China’s PV Industry and Institutional Arrangement
A Study of SUNTECH Power

Wang Dong

Department of Political Science and Economics, Meiji University

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Abstract

China has become the world's largest producer of PV (photovoltaic) and its components, as well as China has initially formed the industrial chain for polycrystalline silicon manufacturing, silicon chip manufacturing, solar cell manufacturing, PV modules package, PV system design and applications. China’s PV equipment manufacturing and supporting industry have entered a fast development stage too. When it comes to the PV industry of China, we have to mention SUNTECH, because SUNTECH’s growth has been so fast that it has become an epitome of the new energy industry in China. The dramatic rise of SUNTECH has received more and more attention nowadays.

This paper, apart from the analysis of the role of government as a supporter for SUNTECH, also shows what is the prime cause that affects the financing decisions of government funding, and explains why Chinese enterprise in the PV industry was able to enter the international market to worldwide compete in a short time by analyzing some institutional factors such as the industrial policy, the system of tax allocation (regional decentralization) and the bureaucratic promotion (political tournament).

Keyword: PV industry; SUNTECH; Government-run venture capital; Regional decentralization; Political tournament;

Introduction

To be listed on the NYSE (New York Stock Exchange) as one of China's private PV enterprise, SUNTECH took a mere 5 years since it began operations from 2001. By 2010, SUNTECH had rapidly become the world’s largest producer of solar panel. How did SUNTECH achieve such rapid growth? What are the factors that transformed a weak PV firm to a strong global competitor in such a short time? And how does SUNTECH deal with problems associated with business finance and marketing in the process of growth? Numerous scholars, research organizations and industry insiders were interested in the case of SUNTECH, and tried to explain these questions.

One view is that Chinese governments at all levels are actively implementing new industrial policy and adding R&D budgets to develop the new materials and new energy industries.

In China, the solar-power industry has always been considered a top priority, so the R&D for relevant industries is rising quickly. The Ministry of Science and Technology (MOST) of China is in charge of implementing the R&D projects. So far, MOST has been responsible for the National R&D Project, the 863 Project and the 973 Project. The National R&D Project has supported the PV industry since 1981, and the support has included R&D projects on crystalline, amorphous and polycrystalline silicon solar cells and materials and the development of equipment for measuring solar cells. During the 10th Five Years Plan (2001–2005) MOST, mainly through the two mentioned programs, provided 50–60 million CHY (5.2-6.2 million euros) for PV research, development and demonstration projects (PV RD&D). And the MOST budget for PV R&D in the 11th year plan (2006-2010) is expected to be around 120 million CHY (12.4 million euros) (Marigo, 2007).

Another view is that many Chinese entrepreneurs can obtain cheap factor of production (labor, land, finance) from government, so they can get competitive power in the international market.

AFP reports that the low cost of labor, coupled with the massive scale of production at its 14,000-person plant, has enabled SUNTECH to become the global industry leader in just a decade. US companies have accused China of improperly subsidizing its solar sector, as part of a no-holds-barred commercial battle for supremacy over an industry expert’s estimate will be worth trillions of dollars in the future. They say Chinese competitors have access to cheap financing from

state-owned banks and outright government subsidies aimed at building up the industry, as Beijing makes alternative energy a priority (Savadove, 2012). SUNTECH benefited from favorable policies from local governments, low labor costs (just 2 percent of manufacturing costs versus 5 percent at competitors overseas), and inexpensive land and material costs-all of which allowed the company to significantly drive down production costs, achieve profitability, and compete globally with big enterprises. By manufacturing exclusively in China, SUNTECH shifted the balance of power in the solar industry, since the company had been able to keep its labor costs so much lower than overseas competitors, including large and deep-pocketed companies like Sharp, Siemens, and BP Solar (Davila, George and Ning, 2010). There is also a suggestion (from SUNTECH Power's CTO) that the secret to China's success is not cheap labor but advanced equipment for making solar cells. The real causes are advances in manufacturing technology that have improved solar cells' performance and cut costs. Labor makes up just 3 to 4 percent of the cost of making solar panels. Additional factors, such as materials and the cost of equipment, are more significant. And as a result of increased automation over the last few years, labor costs are going down (Bullis, 2011).

