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Human Capital Access for Chinese Private Firms: Ownership Effect and Firm Performance

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Abstract

This paper examines the standing of private firms in the post-privatization economic reform in China regarding their access to human capital. The cross-sectional dataset used to test the model is extracted from the World Bank 2012 Enterprise Survey. Using a sample of 2848 Chinese firms of diverse ownership types, the paper studies the effect of firm ownership on human capital, and further studies the effect of human capital on firm performance in terms of growth and expansion possibilities. The results are mixed: significant evidence supporting the claim that private firms are human capital constrained in terms of skilled and trained labor force, yet also suggesting that private firms get better educated labor compared to their state-owned counterparts. It might no longer be the case that private firms are disadvantaged in the *access* to the more educated labor, but only in the *utilization* of such qualified labor. The findings also suggest that the presence of skilled labor in private firms significantly improves their performance. The outcomes propose that the reforms are far from perfect or complete for China which is still expected to undergo a lot of changes to successfully finish its transition and preserve its rapidly growing trajectory. To succeed in acquiring the qualified labor with good human capital, policy recommendations might consider paying more attention to the pool of talent within the country and the recruitment channels, and also supplying the private firms with the needed funds for adopting training programs.

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List of Abbreviations

HCOWN   Interaction Human Capital and Ownership

JSC   Joint Stock Companies

LLC   Limited Liability Companies

OLS   Ordinary Least Squares

POE   Private-Owned Enterprise

ROA   Return on Asset

ROE   Return on Equity

SOE   State-Owned Enterprise

TVE   Township and Village Enterprise

WTO   World Trade Organization

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1 Introduction

From state-socialism to opening-up and modern corporations, China has witnessed great transformations over the last decades. Moving from being centrally planned to a more open market-orientated economy, the emergence of privately-owned enterprises has widely increased since the 1978 economic reform in China. It is no longer a surprise that the privatization phenomenon played a vital role in contributing to China's economic growth over the years (Anderson et al., 2003). An increase from $110 to $994 of GDP per capita took place between the years 1978 and 2002 (World Bank, 2004). Yet, as the idea of privatization was newly born in China's transition market, private firms were greatly stigmatized for a long period of time, being labeled as "red hat firms" and "profiteers", thus causing resources to be channeled into state-owned enterprises (Nee and Opper, 2012, p.110). To solve the problem of this pariah-like status that was pinned to the newly emerging private firms, they hid under other labels such as Joint Stock (JSC) and Limited Liability Companies (LLC) (Nee and Opper, 2012, p.114). However, financial institutions and state banks kept on favoring the state-owned firms for a long period of time (Peng and Heat, 1996). Not only were private firms financially constrained, but also constrained in other areas such as accessibility to human capital (Garnaut et al., 2012).

Human capital is the utilization of the workers' knowledge, skills and experience to add to the value of the individuals themselves, their firm, or their country (Schultz, 1961). It is mainly the combination of workers' education, skills and work experience which makes their contribution to the firm more valuable. The labor force, on the other hand, is an indispensable living entity for a country that must be carefully nurtured and taken care of. Since the labor market is greatly formed by the educational system and opportunities present within the country (Taylor, 2011), it would be valuable to invest in human capital. Over the decades, education became widely and invariably acknowledged as a main driver of economic growth (Lau and Yotopoulos, 1989; Ada and Acaroğlu, 2014; Jin and Jin; 2014). Education is a form of investment in human capital which leads to higher productivity for a worker and the firm itself (Lau et al., 1991).

Access to resources and capital is greatly affected by the ownership type of a Chinese firm (Nee and Opper, 2012). Diverse firm ownership types require different needs for resource utilization; meaning that, firms allocate their human and capital resources differently depending

whether they are private or state-owned, thus rendering the efficiency level of resource utilization diverse (Ju and Zhao, 2009). Given the influence of ownership type on resource acquisition, Foneska et al. (2014) distinguish between two broad ownership types of Chinese firms: private-owned enterprises (POEs) and state-owned enterprises (SOEs), whose general characteristics differ. Not only are SOEs larger and more complex, but also more loaded with a diversity of resources from raw materials to human capital (Peng et al., 2004). To understand why private firms may experience a lasting and significant disadvantage even after the reforms, it is important to know more about the situation in China and its ownership system, as well as the labor market and their allocation system both before the reforms period and after it.

