fosters network effects that facilitate innovative activity such that, “if one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further new ideas.”

Industrial clusters not only improve information flows, but social processes embedded in networks lock in business norms sustaining trust and cooperation within close-knit communities of manufacturers. In his ethnography of an industrial cluster of high-end garment manufacturers in New York City, Uzzi (1996: 176) details how ongoing workaday connections between Italian, Jewish and Chinese firms give rise to trust and fine-grained information: “I found that embedded ties entail joint problem-solving arrangements that enable actors to coordinate functions and work out problems ‘on the fly.’ These arrangements provide more rapid and explicit feedback than do market-based mechanisms such as ‘exit’ (Hirschman 1970); they enable firms to work through problems and to accelerate learning and problem correction.”

In the Yangzi delta region, early founders of private firms had no alternative but to rely on government sources for their supplies. As marginalized, semi-legal entities located at the low end of the pecking order in the manufacturing sector, private firms often experienced long delays and poor quality from government suppliers. It was the rapid entry of new private start-up firms and bottom-up formation of integrated “industrial clusters” (*chanye jiqun*) and “production chains” (*chanyelian*) of specialty suppliers that allowed private producers to decouple from government-owned suppliers and firms. Through mutual cooperation and joint problem-solving, private producers reduced environmental uncertainties and enhanced strategic capability development. Through these bottom-up processes from within discrete industrial clusters, entrepreneurs in the Yangzi delta region constructed autonomous networks of suppliers and distributors decoupled from the state-controlled industrial and commercial sectors of the transition economy.

Once an integrated industrial cluster and production chain is established, expected operational costs decline. More and more entrepreneurs and vendors in accessory industries are drawn in by the critical mass of specialized human capital and organizational resources. A great majority of the firms in an industrial cluster and production chain are private enterprises, ranging in size from household firms to sizeable in the same niche that compete in the global economy. In the mountainous southwestern region of Zhejiang province, for example, when entrepreneurs start up a new business in the city of Yong Kang, they are able to draw on an industrial infrastructure of specialized human capital resources, subcontractors, raw material suppliers and a distribution network for their industrial cluster. Manufacturers in industrial clusters strongly believe

that they cannot find a better location for producing kitchenware and stainless steel products. Ying Weizhong, a manufacturer of professional knives said, “It is better to be here than in Shanghai. There’s more information, you can find parts, people, and supplies close at hand and at the best price and quality.” Yong Kang is a city of about 340,000 people with over 15,000 registered private firms, about 3,000 of which market their products overseas, with the remaining 12,000 serving as subcontractors, suppliers and distributors of the export-oriented firms. The scale of the manufacturing economy is such that nearly every household has someone involved manufacturing.

The competitive advantage of the manufacturing economy in the Yangzi delta region is rooted in multiple overlapping industrial clusters. No other region in China has a comparable density of multiple cluster productions. Most municipalities in the region are home to several discrete industrial clusters, which evolved from mimicking the successful early start-up firms in the industrial niche. This spatial proximity of hundreds, and often thousands, of producers operating in the same industrial niche allows for rapid pace in the production cycle from purchase order to manufactured product. Producers can count on all the needed component parts supplied rapidly by subcontractors ready to produce. Access to a multitude of small satellite firms allied to the mother firm as spin-offs of start-up firms—employees and friends—provides for a ready ensemble of subcontractors who are connected through long-standing personal ties and that have the necessary human capital. As small firms, they are adaptive, flexible and capable of specialized production on a short time schedule.

Clearly, there is a close parallel in the bottom-up institutional innovations that gave rise to industrial clusters and production chains in the Yangzi delta regional

economy with the Emilia-Romagna region of Italy (Brusco 1982). The basis of regional competitive advantage is linked to the social structure of close-knit communities of manufacturers, suppliers and artisans and to the effectiveness of social norms in enabling, motivating and guiding cooperation. There is the additional parallel that both regional governments—Emilia-Romagna and the Yangzi delta region—are controlled politically by communist parties. In both regions, however, sustained high levels of economic performance do not rest on top-down central government measures, but on bottom-up dynamics of entrepreneurship rooted in local networks and norms. Both regions have evolved a manufacturing economy characterized by innovation as the basis of regional competitive advantage in the global economy.