Tomoo (2012) compared PV manufacturers of China with Japan to explain the rapid rise of the Chinese PV industry, and on the other side of the coin, why the rapid decline of the Japanese PV manufacturers has taken place. Chinese PV manufacturers, including SUNTECH, were accused of receiving unfair state supports, and were imposed a punitive import tariff by the United States government in May 2012. However, the Chinese PV industry had relatively minor support from the central government during the course of its development, compared to many other industries. Some local governments have played a slightly more positive role than the central government in the progress of the PV industry. The rapid growth of the Chinese PV industry and the rise of SUNTECH Power show how the development path of developing countries can be compressed by the insertion into the global value chain. When production technology is easily accessible simply by buying state-of-the-art equipment, developing countries do not need to accept foreign direct investment (FDI) to obtain the latest technology. The only thing they need is the money to buy such equipment. The money can also be raised abroad if domestic entrepreneurs can persuade investors that they have the potential to be competitive.

Yin (2012) asserts China's competitive advantage is not cheap labor. The role of the Chinese government, particularly the local ones, is critical in the process of innovation. The patient capital, or financial commitment, provided by the local governments enabled innovation to take place in the face of great uncertainty. Because a lot of Chinese companies enjoyed long-term financial backing such as patient capital from government, companies advanced innovation and reduced the cost of production with these "rents". In 2012, MIT's Technology Review noted the world-record efficiencies in Chinese-made solar cells, achieved over the years by Chinese companies through developing better ways of manufacturing, or what is called incremental innovation.

The early history of SUNTECH is illuminating. In the first five years, there was no market for solar cells, but the government continued to invest in SUNTECH, allowing SUNTECH's engineers to improve their technology. By 2005, when the boom of EU's solar market occurred, SUNTECH was well positioned to seize the opportunity with its well-developed technology. From the several arguments above, it is obvious that both the central government and local government made a serious effort to provide low cost factors of production (labor, land, finance) and manufacturing environment for enterprises in the PV industry such as SUNTECH. In other words, governments' efforts offered advantageous conditions for enterprise to reach "scale of production" in a shorter time. However, what are the mechanisms by which government intensively mobilizes factors of production for enterprises in the PV industry? And what is the motivation behind local governments continuing to fund SUNTECH as the company went five years without its first market for solar cells?

This paper shows the prime causes that affect the financing decisions of governments, and explain how Chinese enterprises in the PV industry have been able to compete worldwide with the help of institutions like industrial policy, the system of tax allocation, and the system of bureaucratic promotion (and political rent or political gains). Before presenting the view of this paper, though, it might be useful to start with a little about the story of SUNTECH.

SUNTECH and The Local Government

Shi Zhengrong, the founder and CEO of SUNTECH Power Holding, graduated from the Shanghai Institute of Optics and Fine Mechanics-Chinese Academy of Sciences in 1986, then studied from 1988 at the University of New South Wales for a Doctoral Degree in Solar Energy Science instructed by professor Martin Andrew Green. By the time *Shi* earned his doctorate in 1992, he privately held more than 10 solar cell technology invention patents.

This resume makes clear the fact that *Shi* is an excellent scientist, but not a necessary enterpriser. Yet *Shi* had a visionary perspective that saw huge business opportunities in the PV industry.

After faults several times in seeking chances to start up a company, *Shi* went to Wuxi, a city in Jiangsu province of east China. *Shi*'s plans and patents greatly appealed to the officers of Wuxi City Government.

Wuxi municipal Communist Party leader *Yang Weize*, executive vice mayor in charge of industrial affairs *Mao Xiaoping*, vice commissioner of City Finance Bureau *Hong Ruqian*, minister of Wuxi City Economic and Trade Commission *Li Yanren* and some leading managerial staff of state-owned enterprises all played an important role or leading influence on SUNTECH's start-up, growth and later listing on the New York Stock Exchange.

Capital Input from Government

Hong Ruqian was first one recommended *Shi*'s project to the Wuxi City Government. *Hong* was factory director of Wuxi Machine Tool Plant, and had 10 years experience in business management. *Hong* later served as vice commissioner of the Wuxi City Finance Bureau. In 1999, the State Ministry of Science and Technology decided to launch a new project promoting technological innovation. Wuxi was one of the pilot cities. Thus an investment company established and funded by the government was affiliated with the Wuxi Science and Technology Bureau. Considering the risks of the operation Fund, the government appointed the experienced *Hong* as general manager. Providing funds to *Shi* were *Hong*'s first task, and he proceeded with caution.