For a long period of time, having a state-sector job meant enjoying nonwage benefits related to social insurance, child and health care, housing and pensions (Cai et al., 2008). It is no surprise that citizens looking for a job would favor working at a state-owned firm. In addition to that, the stigma attached to the newly emerging private firms did not make it any easier for educated fresh graduates to pick a job in the private sector. Not only were private firms less appealing in terms of lack of nonwage benefits, but also in terms of the pariah-like status which was attached to them. This thesis is concerned with testing whether it is still the case that private firms are disadvantaged in accessing the good human capital, or whether the reforms have taken care of this aspect and created a fair playing field for both types of firm ownerships: the state and the private.

1.1. Research questions

Evidence from studies on firms all around the world have shown the importance of human capital for a firm's performance (Youndt et al., 1996; Huselid et al., 1997; Shrader and Siegel, 2007), especially firm-specific human capital (Crook et al., 2011). A firm enjoying adequate physical and financial capital is not sufficient for its success if it lacks the required human capital and skilled labor (Lau et al., 1991). If human capital does in fact matter for firm development, then being constrained in that area poses a problem for the private firms' development in the highly competitive Chinese economy (Tan, 2002).

Several studies investigate human capital in China (Heckman, 2002 and 2005; Li et al., 2009) and its impact on firm performance (Marimuthu et al., 2009; Heckman and Yi, 2012). Yet, the literature has not examined the effect of different ownership types on human capital structure

in China recently. Do Chinese private firms still face disadvantages in accessing human capital today? To that extent, does human capital really matter for firm performance? It is vital to understand the effects of ownership type on the ability to access and exploit human capital since it may affect firm's overall performance. The implication being the following: If private firms are still stigmatized and limited with respect to human capital access and if human capital does in fact matter for firm performance, then policymakers should address these human capital shortages in private firms for better economic growth chances in China.

1.2. Method and material

Using a sample of 2848 Chinese firms from a 2012 World Bank manufacturing Enterprise Survey, the present study addresses these research gaps and extends previous research related to China's human capital constraint to examine whether private firms still face shortages in accessing the desired human capital. The model uses the 2012 cross-sectional dataset from the World Bank in order to investigate the type of ownership (POEs or SOEs) effect on human capital quality, and to further study how different levels of human capital affect firm's performance. In order to determine the possible associations, the ordinary least squares (OLS) regression model is used to test the hypotheses as this method gives unbiased consistent estimates given the available dataset (World Bank, 2013).

1.3. Limitations

Even though the dataset might be the most adequate and most recent available one to study the research questions at hand, it is not perfect. Possible limitations in the survey preceding the dataset caused some obstacles; those include but are not limited to: low response rates, long survey length, and missing observations. However, the interviewers made a lot of effort to reconcile these challenges by recruiting professional teams, performing thousands of callbacks, and pointing out advantages resulting from participation in the survey.

Another more general limitation to the analysis is the appropriate proxy measures for firm performance. The measure total sales per employee might not capture the whole dimension of performance as more data is needed to account for the growth of a firm. It might be better to use alternative measures for firm performance such as Return on Asset (ROA) and Return on Equity (ROE) (Nee and Opper, 2007), but this variable was not provided for the companies in

the dataset. Additionally, using ownership as a binary dummy variable, where 1 indicates privately-owned and 0 indicates state-owned, when in fact more types of ownerships exist in China such as foreign-owned firms, could also be considered a shortcoming to the analysis. Despite the fact that the dataset suffers from these flaws, the problems are not atypical to the common ones faced when dealing with enterprise surveys. Whether it is issues with the dataset or other survey imperfections, the problems should be carefully addressed and dealt with to solve potential flaws that might bias the estimates of interest.