4 Emergence of a Culture of Innovation

The distinctive trait of modern capitalism, as Baumol (2002) emphasizes, is that firms need to innovate not only to profit, but just to stay in place to survive. Without the ability to innovate, a continuous entry of large numbers of new start-up companies would contribute to fueling cycles of boom and bust, characterized by quickly eroding profit margins and low survival rates. Absent the leading edge of “new combinations”—new products, new markets, new raw material, new production process—that drives innovations, Schumpeter (1934) argued that such cycles do not give rise to economic development, which he viewed as spontaneous and discontinuous changes in equilibrium of circular flow of economic activity. If the business cycle reflects the effects of only intense, predatory competition, the erosion of profit margins drives out both new and old firms without the gains from “new combinations” that are the hallmark of modern

capitalism. The innovative activity leading to “new combinations” is the recognition of opportunities for profitable change and the pursuit of those opportunities all the way through until they are put into business practice. For Schumpeter, the entrepreneur—distinct from the capitalist and businessman—is the purveyor of innovations. For Marx, in contrast, innovation is a systemic feature of the underlying competitive dynamics of market capitalism. This view of innovation as an outgrowth of the ferocity of competitive pressures on capitalists has attracted new attention in the research on innovation. Insofar as innovation is a social process involving cooperation and competition within a larger institutional structure, incentives are matters not only of individual-level motives and decisions, but also of that institutional framework.

Over the course of three decades of economic reform that gave rise to an unprecedented founding rate of non-state firms, China has developed into a highly competitive market economy, characterized by low market concentration ratios in virtually all manufacturing sectors. The five largest machinery builders in the US, for instance, have a combined market share of 69%, and in Japan the top five hold 42%, whereas the top five manufacturers in China have only 20% of the market (OECD 2002, 403). Thus, competition drives the innovative activity not just for large-scale firms, but also for smaller businesses as well. As the owner of a small textile company with only 40 employees in Zhejiang province emphasized, “We strive to be unique for a short period of time. We need to be different. Only by differentiating our products from competitors do we get the volume of sales we must have to be profitable.” And the owner of a small packaging company in Hangzhou adds, “Innovation is a necessity. There is a saying among private manufacturers: Think about dangers while you are still safely profitable.

You have to know what you do in three years. Others see the niche you have, so you need to have new products to survive the competition.”

Competitive pressures on a firm motivate the entrepreneur to innovate, but do not provide the ability to successfully do so. As self-reproducing social structures of firms arrayed in a network, markets are far from the image of the atomistic market of standard economic models (White 2002). In fact, many economic transactions are guided informally by mechanisms regulated by ongoing social relationships (Burt 1992; Abolafia 1996; Uzzi 1996). In particular, the social structure of markets enables private firms to develop endogenously the norms and conventions of cooperation and exchange needed to compete in innovative activity. Cooperation helps to lower costs of innovation, facilitates learning, increases legitimacy of novel activities, and alleviates resource constraints among marginalized producers without access to the country’s formal infrastructure supporting research and development. Successful innovators develop into local role-models that provide the scripts, myths and norms that highlight cooperation and mutual learning as an essential feature of innovative activity. These self-reinforcing mechanisms embedded in the emergent private production markets have shaped incentives and opportunity, which jointly enabled the rapid development of innovative activities outside of the state-controlled mainstream economy.

Our seven-city survey of entrepreneurs, which we conducted among 700 private firms in 2006 and 2009 in the Yangzi Delta region, confirms that entrepreneurs in the Yangzi Delta region have successfully developed a culture of innovation. Innovative activities range from product and process innovation to changes in quality control, management, and organization (see table 1). Whereas patentable innovations are still rare,

more than 60 percent of firms introduced new production processes, and more than 50 percent introduced new products in both survey periods.

Table 1: Firm innovation between 2002 and 2009, in percent

Type of Innovation performed	in 2002-2005	in 2006-2009
New patent approved	n.a	5
Introduce new product	58	52
Upgrade existing product line	50	41
Discontinue at least one product line	22	15
Process innovation	62	66
New management technique	65	64
New quality control	61	41

Source: Yangzi Survey 2006 and 2009.