Hong's caution influenced the government official's attitude, and an investigation team organized by the Wuxi City Government went to Australia for checking the situation of solar cells and Shi's individual information on February 6, 2001. The team's members included two officials from

the City Planning Commission, a secretary of the Municipal Party Committee, a section chief from the City Science & Technology Bureau and a representative from City Trust & Investment Corporation. The conclusion of the investigation was that solar cells had a huge market and broad prospects, and polycrystalline silicon films doctor *Shi* studied had reached world-leading level. All of these removed the government's doubts and increased its confidence in financing *Shi*.

Wuxi City Government then decided to back *Shi*'s project and first funded $8 million in registered venture capital. But the government set two conditions. The first was that *Shi* was expected to transfer personal assets in Australia to the venture in Wuxi to build interest community with the Wuxi City Government. The second was that all *Shi*'s technological achievements shall belong to the venture and he shall not cooperate with any other companies engaged in the same or similar business. To these conditions *Shi* gladly assented. The results of negotiations were that *Shi* had a 25% holding in the venture, among which tech stock accounted for 20% ($1.6 million) and cash stock accounted for 5% ($0.4 million). Besides *Shi*, the 75% stock ($6 million) remaining was co-funded by seven state-owned enterprises, Wuxi Venture Capital Group Co. Ltd (state-owned), Wuxi New District Technology Financial Venture Investment Group (state-owned), Wuxi Keda Innovation Investment Co., Ltd (state-owned), Wuxi Guolian Trust Co., Ltd (state-owned), Little Swan Group (state-owned predecessor), Wuxi Boiler Group (state-owned predecessor, closed), and Wuxi Shanhe Group (state-owned) (He, 2006). In this way, the combination of capital from the local government and private technology brought about the start of SUNTECH.

During the start-up stage of SUNTECH, there were not monitoring mechanisms like stock markets, so the City government needed an agent to monitor operating conditions of SUNTECH, and feed back the information obtained to the government and investors quickly. *Li Yanren*, then minister of Wuxi City Economic & Trade Commission, was absolutely the right person for this job.

As SUNTECH was started, *Li* was about to step down from his leadership positions. Per government's instruction, *Li* assumed the title of Chairman of the Board of SUNTECH as a representative of investor Wuxi Venture Capital Group, and *Shi* was appointed to the position of general manager.

For SUNTECH's first few years, *Li* was in charge of fundraising primarily, used his excellent

connections and personnel coordination, and *Shi* was responsible for daily management and technology development. The golden partnership of a senior official with a "semi-retired" situation and a high-tech expert was hailed as a perfect match.

But a difficult venture, SUNTECH's operations were at high risk before 2004. To form a scope effect, SUNTECH's production capacity was so expanded at the beginning that an enormous sum of capital funds was tied up for a long time. In order to continue with the operation and alleviate capital insecurity, the raw materials imported by SUNTECH were once sold domestically. In 2002, SUNTECH's sales were 10 million CHY, the losses as much as 7 million CHY. Then, in early 2003, the situation was worse. Not only with a shortage of funds, but also brain-drain was very much a live issue (Xiao, 2009).

But, *Li* resolved the crisis, using his influence and personal resources again. He persuaded five state-owned enterprises to fund SUNTECH successively, and raised 50 million CHY. Other than that, He used his connections and governmental networks to get a loan of about 50 million CHY from the Wuxi Municipal Labor Bureau at lower interest rates.

Li backing SUNTECH largely represented the government's official position. The Wuxi City government made a move to help SUNTECH's financial difficulties too. From 2001 to 2005, the government won 11 projects at the national, provincial and municipal levels for SUNTECH, and raised more than 3.7 million CHY. This money, as fund for the transformation of scientific achievements, 2 million CHY was free (He, 2006).

Much of SUNTECH's credits came from guarantees of officials. If there were no guarantees like these, it would have been impossible for SUNTECH to raise money from state-owned enterprises and banks. Wuxi City mayor *Mao Xiaoping* was one of the officials.

Mao was Wuxi City Mayor for 8 years before he became a Communist Party secretary himself. During his presidency, many new industries such as new energy and IT grew by leaps and bounds. SUNTECH was able to raise money from state-owned enterprises successfully because *Mao* played a crucial role.