1.4. Disposition

The remainder of this paper is organized as follows. Section 2 discusses the theoretical background in light of prior studies related to this subject, describes the policy background in China before and after reform, discusses private firms' accessibility to human capital as well as human capital's association with firm performance; it also develops the main research hypotheses. Section 3 explores possible limitations in the dataset and efforts to reconcile them, presents the model specification and describes the variables of interest in detail with their descriptive statistics. Section 4 presents the results, alternative measures for robustness checks, and a discussion of outcome implications. Section 5 finally concludes by shedding light on possible policy recommendations, certain limitations, and future research.

2 Theoretical background and Research Hypotheses

To realize why private firms may experience substantial shortcomings and inefficiencies, it is important to understand the disadvantages brought about by the socialist system which emerged in China for decades before the reform. For the purpose of this analysis, the thoughts adopted by major economists in history will be elaborated on. During the period before the reform, China's economy was dominated by the inefficient socialist regime. According to Karl Marx, socialism is one of the classical ideologies whose goal can be briefly described as one that aims at constructing an economy on the basis of common ownership or state collectivization of private property. Under the socialist regime equality reigned as everyone receives an equal income regardless of whether one was working according to one's ability or not (Rothbard, 1991).

Prior to the 1978 economic reform, the state had a major influence regarding all matters related to the economy. Centuries-old theories put forward by Adam Smith and David Hume from the Austrian school of economics (see for example Menger, 1871; Hayek, 1949) argued that society doesn't need a ruler or state control as it merely organizes itself through the "Invisible Hand". Adam Smith (1887) first described the Invisible Hand by referring to a market which is self-regulated and free from any government intervention or "mastermind". He was a pioneering advocate of this concept, and the liberty of society and its people. He denied any significance for the government involvement, as well as any good that may arise from setting policies, plans and recommendations. In his opinion, any government or state action leads to failure and is disturbing to the greater order which prevails smoothly due to the "laissez-faire" approach. Since only a market system would result in maximized welfare and economic growth, society should have faith in the system and the natural order of markets. Individualistic freedom and the self-regulating property of the market are enough for the creation of a well-functioning society. As deliberate human involvement plays an important role in allowing the normal course of action to take place (Smith, 1887), the laborers choice between working in a private or state job might in fact matter. Read (1958) also believes that only through the absence of a higher order (i.e. a ruler or state) will people make free decisions and allocate themselves in the most efficient way possible.

In explaining the potential invisible network which holds things together, Roberts (2005) criticizes policy recommendations and state decisions, and further shows how useless they prove to be. Another standard economic theory by Hayek (1949) does not support socialism due to the mere fact that it is totalitarian in nature and takes away people's freedom of choice. He supports a more liberal society which should only take from socialism its idealistic nature. Similarly, Mises (1990) criticizes the socialist planners for substituting the market mechanism of allocating the factors of production by an economic state planning mechanism. In a socialist society, he claims, the government is incapable of knowing the true value of the different means of production. A socialist market lacks the appropriate pricing of the means of production including labor's wages. He also explains how a capitalist society achieves the adequate resource allocation through respecting the subjective values of individuals and hence, its superiority to a socialist-run society. In relation to China, had the market been capitalist pre-reform, standard economic theory suggests that pricing of outputs and inputs (labor's wage) would have been easy

to achieve by the market mechanism of determining the values of all products and the factors of production. Yet, socialism necessarily removed this privilege and forbade the state from valuing their means of production. In principle, the above happens because socialist planners lack the most vital tool that a capitalist private entrepreneur has: an incentive.

Post-reform Chinese leaders sought to establish a more open market which is less controlled by the state, yet which is in fact not completely free from government intervention. Theories adopted by other economists argue that the co-existence of market mechanisms with some state intervention would help form a well-functioning economy. For instance, Hayek (1967) viewed the market as effective yet imperfect on its own as it needs some guidance from the state. Smith (2002) reflects on whether the market should be regulated using state set laws or whether it should be allowed to emerge freely and be regulated naturally by an invisible hand. To make his point, he distinguishes between two kinds of rationalities: constructivist and ecological. On one hand, constructivist rationality is the careful use of reason to explore, analyze and recommend rules, similar to the job of the state. On the other hand, ecological rationality emerges due to an unintended evolution of markets, norms and social processes. Both are interdependent on one another since most institutions do not just arise from policy planning alone, but also from the unpredictable natural outcomes of a society. In brief, he theorizes that the state and markets should represent some form of coexistence for a prosperous and ongoing economy (Smith, 2002).