While most manufacturers made only marginal improvements and modifications of existing products and product lines, some continuously expanded or modified their main line of business, and developed new product lines as a strategy to move into less crowded niches offering higher profit margins. In these cases, the firm made bold technological shifts that required substantial investments in research and development. For instance, an entrepreneur who pioneered the production of standard household scissors in Wenzhou shifted his main line of production to x-ray bulbs when the market for scissors became crowded with imitators. By 2008, he was preparing his shift to x-ray machines because he detected signs of crowding in the market for x-ray bulbs. Others reported similarly bold moves, shifting gradually from textile to electronic production, or motorcycle to automobile production. Following the folk wisdom of entrepreneurs in the region that even “small innovations can make a difference,” it has become commonplace

for firms to introduce routinely new production processes and organizational innovations to improve their profit margin.

Driven by intense market competition, private entrepreneurs developed a strong sense of market orientation focusing on applied solutions serving the specific needs and wishes of their customers. Customer orientation is not just an important component in developing distribution networks and building a loyal customer base; it also helps to steer innovative activities towards marketable solutions with robust demand. Wu Liping, the founder of Joyea Ltd., currently China's largest producer for packaging machines in the milk-powder market, responds somewhat puzzledly when asked about the sources of ideas in his highly innovative enterprise. "Of course, innovation comes from the market; we are just chased by our customers." Long-term customers constantly request quality improvements and cost reductions. This often requires adjustments and modifications of the production process and improvements of quality management to guarantee certain product standards.

Customer-driven innovation goes beyond mere quality concerns and process adjustment. Direct customer feedback also inspires product innovation. For instance, Haier Ltd., today one of China's largest producers of electrical household appliances, learned from its local service engineers that rural customers used their washing machines to clean vegetables and thereby caused frequent damages. Haier responded by inventing a new model, which allowed switching between two modes, one for clothes and one for vegetables (Duysters et al. 2009). Other products, such as small washing machines fitting relatively small rooms (the model "little magic kid"), and energy saving air-conditioning

systems (the model “little superman”), are similar examples of the company’s direct responses to customer feedback (Xu et al. 2006).

Entrepreneurs also develop new ideas for product improvements through observatory research. The owner of a small-scale packaging company in Hangzhou, for instance, used to spend much time visiting the local shops and supermarkets to study problems with existing packaging systems displayed in the shelves. He observed inefficiencies in storing systems, and developed new packaging models. Careful observation is also an essential tool to better understand different preferences of international customer groups. The owner of a textile company producing for export markets underscores, “You really need to know your customer wishes. We apply a very simple way of information gathering. We just go there, visit different countries, and study the local standards in terms of size, colors, and patterns (...) All what you need is an analytic eye for consumer taste and trends.”

A strong sense of customer orientation and customer-driven innovation is also decisive in the market for parts, components, and unfinished products. Clients travel to their suppliers to discuss future projects and explore ways to modify existing components and modules to match their new product designs. Others bring samples of products or prototypes, to request the design of similar products. Clearly, not all of these ideas lead to innovation. Some never go beyond imitation. During our fieldwork we witnessed various cases. A producer of special machinery in Wenzhou, for instance, reported with professional pride, how he and his staff—through research and reverse engineering—successfully copied a machine now displayed in his workshop. Similarly, a textile producer proudly presented the company’s ‘research department’, where staff used

modern software to copy patterns and designs of luxury clothing labels, to produce cheap knock-offs.

Notwithstanding, the majority of cases suggest that customer orientation leads to real innovation. In our 2009 survey, 47 percent of managers regard their customers as the most important source for new ideas. 82 percent of the interviewed managers rank customer ideas among the three most important sources for new ideas (see table 2). Conferences and trade fairs, showcasing new domestic and global developments in specific industries and niche markets, provide a complementary, institutionalized platform which allows producers to test their ideas and receive immediate customer responses. Trade fairs also facilitate inter-firm comparisons and help identify future market trends.

New technical and industry standards provide additional incentives and ideas to bring new products and production processes in line with national regulation. Environmental standards play a particularly important role in guiding developmental trends within certain market segments—among automobile part producers, for example. In total, 31 percent of all interviewees regard technical and industry standards as one of the three most important sources for new ideas. Finally, the marketplace, with its dense network of suppliers, and competitors, provides additional sources for new ideas. About 30 percent of the surveyed managers indicate that their suppliers serve as one the most important sources for ideas. Even more managers (50 percent) look at companies in their own industry for new ideas.