Therefore, even now, veteran employees of SUNTECH insist that their company was lucky to have been a start-up in Wuxi City. If its start-up had taken place in another place without the

support from the government or officials, SUNTECH's success would have been must be rather costly. But sometimes, the guarantee of officials faces serious risk or uncertainness. If SUNTECH's business had failed, the Wuxi City Government would have eventually shouldered all responsibility.

The Capital Exit

In August 2004, the Reichstag amended the Erneuerbare Energien Gesetz (EEG), and aimed to heavily subsidize new industries such as solar energy. A hasty demand for PV shot up worldwide. When other PV makers were not yet able to swallow the "cake", SUNTECH entered a harvest season with its three excellent production lines. SUNTECH's net profit reached 19.8 million US$ in 2004, and in the first three quarters of 2005, its net profit reached 20 million US$.

From mid-2003, *Shi* submitted reports on expanding production capacity to the board three times. However, shareholders showed little willingness to increase investment. During this stage, SUNTECH's bank debt ratio approached 60%, and the capital chain was likely to fracture too. SUNTECH was at risk once again. At that moment, *Shi* and *Li* both thought to raise money by listing. But the result of contact with investment institutions was that SUNTECH's state-owned shareholders must withdraw shares. How then to persuade the state-owned shareholders to exit? There is no doubt it was a difficult issue for SUNTECH's leaders. Nonetheless again SUNTECH gained the support from government officers on this issue.

Wuxi Municipal Communist Party Secretary *Yang Weize* aligned SUNTECH with the exit of state-owned shareholders, and suggested that if SUNTECH couldn't access capital markets, it would come to an end. *Yang*'s effort influenced the decision-making of the shareholders.

The president of Wuxi Venture Capital Group first decided to exit from SUNTECH. However, the others hesitated about whether to exit or not, because they thought that listing might bring huge gains.

Facing this situation. The Wuxi City Committee and government actively persuaded the others shareholders out of the idea of keeping stake in SUNTECH, and organized the negotiations to settle interest disputes. Finally, all of the state-owned shareholders agreed to sell shares in March 2005. Wuxi Venture Capital Group acquired 10 times revenue on its investment, and some shareholders

got even 23 times revenues respectively.

Meanwhile, Chairman *Li*, as government's agent was asked to leave SUNTECH because his term of office of 4 years had run out, When *Li* left, he received 1 million CHY and an Audi A6 car from SUNTECH.

After that, Power Solar System Co., Ltd, or SUNTECH BVI, was established in the British Virgin Islands on January 11, 2005. *Shi* held 60% of the stock; Million Power held 40%. SUNTECH's first round of private equity was taken in May 2005; at the end of the first round, *Shi*'s share reached 54.144%, and most of the world's top investment banks, such as Goldman Sachs, became controlling shareholders. SUNTECH Power Holdings Co., Ltd. listed on the New York Stock Exchange (NYSE:STP) at a price of US $15 per share on December 13, 2005. On that day, the shares closed at a price of US $21.20 and raised nearly US $400 million. In 2006, *Shi* was named China's richest man in the energy industry. In early 2008, SUNTECH Power Holdings Co Ltd was the world's largest maker of solar panels, and its shares hit a high of US $86 (Xiao, 2009).

Capital Re-Input from Government

After being listed on the NYSE, SUNTECH's production capacity started to expand.

In 2005, SUNTECH's PV cell manufacturing capacity was only 150MW. In 2011, however, after 6 years, the production capacity had been increased by 16-fold (2400MW) (Figure-1). The same year, SUNTECH's production volume exceeded that of the US and became the number 1 ranked in the world. During this period, SUNTECH completed goals ordinary companies would have needed 30 years to reach (Li, 2012). There were two primary reasons for SUNTECH's giant leap forward.