2.1. China's policy background: labor market and ownership system evolution

The literature widely discusses a major reform which took place in China during the 1978 and the subgroups of reform alterations which followed the reform era and added to the formation of a market-oriented economy (Brandt and Rawski, 2008; Nee and Opper, 2007). In that period, China witnessed major transformations which lead its economy to move from state-socialism to "politicized capitalism". According to Nee and Opper (2007), a politicized capitalist society is one where there is no clear cut division between the affairs of the state and the firm. China is currently a mixed society that is home for ongoing market liberalization efforts in the presence of uncompleted reforms. Both the economic and political scopes intersect to formulate the firms' decisions. There exists a clear overlap between the government and enterprises' businesses as there is no defined line distinguishing the state and the market.

Labor market evolution

The Chinese labor market has had its share of transformations. The labor allocation system was different before the reform period: labor markets were not functioning well and laborers were not able to move freely across provinces (Cai et al., 2008). Previously, China used to centrally allocate the labor into SOEs and state jobs. The state had developed a system plan which not only included agreed upon prices set by the government itself, but also distributed various inputs, including labor, administratively into jobs as seen fit (Fleisher and Yang, 2003). In order to support the development of heavy industries as requested by the Chinese socialist leaders at the time, the workers were given a low wage which was acceptable due to the subsistence prices of food and the nonwage benefit system. The urban workers in that socialist era received nonwage benefits such as child and health care, housing, and pensions. The sole reason why the economy did not fail at that time was that profitability of SOEs was assured given the fact that all quantities produced and prices of inputs and outputs were set by the government itself (Cai et al., 2008).

Aside from the workers, firm managers were also not allowed to make independent decisions concerning employment and wages as state planners had their hands on the managers' autonomy as well (Lin et al., 1996). Competitive advantage of workers was ruled out as the socialist system heavily planned labor distribution into a classification system based on their location, region and occupation regardless of their education level or degree. As claimed by Cai et al. (2008), the Bureau of Labor and Personnel in China was the only responsible entity to plan the labor allocation and match workers to their respective jobs. The authority this Bureau had was major as no mobility was allowed after a match had been made between workers and their employers. All working citizens were assigned a status, either agricultural or nonagricultural, depending on where they were born; this system of registration was known as *hukou*. A goal of full-employment further led to the presence of many redundant workers in state firms.

Due to the apparent failure of the state-socialist system to provide effort and innovative motivation for workers, labor productivity became very low which translated into output shortages (Cai et al., 2008). It was evident that the current centralized allocation system was inefficient, thus the realization for the need for a reform. The transition to a market-oriented economy aimed to make a more open labor market possible where workers should no longer face planned allocations but should instead be allowed to freely choose between being employed in

SOEs or non-state private firms. This was evident since after the reform era, an increasing number of workers took jobs at non-state firms thus making the fraction of labor working in SOEs decrease from 78 percent to 24 percent from 1978 to 2005 (Cai et al., 2008). One of the reforms' major goals was to remove the barrier which centrally allocated workers to SOEs depending on their location regardless of their education and skills (Brooks and Tao, 2003). Similarly to various rapidly emergent countries, the working citizens were widely affected by the set of transformative structural reforms which mainly brought them out of the agricultural rural areas into the urban industrial sectors causing the fraction of agricultural workers to decrease from 71 percent to 45 percent from 1978 to 2005 (Cai et al., 2008). The main reason for the huge migration was the relatively high returns of nonagricultural work. As stated by Lin et al. (1996), the focus of the reforms on enhancing labor mobility aids in increasing citizens' investment in human capital as they become aware that better education eases mobility across areas. Labor mobility also develops incentives to allocate resources more efficiently from the wider pool of available workers. These factors allow improvement in the economic performance since workers become motivated to exert more efforts, as well as distribute themselves in the appropriate sectors (Lin et al., 1996).