Table 2: Top sources for new ideas

Sources for ideas of innovation	Percentage of firms which list sources as one of the three most important sources for ideas
Customers	82
Other businesses in own industry	50
Own employees, R&D	39
Technical or industry standards	31
Suppliers	30
Conferences or trade fairs	29
Businesses in other industries	8
Books and scientific journals	8
Universities , research institutes, research services	8
Industry association	7
Overseas / international companies	5
Government assistance	3

Source: Yangzi Survey 2009.

5 The Social Structure of Innovation

In spite of massive national investments in science and technology following the government’s “Resolution of the Central Committee of the Communist Party of China on the structural reform of the science and technology system” in 1985, private firms rarely benefit from government support. State-sponsored programs designed to spur innovation mainly focus on promoting linkages between national institutes of science and technology development and large-scale state-controlled enterprises listed on the country’s stock exchanges. Private firms received only 5.8 percent of government funds earmarked to support science and technology development in manufacturing firms in 2007, while state-controlled and state-owned firms received 82 percent of funds (Statistics on Science and Technology Activities of Industrial Enterprises 2008: 81). These statistics grossly exaggerate the difference in innovative activity between private firms and the established state-owned or controlled industrial economy, however. In

2007, 21 percent of technology development was conducted by private firms, and 35 percent of R&D was funded in state-owned firms. Moreover, 19 percent of R&D departments were located in private firms, while 35 percent were in state-owned firms (Statistics on Science and Technology Activities of Industrial Enterprises 2008: 25). By 2008, 18 percent of the patent applications of large- and medium-size enterprises were submitted by private firms and 38 percent by state-owned firms (China Statistical Yearbook 2009; 831). Clearly, even without government funding for research, private firms were closing the gap with state-owned firms in research output. We argue that it is the social structure of private production markets that enables private firm to move up the technological ladder and to gradually close the gap with state-sponsored public enterprises.

Insofar as innovation is a social process, involving both cooperation and competition, innovations do not emerge in isolation (Gulati 1998). Across a wide spectrum of industries technical change is facilitated through reliance on inter-firm cooperation. Why do companies cooperate in their innovative activities? In advanced industrial economies, the increased complexity of technologies and multiple scientific subfields contributing to technical advances means that even large and diversified firms lack core competences required to engage in state-of-the-art research and development. It is common practice for firms to enter into cooperative contracts for R&D to share research capabilities and knowledge to take advantage of economies of scale among key players, while limiting market access to rival firms not in the research network. A related motive for firms to cooperate in innovative activity stems from interest in minimizing and sharing the uncertainties inherent in R&D, especially in high technology industries where

the technical knowledge required for innovations are at the frontier of different scientific fields and entail complexities that no firm can afford to internalize in its R&D department. Firms also participate in strategic alliances in R&D in order to gain access to other firms' technologies, exercise control over market entry, open new market niches through joint product development, and reduce the time-span required for innovations and their market entry.

In the U.S. biotechnology industry, for example, networks linking firms and universities serve as the locus of innovation in providing timely access to research and resources not available inside the firm (Powell, Koput and Smith-Doerr 1996). Because expertise needed for biotechnology research is widely dispersed in universities and firms, biotechnology firms must rely on cooperative ventures in often farflung networks of research and development. Small, dedicated biotechnology firms simply lack the resources and in-house expertise to conduct their own R&D to develop new products. The path-dependent evolution of "networks of learning" suggests that the dynamics of cooperation in R&D are endogenous to the industry in which technological change fosters new forms of cooperation. "Thus, once a firm begins collaborating, it develops experience at cooperation and a reputation as a partner. Over time, firms develop capabilities for interacting with other firms....Firms with access to a more diverse set of activities and those with more experience at collaborating are better able to locate themselves in information-rich positions....Put colloquially, a firm grows by being a player; it does not become a player by growing" (Powell et al. 1996:120-121). Moreover, the ongoing exchange of knowledge through interfirm networks develops and strengthens

the R&D competence of the firm, deepening the capacity to collaborate with other firms and centers of biotechnology research.