Firstly, the demand from the global market, especially the EU market increased. From 1999, some countries of the EU started to present new policies for subsidizing new energy. For example, in January 1999, the German government launched the 100,000 Roofs Program (HTRP) for PV systems, aimed at stimulating the installation of 100,000 grid-connected PV systems totaling 300 MWp within 6 years. In the beginning, the program granted loans at a "reduced" interest rate of 0% for PV systems and a waiver for the last installment of up to 12.5% of the investment. In total, this corresponded to a subsidy rate of about 35%. Under the above-described conditions, the total

amount for subsidies within the HTRP amounted to one billion Euros, which was to be paid by the government over the loan period. In total, from 1999 up to 2003, 45,858 PV systems with 345.5 MWp were subsidized under the HTRP from among loans of 1.72 billion Euros. The HTRP stimulated the PV market (Stryi-Hipp, 2004).

In 2004, Spain's government shifted to revise renewable-energy subsidies every four years instead of annually.

Spanish renewable-energy companies that once got Europe's biggest subsidies are deserting the nation after the government shut off aid, pushing project developers and equipment-makers to work abroad or perish (Morales and Sills 2012). Not only Germany and Spain, nearly all countries in the EU has unique subsidy schemes in place for new energy (Badcock and Lenzen, 2010). The changes brought by these new policies and schemes can also be seen from SUNTECH Annual Reports (Figure-2).

In 2004, the German market shared 72.1% of SUNTECH's total net revenues. Since then, while the data decreased annually.

The total net revenue from Spain also reached its pinnacle at 37.4% by 2008, and then suddenly went off. The market shrinkage of Germany and Spain is tied up with subsequent policies of cutting subsidies for PV.

On the other hand, market share from other European countries, U.S and Japan also began to increase. SUNTECH's total net revenues from other European countries came to $1,012.7 million in 2010. Share from the U.S was 23% and up to $723.7 million in the next year.

Compared with the EU and the U.S, the share of China was lower. In 2005, China's share was only 25%, a highest number SUNTECH reached. This means that SUNTECH's structure was the export or external demand-dependent. And this set a risk for SUNTECH's future operation.

However, as the expansion of the production capacity of SUNTECH, the employees and the taxes have been also increased. This was the second reason for SUNTECH's giant leap forward.

In 2004, the number of SUNTECH's employees was 852. But, in 2011, the number jumped to 17,693, 20 times that of 2004. Meanwhile, there has been a big leap in income taxes paid too.

In 2005, SUNTECH's income taxes paid was just $2.5 million. By 2011, however, it had

become $85.4 millions more than 30 time that in 2005.

To continually encourage increase employee and taxes, in 2011 the local government put forward a target of building such a “SUNTECH” within five years. For this, the government transferred several hectares of land to SUNTECH, and demanded that SUNTECH must build a factory admitting 50,000 to work within the given time (Liu, 2010).

The command to expand the scale of SUNTECH despite future market situations and the ability of SUNTECH caused *Shi* dissatisfaction, and it became a cause of variance between *Shi* and the Wuxi City Government or officials.

The expansion of SUNTECH at the employee rate, taxes and GDP is an important index to evaluate official’s achievement record. This also determines whether or not government officials are promoted as well. So the government’s desire to expand the scale can be easily understood.

Figure-1 SUNTECH’s production and operation situation

	P.C.	N.C	S.T.B	Employees	I.T.P
2004	-	$2.576	-	852	-
2005	150	$22.6	-	1374	$2.5
2006	270	$168.9	-	3284	$10.7
2007	540	$9.1	-	6784	$15.3
2008	1000	$171.3	$638.5million	9070	$16.2
2009	1100	$292.9	$800.4million	12548	$17.1
2010	1800	$30.0	$1400.8million	20231	$17.1
2011	2400	-	-	17693	$85.4

P.C (Production Capacity) in MW, N.C (Net cash used in operating activities) in millions, S.T.B (short-term borrowings including current portion of long-term bank borrowings) in millions, I.T.P (income taxes paid) in millions.

SUNTECH Annual Reports (2006-2011)