In the mid-1980s, China witnessed the development of Townships and Villages Enterprises (TVEs) in an attempt to correct for the socialist system's failure in creating incentives (Brandt and Rawski, 2008). This development enhanced the labor market outcomes as it absorbed the agriculture surplus workers and increased competition making the SOEs reconsider their inefficiencies when performing planned allocation. The fact that TVEs were regulated to a lesser extent and had harder budget constraints than SOEs created pressures for the latter and caused them to reform. The reforms ended the planned permanent employment system, known as the "iron rice bowl" (Gross and Dyson, 1996); and consequently permitted managers to hire with more flexibility based on market needs. Furthermore, the market competition made it possible to employ the suitable employees for the job depending on their human capital and level of expertise. Yet, the new labor contract system made firing or dismissing workers limited to only a maximum of 1 percent per year since it still allowed two routes for employment: state planned allocation and natural employment by firms (Fleisher and Yang, 2003).

With that reform taking place a privatization phenomenon followed in the 1990s where the state set a policy to privatize the small and medium state firms while preserving the large firms as SOEs. According to Brandt and Rawski (2008), the policy adopted by the Ministry of Labor allowed the setting of wages by firms based on skill level and productivity of the worker which increased efforts and incentives. Yet, regardless of the new laws, the workers with good education still preferred the SOEs due to the nonwage social insurance benefits they offered aside from the regular wage. As child care, private housing, pensions, and health care were not supplied by the private firms, most labor, especially those with the good human capital, favored working at state firms to benefit from those aids. In line with Nee and Opper (2012), through bottom-up change enabling the workers to take a job in the private sector through their personal connections and networks, the development of a new labor market was surfacing even before the first Labor Law. However, the low status accompanying private firms had a major role in influencing the network recruitment channels especially for the scarce skills and made the process challenging. With the 1994 Labor law taking effect, many of the workers' rights were recovered. The law issued rules for equality in obtaining employment and getting the same wage across similar jobs, accessing social insurance and welfare, and minimum wage requirements. Notably, it also recognized the right for workers' equal treatment in diverse ownership types (Brandt and Rawski, 2008), hence making employment at private firms more appealing.

By the end of the 1990s, further economic restructuring ended the permanent guaranteed employment as well as the extensive welfares the urban employees previously enjoyed. It also had a major impact on the labor market as it caused the dismissal of millions of employees thus raising unemployment (Cai et al., 2008). Little by little, China formed a better functioning labor market which not only enjoyed increased mobility but also allowed the market to shape the employment and wage decisions in enterprises. These changes obligated a new path for China, one that is more market-oriented in its vision.

Ownership system evolution

Pre-reform the major types of firm ownerships were either state or collective. State ownership and collective enterprises kept dominating for a while even after the reform took effect. During the mid-1990s, the state allowed diversified ownerships to allow private firms' emergence and to let go of the inefficient labor which negatively affected the economy (Cai et

al., 2008). Yet, the privatization phenomenon started prevailing in China discretely even before the reform took place. As stated by Nee and Opper (2012), the discretion was due to the social stigmatization which accompanied the private firms; they were usually considered a tail of capitalism as they were new elements which sought profit. However, this scenario is not unique to China as any de-coupling from the norm is looked upon suspiciously and faces heavy social stigmatization. With the 1994 Company Law designing a system of modern enterprise, the legitimacy was more easily established as the national policy for corporates started gaining private entrepreneurs' social and political acceptance. But institutional change did not happen overnight; firms had felt tired of the high costs entailed to being registered as cooperative and collective ownerships and sought for an identity change. Due to the corporatization policy aiming to turn the sector into one resembling the modern Western corporations and due to the Company Law which provided guidelines, mimicking the organizational behaviors of JSC and LLC and being registered under these names were possible routes. The aim was to find strategies which help converge in the outer appearance with the Modern Enterprise System to avoid public discrimination and establish legitimacy. Since everybody was doing the same in society, the process started to evolve faster. The key factor causing institutional change and triggering entrepreneurship was marketization and the profit making opportunities. The Company Law managed to reduce the intensity of government interference in enterprises, thus depriving the state from its previous unopposed monopoly power and control over the market (Nee and Opper, 2012).