Formal contractual agreements to cooperate in research and development are the ‘tip of the iceberg’ in an even larger and more dispersed informal network of cooperative arrangements between firms. “Beneath most formal ties, then, lies a sea of informal relations” that accumulate over time as the firms move from one formal R&D collaboration to another, resulting in informal network connections that offer a continuing source of benefits beyond any particular exchange. Because the locus of innovative activity is embedded in interfirm networks, the boundaries between firms and research universities become blurred, which in turn promotes timely and effective diffusion of new technologies in the biotechnology industry.

Reliance on social networks provides the informal channels and trust to cement strategic alliances between high technology firms and enables players in the network to gain access to entrepreneurial opportunities in the external environment (Burt 1982; Mizuchi and Galaskiewicz 1993 Gulati 1998). Not only does the position of the firm in the pecking order of the technology niche influence propensity to cooperate in innovative activity, but the extent of crowding in the niche also endogenously gives rise to incentives for firms to enter into strategic alliances to innovate (Stuart 1998). In other words, the density of firms in a technological niche not only heightens competitive pressure to innovate, but crowding implies that many firms that share similar technologies and technical expertise are likely to have overlapping and concurrent R&D projects. In crowded technological niches, firms will form strategic alliances in R&D because firms that share similar technical expertise gain from cooperation: “The common

stock of knowledge held by technologically similar firms both obviates the need for investments to understand and evaluate the technologies of alliance partners and facilitates the processes of transferring and integrating knowledge” (Stuart 1998: 673). Moreover, because of redundancy in technical expertise, firms have an incentive to pool capital and technical resources to economize on R&D costs. Closely related is the incentive for firms in strategic alliances to collude in crowded technology niches to control market entry of rival firms not participating in the technical collaboration. Crowding has a stronger effect on low-status firms that lack the technical know-how of the high prestige firms in the market niche, because low-status firms “are less likely to possess the skills to work productively with collaborators from outside of their proximate technological vicinity, are more dependent on their neighbors in technology space as potential collaborators” (Stuart 1998: 677).

In confirming the salience of social structure in technical change, the organizational literature suggests that to understand where innovations come from, it is important to move beyond the study of the individual entrepreneur and firm to specify mechanisms embedded in institutional structures. The importance of social arrangements, including non-price exchanges such as interactive learning processes, in facilitating firm-based research and development is beyond doubt. The underlying notion, however, is that social interaction in the field of R&D is typically embedded in markets organized by formal and legal arrangements protecting economic transactions.

Cooperation in R&D involves specific risks, as both partners may have an interest in securing key technologies without contributing equal efforts or sharing the gains from commercialization. Well-specified property rights including intellectual property rights,

contract law, corporate law, and arbitration institutions guiding and safeguarding economic transactions are therefore seen as a given in high-income countries with well-protected property rights such as the US, Japan and Sweden. The situation in China, however, poses severe challenges, as one entrepreneur notes: “If we were in the USA, we would not need to work so hard to protect ourselves, because you can rely on intellectual property rights. Here, if you have a very good idea, before you start business, you must worry about someone copying from you. The legal system is just not good enough to protect intellectual property rights.”

In this type of environment, the bottom-up rise of R&D cooperation provided a crucial problem-solving mechanism for private firms, where knowledge creation and diffusion depends on social interaction and geographic proximity of market participants. Learning how others detect and realize market opportunities is an essential lesson that relies on ongoing social interactions and information exchange between market players. It is commonplace for entrepreneurs to carefully analyze the factors for success and failure for innovative activities by talking about the experience of other market players in their industry. Similarly, entrepreneurs learn through observation and consultation with others “how to create new ideas”.

Within local business networks, informal technology collaborations are as common as mutual lending activities or the joint development of supply and distribution channels. Many entrepreneurs view this type of exchange not even as technical cooperation in its narrow sense. The mutual exchange of ideas, the joint search for technical solutions, or the joint use of equipment are natural components of longstanding business relations. Based on the expectation of mutual help and support, information

exchange about new technologies is part of casual business talks, and may lead to technical collaborations.