Figure-2 SUNTECH’s markets and customers

	Region	
	EU	Non-EU

Year		Germany	Spain	Others	China	S.A	U.S	Japan	Others
2004	TNR	$61,5	$1,7	$13.0	$6,7	$1,3	-	-	$1.0
	Share	72.1%	2.0%	15.3%	7.8%	1.6%	-	-	1.2%
2005	TNR	$101,6	$18,1	$41.5	$56.4	$0.5	$1.7	-	$6.1
	Share	45.0%	8.0%	18.4%	25.0%	0.2%	0.8%	-	2.4%
2006	TNR	$254.3	$123.5	$43.7	$129.7	$1.9	$20.4	$4.3	$20.9
	Share	72.1%	2.0%	15.3%	7.8%	1.6%	3.4%	0.7%	3.5%
2007	TNR	$685.8	$466.2	$43.7	$25.7	$0.9	$86.7	$8.4	$30.8
	Share	50.9%	34.6%	3.2%	1.9%	0.1%	6.4%	0.6%	2.3%
2008	TNR	$570.9	$718.7	$203.6	$134.9	$1.9	$142.7	$6.7	$159.1
	Share	29.7%	37.4%	10.6%	7.0%	0.1%	7.4%	0.3%	8.3%
2009	TNR	$701.8	$61.1	$490.6	$75.7	$1.7	$160.4	$81.6	$153.9
	Share	41.4%	3.6%	29.0%	4.5%	0.1%	9.5%	4.8%	9.1%
2010	TNR	$818.5	$86.5	$1,012.7	$154.0	-	$443.3	$134.2	$252.7
	Share	28.2%	3.0%	34.9%	154.0%	-	15.3%	4.6%	8.7%
2011	TNR	$631.0	$44.6	$754.2	$371.6	-	$723.7	$143.9	$477.6
	Share	20.1%	1.4%	24.0%	11.8%	-	23.0%	4.6%	15.1%

TNR (Total Net Revenues) in millions, S.A (South Africa)

SUNTECH Annual Reports (2006-2011)

2012, for SUNTECH, was absolutely a troubled time. Mistakes in operation, changes in the worldwide demand situation, a surge in bank debt and the disagreements between the Wuxi government and Shi, all erupted suddenly.

From 2005, Shi made a large investment in some projects, but failed most times. SUNTECH suffered much as a consequence. Meanwhile, one hundred PV Industrial-Parks was launched together in China to get subsidies, discount loans and low price land from governments. To fight in the PV market, enterprises waged a price war. For SUNTECH, the price of standard PV modules fell by 89%, down from $3.98 at 2006 per watt to $0.43 per watt at 2011. That led to financial

losses for SUNTECH of over 1 billion US$ (Wang, 2012).

In 2008, under the shadow of the financial crisis, atrophy in the demand for PV commodities demand atrophy is serious. From 2011, government subsidies to PV around Europe were to cut. The loss of European orders seriously affected most of SUNTECH's business.

On July 30, 2012, a bulletin was released announcing that SUNTECH was involved in a scam worth as much as euros560 million (Shen and Jewkes, 2012).

On Aug 15, 2012, Shi announced his resignation as CEO of WUXI SUNTECH POWER (subsidiary of SUNTECH POWER).

These incidents caused a large selling of stock of SUNTECH by shareholders and large funds. Shares slipped to 1 US$/p, the lowest since SUNTECH POWER was listed on the NYSE. Because the situation of SUNTECH POWER Holdings did not meet the NYSE's price criteria for continued listing, as the average closing price of the stock was less than $1 over the last 30 trading days as of September 10, 2012, this top solar panel maker faced NYSE delisting (Das and Selvi, 2012).

Facing these, the new CEO of SUNTECH POWER wanted to put WUXI SUNTECH POWER out of business. The proposition startled the Wuxi government, and the incumbent mayor *Zhu Kejing* took urgent measures and loaned 2 billion CHY from the Bank of China for avoiding WUXI SUNTECH POWER's bankruptcy. For Wuxi government and banks, loaning to WUXI SUNTECH POWER was not only just to aid SUNTECH, but also save themselves.

It's easy to explain why WUXI government did it. If SUNTECH went under, its debt may not be paid back; the employment situation, taxes and companies related to WUXI SUNTECH POWER would be badly affected. So, the existence of WUXI SUNTECH POWER had a special meaning. And, for government officials, all of this may be an obstacle to their promotion.

Regional decentralization and bureaucratic promotion

SUNTECH's story shows an injection of resources such as capital, labor and land from the government when SUNTECH began, an exit of government capital as SUNTECH needed to raise money worldwide and a re-interference of government power when Wuxi SUNTECH was near insolvency. And occasionally, the Wuxi government offered cheap factors of production to private

enterprises through administrative regulation even while facing great risks. So what is the motive of the government in enforcing these administrative regulations? This paper tries to analyze this problem as a matter of institutional arrangements such as incentives government official (political tournaments, promotion tournament) and the system of regional decentralization.