Mises (1990) theorized about the importance of private ownerships in general and capitalist decision makers and entrepreneurs who were greatly motivated by returns. On the one hand, the profit-seeking capitalists are incentivized by the phenomenon of profit maximization. They aim to make profits and avoid losses through employing their factors of production in an efficient manner; and consequently, creating a market for those factors. In contrast, the collective or state ownership nature of a socialist society would lead the means of production to inefficient pricing since all resources are owned by a single entity, the government. Therefore, the socialist planners cannot carry out adequate calculations, decisions or plans to save the market from inefficiencies (Mises, 1990). Following this theory, permitting Chinese firms to dismiss unproductive employees and allowing inefficient firms to go bankrupt enhanced the economy and greased the wheel for growth. Given this permission, China faced in 1997 the dismissal of

tens of millions of employees, the decrease of the SOEs, and the emergence of privatized businesses. The number of workers almost halved between 1995 and 1998. Similarly to other transition economies, high unemployment followed the restructuring reforms (Brandt and Rawski, 2008).

The structural transformations have undoubtedly witnessed impressive magnitudes but the reforms are still unfinished. The reforms were far from complete as there were many obstacles and challenges along the way which made them less than perfect. To what extent have the reforms fostered change and addressed the previously restricting issues in regard to labor markets? The aim of this paper is to test to what degree in year 2012, those reforms have succeeded in formulating an efficient labor market which functions well and has a high degree of mobility through testing the freedom of private firms in accessing the qualified labor market which makes a difference.

2.2. Private firms and accessibility to qualified labor

To illustrate why private firm may or may not experience a disadvantage in accessing labor with good human capital, two contrasting views will be discussed: one that claims that private firms are human capital constrained, and another which suggests that this is no longer the case nowadays. The former view has been frequently discussed in prior studies and many scholars have contributed to that literature, while the latter view proposes that private firms by 2012 might actually have better human capital.

Studies have shown that recruiting and retaining qualified labor is not so easy in the Chinese marketplace (Dessler, 2006; Wu, 2009). Private firms in China face more constraints as compared to the state-owned firms (Peng and Heath, 1996). Since SOEs enjoy a better status than private firms, they are able to acquire state-owned capital goods at a lower cost (Tan, 2003). In the same way, it is easier for them to have access to human capital resources (Garnaut et al., 2012). Besides being privileged in accessibility to better resources, several studies have also shown that state-owned firms in China hold aside large human resource inventories (Kornai, 1992; Peng and Heath, 1996; Tan, 2003). In other terms, they are not just more advantaged when it comes to acquiring quality, but also fortunate enough to have access to a larger quantity from the pool of resources available in a country. Yet, additional workers prove

to be beneficial only if they fit the structure of the firm well; they should be well adaptable to the organizational habits of the firm and their skills should be utilized to alleviate and overcome growth constraining areas (Mishina et al., 2004). Another study by Tsai (2008) found that compared with developed countries, the state in China exerts great influence over firms since it has its hands on a major number of Chinese companies. Governmental support helps in the accumulation of abundant resources for the state-owned firms. Since firms' innovative technology and market success is widely shaped by the quality of human capital, limitations in accessing the desired amount of human capital constrain firm's innovation and success measures (Garnaut et al., 2012).

The main impediments which limit private firms from obtaining or even retaining qualified human capital and the barriers blocking the possibility for private firms to attain better labor quality will be elaborated on from both perspectives: the worker's perspective and the private firm's perspective.

<u>From the workers' perspective</u>

First, as POEs faced resource constraints, they cautiously consider raising employees' wages or potential compensation for new workers which is considered to be unpleasant from the worker's point of view (Garnaut et al., 2012). With the low wage offer, it was very hard for private firms to attract the qualified people needed for operating their firms. The less attractive benefits and working conditions caused the high-achieving graduates to shift their preference away from private firms to other types of employers.