Informal exchange focuses on the joint development and learning of new technologies, or the implementation of new technical standards introduced by government or business associations. This allows entrepreneurs to spontaneously organize activities in response to new ideas without the substantial costs incurred by R&D departments. Reliance on long-standing business networks enables even small- and medium-scale companies to innovate. Members of business networks share resources and skills to jointly develop and improve their technical capabilities. Expectation of future benefits through joint use of resources and pooling of complementary skills motivates and guides entrepreneurs to invest in specific ties and trust building. More than 65 percent of entrepreneurs in the Yangzi region surveyed in 2009 maintained informal technical collaborations with at least one of their five most important business ties. 40 percent of the surveyed firms collaborated with more than one of their key business contacts.

Firms aiming for product development and patentable innovations increasingly complement informal strategies of tacit learning and mutual help with formal technology agreements, which specify *ex ante* the respective duties and rights of the collaborating parties and the distribution of future profits. Such agreements often build on longstanding vertical customer- or supplier-relations between contracting parties. Uncertainties are relatively small, as both parties know about the partner's business reputation and technical capabilities. More and more entrepreneurs also extend their search for technical and research partnerships beyond their local business networks. The private market

allows the free development of technology collaborations, and market mechanisms help to identify the most promising collaborators. Business-to-business (B2B) internet platforms like alibaba.com have dramatically reduced search and contact costs in the domestic market. With more than 34.8 million registered users, that platform is today the largest internet trading place for China's small- and medium-size enterprises. Formal collaborations are most common when it comes to patentable innovations, with close to every third patent resulting from formal technology collaboration. Formal technology agreements are also relatively common with respect to new product developments. In contrast, few entrepreneurs rely on formal technology agreements when it comes to product upgrades and improvements of production processes.

6 How do private firms compare with the mainstream economy?

Whether private firm innovativeness is sufficient to survive in China's highly competitive market place is ultimately a question of relative performance. Only if the described bottom-up strategies developed by private firms live up to the standards within the mainstream economy, will private firms develop into an independent economic force, sufficiently powerful to influence and shape institutional and economic development. For a tentative assessment of the sector's relative competitiveness, we broaden our empirical basis, and shift focus to a cross-ownership comparison of firm innovation.

We use data from the World Bank Investment Climate Surveys conducted in two waves in 2002 and 2003. These surveys provide a broad selection of different institutional environments and market structures. The 2002 survey includes firms located in five middle-size and large cities (N=1,548); the 2003 survey includes firms in 18

middle-size and large cities (N=2,400). These 23 cities are located in 20 different provinces, ranging from the southwestern province of Guizhou (only 1% private employment and practically no private enterprise economy) to Shanghai with more than 41% of employees in the private sector (National Bureau of Statistics of China 2004). Participating firms were randomly selected in each city. The industry mix comprises both labor-intensive and technology-intensive sectors across a broad spectrum of different production technologies and levels of competition. Both surveys share a set of in-depth questions covering innovation activities and related firm-level strategic decisions. Most importantly, both surveys cover a sample of mixed organizational and ownership forms—private, collective, partly state-owned or state-controlled, and wholly state-owned enterprises

To assess a firm's innovativeness, we look at whether a firm has introduced new products in the three years preceding the survey and also whether the firm has registered a patent in the same period.

Our independent variables include the local opportunity structure, R&D collaborations, ownership identity and competition. We proxy the local opportunity structure for tacit learning by a measure of market structure and construct an industry-specific measure of private production at the provincial level. Our core assumption is that increasing density of private firm activities in a particular industrial niche is positively associated with inter-firm activities such as tacit learning, mimicking and informal exchange. To construct measures of private market participation we use data from *China data online* and China Labour Statistical Yearbooks. In a first step, we re-categorized the industry categories in the World Bank data into 15 discrete industrial sectors that are

consistent with industry categories in those sources. Then we constructed the provincial-level measure of private firm activities for each of these sectors. We define private firms as companies not registered as state-owned or collective, including wholly foreign-owned and joint-venture firms. To approximate the market share of private firms, we used industrial output values retrieved from *China data online* for manufacturing sectors, and for service sector activities, we used employees' earnings provided by China Labour Statistical Yearbooks. We created this measure for the years 2000 and 2002, the former for the 2002 survey and the latter for the 2003 survey, and matched its values to each firm based on the firm's province and survey year in the World Bank data set.