First, it has something to do with China's "regional decentralization" such as "independent administration" and "complete financial responsibility" (a system where local authorities take full responsibility for their finances).

Since reforming and opening, China's local governments have played a crucial role in the growth of regional economies.

Regional decentralization is to be regarded as an incentive delivery mechanism to local governments from the central government (Bardhan and Mookherjee, 2006), and as starting a new chapter in central government-local government relationships. Meanwhile, it has strengthened the independent position and influence of local governments in economic activities. This means that, sometimes, local governments can intensively mobilize factors of production for the rise of non-state-owned enterprises, and for the emergence of markets (Qian and Xu, 1993) under minimum regulations and monitoring.

Decentralization gained local government more and more autonomous rights to decide to invest, attract foreign direct investment, manage enterprise and trade overseas. The institutional arrangement increases enthusiasm for local governments' participation in reformation and development.

China's central government introduced "financial responsibility" in 1994. From that time, the central government made contracts of "financial responsibility" with local governments.

Under "financial responsibility", 75% of VAT (Value Added Tax) were handed over to the central government, and 25% was left to the local government. Most of the tax revenue created by the manufacturing sector flowed to the central government. Meanwhile, profits and revenue from urban expansion and occupancy of land belonged to the local governments.

For example, Guangdong province turned over 1 billion CHY revenues to the central government. Then Guangdong provincial government can dispose of all the rest of the revenue. And

provincial governments were allowed their own “coffer”- budgetary funds. It should be noted that the budgetary funds are out of central government control, and entirely to local governments disposal. The institutional arrangement of financial responsibility in China resembles “fiscal federal”(Zhou, 2008, p.48).

But in some places local government officials indeed thinks that even if the local government unable to fulfill the repayment contract with banks and investors, officials can also use many different methods to extend the debt peak for a few years more, and in so doing the debt risks can be shifted to the next government. If all that is in vain, the local government also can call for support from the central government.

After 1994, the central government tightened its financial regulation on local governments.

However, local governments still control some local investment platforms by recessive debt such as infrastructure loans. So local governments can collect a large sum of money easy to pile up policy achievements, and need not worry about the risks of repayment. All of these have become a large hidden trouble for the nation's financial system.

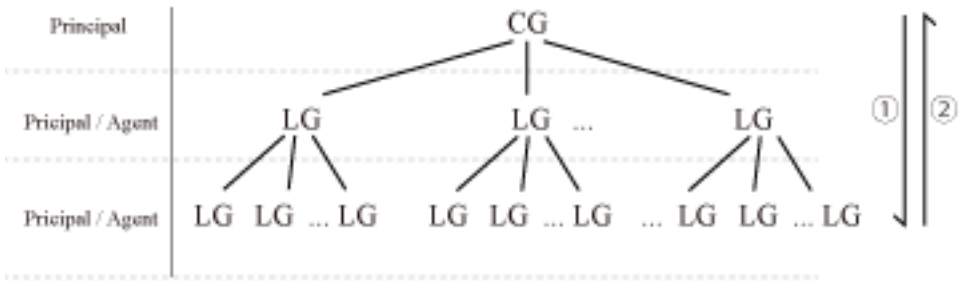
It is easy to see the relationship between the central government as a principal, and local government as an agent.

The principal (central government or local governments) can incentivize the agent (local governments) by the method of “relative performance evaluation” (Zhou, 2008, p.29-30). This evaluation caused competition between government officials at the same level for promotion to high-level positions (for example, several city mayors compete for one governor’s position).

Upper level administrative leadership directly controls the promotion of local officials; it formed a political tournament situation between next level officials, and forces them to better accomplish the above tasks. This institutional arrangement established a close link between promotion of officials and GDP growth of local economy.

In this way, the relationship between central and local governments forms a pyramid structure. The central government dictates the order of the political economy from top to down, and the achievements of the local governments and officials are fed back to a higher authority (Figure-3).

Figure-3



CG: Central Government; LG: Local Government; ① Send the orders of Political Economy to Local Governments; ② Return the Achievements of officials to the higher-level government.

But it also drew waves of inefficient competition. For instance, SUNTECH's success in Wuxi City blindly brought launching of the PV industry in other cities, and made the price of PV production go down.