Second, employees, especially college graduates, were reluctant to work in stigmatized private firms even if they are offered higher wages since they prefer working in firms with better known ownership types in China such as state-owned, foreign-owned or joint ventures. They see these employers as offering more protection for local employment, better social insurance as well as better retirement benefits. Also, workers with good education tend to prefer working at SOEs in China due to their better standing as compared to POEs (Foneska et al., 2014). The young, newly born private firms sent out risky vibes for educated graduates who seek high job prospects. In addition, employees who mainly look for a job within a reliable, well-reputable firm have uncertain predictions related to the firm's success when comparing private firms to its state-

owned counterparts. In brief, POEs lacked the foremost prerequisite for attracting potential well-educated workers (Williamson, 2000).

<u>From the private firms' perspective</u>

First, given that many tasks done by newly existing private firms require a minimum level of skills, hiring workers with low education seems like a rational choice for them. The actual obstacle comes into existence when the firm starts growing and expanding in the market as it will demand technological innovations which can be better achieved only by employing workers with higher educational levels. In that case, they might consider on-the-job training of their employees which they find cheaper than hiring more educated workers in the first place. Especially considering the fact that most often, the training required by private firms falls among the following three categories: technical, accounting and marketing, and quality control (Garnaut et al., 2012).

Second, the high turnover rate makes it unlikely that a private firm seeks investment in training its employees; this is turn further reduces the labor force's skills and quality level (Foneska et al., 2014). Workers are driven and widely motivated by wage levels. A slightly higher wage will make the workers, especially the unskilled ones, turn to rival companies which are offering more money, subsequently rendering the turnover rate high. According to Wu (2009), even foreign-owned private firms in China face a high turnover rate yet for a different reason: due to constant search for qualified talent. In fact, China had the highest ranking turnover rate among other Asian countries after it joined the WTO (Wu, 2009). As a result to the high turnover rate, the private sector finds investing in training its employees unattractive and causes the current labor's human capital level to diminish.

Third, as private firms came into existence after the longstanding, well-established state-owned firms, the available pool of employees from which they were able to recruit is typically the migrant workers looking for a slightly better job in a non-rural area. The labor market's supply of workers for the newly established private firms came from a large pool of agricultural labor force who wanted to shift to a more promising sector (Nee and Opper, 2012, p. 162). Those workers' education level ended up being lower in private sector as they relocate from the inland, countryside provinces where the majority had only completed elementary school due to the scarcity of good higher education institutions in those rural areas. This was the case a while

back; even though more recently private firms rely on those migrant workers for the unskilled work, migrants still occupy a large fraction of the firms' workforce (Brandt and Rawski, 2008).

In contrast to the above view, other studies have also looked at the possibility that it may no longer be the case that private firms nowadays are human capital constrained as they are outperforming SOEs in some areas (Wei et al., 2003; Tong and Junarsin, 2013). State-owned firms face obstacles in adapting to the transition market and adjusting to the more competitive practices in a marketplace which includes the new privatized firms (Tong and Junarsin, 2013). A study by Wei et al. (2003) shows evidence that private firms in China are facing significant progress in their employment efficiency as compared to the state firms; meaning that the efficient labor force is choosing to supply its capabilities to the privatized firms. SOEs become inefficient as they focus on deploying their human resources in administration duties instead of bringing profits which is what private firms are concerned with (Li and Xia, 2008). Even though private firms face high resource constraints (Perkins, 1994), various studies by Li and Zhang (2007), Peng et al. (2004) and Tan (2002) show evidence that POEs utilize their constrained resources better than their state-owned counterparts. In other words, regardless of all the constraints, the limited resources are better utilized in private firms than in state-owned ones. Due to diverse ownerships, human resources are exploited in different ways and some strategies prove to be more beneficial than others in driving growth in China. Given the fact that almost 25 years have passed since the 1978 economic reform, private firms operating in 2012 might have overcame the stigma and pariah-like status, thus making it possible to exploit the human capital which make a difference. According to Gao et al. (2010), Peng et al. (2004) and Ju and Zhao (2009), the ownership type induces diverse limitations and benefits for a firm. The distinct characteristics, organizational structure and identity of firms can be reflected differently depending on the ownership type (Hannan and Caroll, 1992).