The sector with the lowest mean private share in our sample is "traffic, transport and storage services" with 14%, and the sector with the highest mean value is "electrical appliances for daily use" with 92%. The shares of privately organized production within each industry vary considerably across provinces. For "traffic, transport and storage services", for instance, the share of private production ranges from 1.16% in Jiangxi province to 34.37% in Zhejiang province; similarly in the most privatized sector "electrical appliances for daily use," shares range from 69.02% in Beijing to 100% in Chongqing, Guizhou, Heilongjiang and Shaanxi provinces. Within each province, the extent of privately organized production varies greatly across the different industrial sectors. It is typically lowest in the state-dominated and highly regulated service sectors, and most pronounced in light industrial manufacturing, where new market entrants found open and quickly expanding opportunity structures. Overall, the scope of private firm participation in markets in our sample has a mean value of 45%.

We capture the existence of contractual agreements and strategic alliances for cooperative research and development (R&D) over a period of three years. The World Bank dataset allows differentiate strategic alliances between the firm and (1) other firms, (2) universities, and (3) research institutes.

The inclusion of different ownership forms requires specific controls for market power. Reflecting assumptions on the role of monopoly power (Schumpeter 1947; Arrow 1962), a dichotomous variable indicates whether a firm's domestic market share is more than 10%. We also control for the perceived competition via the self-reported number of competitors in the main domestic market, using a five-point scale (1: 1-3, 2: 4-6, 3: 7-15, 4: 16-100, 5: more than 100).¹ As competition may have different effects on innovation in less and highly competitive markets, we allow for a non-linear relation (Scherer 1967; Aghion et al. 2005) and specify a square-term of the number of competitors. Lastly, we also control whether firms participate in the export market.

The estimation results summarized in table 3 highlight two important points:

First of all, non-private companies do not enjoy systematic advantages compared to private companies when it comes to innovativeness. Both state-owned companies and collective firms perform weaker than private firms. Only partly state-owned companies can still secure slight advantages when it comes to product innovations. This indicates that private firms have apparently succeeded in growing out of their pariah-like status of marginalized low-tech producers to compete with the traditional mainstream economy.

¹ Reliance on self-reported measures provides a more accurate assessment of a firm's market position in China's transitory economy than, for instance, industry-specific concentration ratios, as competition is still affected by the uneven development of distribution channels, non-tariff trade barriers and local and provincial trading networks.

Secondly, the estimations suggest that innovation strategies employed by private firms have developed into universal tools, advancing innovativeness across a broad spectrum of different organizational and ownership forms. Formal R&D collaborations are effective drivers of all types of innovation under review. Moreover, the extension of private firm activities in distinct market niches benefits not only private firms, but also stimulates innovative activity of state-owned firms. Opportunities for tacit learning and informal exchange embedded in the social structure of private markets extend to all organizational forms, with positive effects on firm innovation.²

² All estimation results are confirmed under inclusion of a broad set of control variables such as the stock of patents, the existence of in-house R&D, the average R&D to sales ratio, location in industrial park, membership in business associations, firmage, firm size, financial leverage, number of employees, education of manager and survey year.

Table 3: Ownership, technology exchange and innovation, 2003

	Product innovation Coefficient (SE)	Patent Coefficient (SE)
Marketization		
Proportion of private enterprise economy	0.601*** (0.107)	0.579* (0.264)
R&D networks		
R&D cooperation with firms	0.545*** (0.067)	-0.025 (0.129)
R&D cooperation with universities	0.523*** (0.077)	0.594*** (0.134)
R&D cooperation with research institutes	0.539*** (0.079)	0.287* (0.122)
Ownership forms		
State-owned firm	0.023 (0.067)	-0.362*** (0.101)
Collectively owned firm	-0.324*** (0.071)	-0.358** (0.133)
Partial state ownership in limited liability or joint stock company	0.280* (0.141)	0.082 (0.114)
Competition		
Market share > 10%	0.317*** (0.065)	0.417*** (0.105)
Number of competitors in main business	0.296* (0.138)	0.326* (0.141)
Number of competitors ²	-0.061** (0.021)	-0.077*** (0.023)
Firm Exports	0.176* (0.073)	0.196+ (0.113)
Constant	-1.057*** (0.202)	-1.867*** (0.252)
Method	Probit	Probit
Pseudo R ²	0.139	0.184
N	3565	2453

Source: World Bank Investment Climate Survey 2002 and 2003.