Second, the motives of local government officials in improving local economic growth are not only budgetary funds, but also political benefits like opportunities for promotion.

From 1984, China initiated a personnel system reformation. The central government was directly responsible for the designation of provincial and ministerial-level cadres, and the provincial-level government had overall responsibility for the appointment and election of cities-level cadres.

The promotion of local officials is linked to local economic growth. Local officials must compete economically with each other for political promotion. It is called a "political tournaments". But, sometimes, it is seen more as a GDP tournament. Some studies are analyzing China's provincial data lever from reform 1978, and concluded that there was a remarkable correlation between the promotion of local officials and economic performance or GDP growth (Li and Li-An, 2005).

Mattozzi and Merlo (2008) argued that two main career paths are prevalent among politicians in modern democracies: there are career politicians (i.e., politicians who work in the political sector until retirement), and political careers (i.e., there are politicians who leave politics before retirement and work in the private sector). The main incentive for career politicians working in government is the promotion and gaining more power. But the main incentive for political careers is becoming famous and networking for a better position in the future. There is a elementary difference in motive between the two, but they share one same point, that the most important thing is an emotion

to expect future than getting wages from the government.

If we list the resumes of the key people who have affected SUNTECH, it may be observed that *Yang* and *Mao* were a career politician, and Hong and Li belonged to the political careers path (Figure-4).

Figure-4

	Yang Weize	Born 1962
January, 2000	Director of the Jiangsu Provincial Communications Department, the Party secretary	
December, 2001	Vice secretary of Suzhou municipal Party committee	
January, 2001	Vice secretary of Suzhou municipal Party committee; Mayor	
November, 2004	Secretary of the CPC Wuxi Municipal Committee	
November, 2006	Jiangsu Provincial party committee member; Secretary of the CPC Wuxi Municipal Committee	
March, 2011	Jiangsu Provincial party committee member; Secretary of the CPC Nanjing Municipal Committee	
November, 2012	Alternate member of the CPC Central Committee (the eighteenth session)	

Information from website, http://leaders.people.com.cn/GB/70117/index.html

	Mao Xiaoping	Born 1957
2001	Vice Mayor of Wuxi	
February, 2004	Mayor of Wuxi	
April, 2011	Party Secretary of Wuxi	
December, 2011	Mao was dismissed from office for taking bribes and corruption.	

http://leaders.people.com.cn/GB/58318/58449/80346/85257/5820011.html

	Hong Ruqian	Born 1942
1994-2000	Director of Wuxi City Finance Bureau;	
2003-2007	General Manager of Wuxi Venture Capital Group	

Information from website, http://cvsource.chinaventure.com.cn/

	Li Yanren	Born 1942
1988-2001	Director of Wuxi City Economic Committee	

2001-2004	Chairman of Wuxi SUNTECH
2008-	CEO of Danyang Semiconductor; CEO of Wuxi Zotec; Strategic Consultant for SF-PV

http://baike.baidu.com/view/3206363.htm

http://3193342.czvv.com/contact

Conclusion

Wuxi City Government has cultivated some star PV enterprises such as SUNTECH of government-run venture capital. But regarding the situation now. The hidden risks of “state capitalism” began to surface.

Regional decentralization means some local governments can intensively mobilize factors of production for a lower price for enterprises they want to provide. And these allow enterprises to form a large scale of operation in a short time. Then, as market demand increases, the enterprises are able to profit from the advantages. Or, the action of local governments reduced the time enterprises match demand from the market.

Also, using promotion under GDP system as the main evaluative criterion enhances the motivation for local government officials to obtain a good GDP for promotion.

In China, the PV industry was never a product of domestic demand. This led to an embarrassing situation in which SUNTECH’s national market never amounted to more than 25%. So too great a reliance on external demand also poses problems such as that if the volume of exports from the international market suddenly falls, it may seriously impact the operation of the enterprise. And, sometimes, local governments ignore the needs of the market to blindly launch duplicate projects. Usually this causes enterprises get into an inefficient price war, and exacerbates domestic overcapacity.

For the future, Chinese governments at all levels will accelerate the development of new industries. But, how to treat the sequelae from government intervention？ The pattern of change in economic growth and incentive system may be an effective prescription.

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