7 Conclusion

The central thesis of North's state-centered theory is that successful evolution of political institutions and credible commitment by political elite to formal rules securing property rights provides the necessary and sufficient conditions for economic growth to take place. As North (1981: 32) asserts, "institutional innovations will come from rulers rather than constituents since the latter would always face the free rider problem." In this "institutions-as-rules" account, the evolution of institutions favorable to economic performance is a top-down process led by politicians who control the state. Hence, in Third World economies, the counterfactual is that if formal institutions secure property rights and check predatory action by the political elite, then sustained economic growth would follow. Greif (2006: 7) observes that this framework "is very useful in examining various issues, such as the rules that politicians prefer and the contractual forms that minimize transaction costs." But he argues that its limitation stems from the problem that behavioral prescriptions—formal rules and regulations—that reflect what politicians prefer are "instructions that can be ignored."

The study of founding processes of private firms in the Yangzi Delta region provides first insights into central micro-mechanisms enabling the rise of capitalism. A duality of agency and social structure organizes the analytic narrative in which the entrepreneur is the central agent who drives the institutional innovations that give rise to the private enterprise economy; once established, informal economic institutions structure the framework of entrepreneurial action. Entrepreneurship in the Yangzi delta region was not fueled by exogenous institutional changes. When the first entrepreneurs decided to decouple from the traditional socialist production system, the government had neither

initiated financial reforms inviting a broader societal participation, nor had it provided property rights protection or transparent rules specifying company registration and liabilities. Instead, it was the development and use of innovative informal arrangements within close-knit groups of like-minded actors that provided the necessary funding and reliable business norms. This allowed the first wave of entrepreneurs to survive outside of the state-owned manufacturing system.

This bottom-up process resembles earlier accounts of the rise of capitalism in the West. Similar to Weber's narrative of economic development in Manchester and Northrhine-Westfalia, the drivers of institutional change in the Yangzi delta came from outside of the established economic order. As in 19th England and Germany, the first entrepreneurs were not part of the political or economic elite, but came from modest social background. As Li Shufu, the founder and CEO of Geely Automobile notes, his generation of capitalists were "just a bunch of simple farm boys," many coming from impoverished farming households. In reporting on Geely's bid to buy Volvo from Ford, the *Wall Street Journal's* description of Li's socioeconomic origin recapitulates the bottom-up account we present:

"Behind Geely's transformation is the chairman, Mr. Li, a self-described workaholic who most nights sleeps inside the company's headquarters building in Hangzhou. Born in 1963 to poor farmers in Taizhou, about 250 miles southeast of Shanghai, he came of age during the era of economic reform that began in the late 1970s.

When he finished high school he used his graduation gift of 100 yuan, about \$14 today, to buy a used camera. He then opened a photo studio for villagers. With the money he earned, he launched a business stripping gold and other rare metals from discarded appliances and machinery. Later, he opened factories to produce refrigerators and freezers, and then construction materials.

By the early 1990s Mr. Li was thinking about building cars. But at the time, China's central government barred private companies from the auto industry. So Mr. Li began making motorcycles, while still buying cars and stripping them down to learn how they were made. In the late 1990s, as official restrictions began to ease, Mr. Li founded Geely. He came up with the company's first auto prototypes based loosely on competitors' models and began selling cars in 2001 (Leow 2009).

These were the types of first deviators, who simply did not mind the low social status or the stigma of extra-legal activities. Mimicking by like-minded people then gradually led to the development of norms of mutual help and organization in cluster-like local business networks. It was through this process of imitation that the once-stigmatized deviators turned into capitalist role models spearheading a broad-based social movement dynamic of firm founding, which could no longer be dismissed as a negligible extra-legal sector of the economy. The success of China's developmental state was to recognize the importance of bottom-up economic development. Although the state continues to favor state-owned and controlled firms, it has cumulatively accommodated robust bottom-up entrepreneurial action through macroeconomic policies and legal reform to legitimize the private enterprise economy and secure property rights. Revenue maximization motivates the government's accommodation with entrepreneurs and capitalist economic development. The state would not have been accommodative, however, if the private enterprise economy was not already established as the most rapidly growing source of private wealth creation, employment, tax revenue, technological innovation and sustained economic growth. The rise of private enterprise-led capitalist economic development was not *because* of the state, but *despite* the state's earlier effort to block its development.

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