Given the distinct arguments portrayed by contrasting views in the literature, this paper aims to identify private firms' current standing in China when it comes to human capital access. It basically tests whether, in comparison to the state-owned firms, private firms are more constrained, equal, or even more advantaged in that regard. Therefore, in view of the above point of views about resource allocation, I hypothesize that the effect of ownership type on human capital leads to the following:

Hypothesis1 (H1): *Chinese private firms today are still human capital constrained compared to state-owned firms. This means that the POEs have disadvantages in accessing and exploiting human capital in comparison with SOEs.*

2.3. Human capital and firm performance

In light of the importance of the issue at hand, Chinese firms need to also grasp an understanding of the factors affecting their performance: whether human capital is a significant factor, whether the interaction of human capital and ownership limits the firm performance, and whether the quality of human capital encourages or constrains firm's growth and expansion. Human capital proved to be a vital key for a firm's prosperous growth, development and performance (Decenzo and Robbins, 1999). Standard economic theories have asserted the negative implications state ownership has on firm performance (Kirzner, 1984). Several scholars claim that resource constrained firms find it harder to undergo development as their constraints cause them limitations in many areas related to growth and performance (Baker and Nelson, 2005; Starr and MacMillan, 1990; Mosakowski, 2002). Private firms' limited access to resources affects their performance as well as their competitive advantage in the marketplace. Given that, the standing position of private firms is more risky than their counterparts as limited resources make it hard for POEs to compete with other types of enterprises (Garnaut et al., 2012).

Acquiring extra resources is a firms' strategy to accelerate its growth and expansion (Kor and Mohoney, 2000). Better sales, and ultimately better performance, inspire managers to consider expansion opportunities for their businesses (Foneska et al., 2014). Consequently, they would consider employing better workers, training the existing workers, or spending more on durable fixed assets as first steps towards expanding the firm. Put differently, being human capital constrained decreases private firms' adaptability, performance, and responses to enhancing standing prospects or new business chances (Tan, 2002). Also, according to Ng et al. (2009), the ownership type as well plays a role in contributing to the performance of a firm.

Pitelis (2007) argues that better firm performance could be achieved through hiring more educated workers as they are more ambitious and would thus seek to exploit the available resources to expand both, their labor productivity and product quality. With better products come higher profits for the firm and better expansion opportunities into new markets. Another study by Fung (2007) also argues that firm's profitability is greatly affected by how enriched it is with

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human capital. Investing in human capital yields returns not only to the individual worker who enjoys higher earnings, but also to the firm which will benefit from a higher productivity. A firm with a more educated labor force can stand out from its rival firm since its average worker tends to be more skilled, a faster learner, and adapts better to the changing environment. So, despite the additional costs from hiring better labor, the increase in profits resulting from higher labor productivity would even out the situation (Pitelis, 2007).

The above arguments lead to the following second hypothesis:

Hypothesis2 (H2): The presence of better human capital in private firms has a positive relationship with firm performance in terms of growth and expansion.

3 Data and Research Design

The cross-sectional data used is extracted from the World Bank 2012 Enterprise Surveys database and covers country-specific questions regarding Chinese firms useful to get information about the business environment in China. The survey questionnaire preceding the data is titled "Manufacturing Module (2012) of the China-Enterprise Survey". The dataset is composed at firm-level by gathering responses from business owners and top managers for 2848 privately-owned or state-owned firms. Data for 2700 privately-owned or mixed firms and 148 fully state-owned firms in China were provided separately, but I merge both datasets together to be able to study the diverse ownership effect. The only reason why both datasets were originally separated is to make it easier for comparison with datasets in other countries. Yet, since I am only interested in one country, China, the fully state-owned establishments should not be excluded from the sample but merged with the private firms' data. The dataset provided is suitable to test various restrictions to growth and performance of firms. Specifically, it assesses the factors constraining private firms' growth (World Bank, 2013).

3.1. The Dataset

To begin with, the sample in the dataset is quite randomly selected as it was chosen using stratified random sampling by including Chinese firms covering diverse sectors, industries, locations and sizes. The Enterprise Survey leading to the dataset formulation includes several sections related to various aspects of the business environment, such as infrastructure and services, sales and supplies, land and permits, innovation and technology, access to finance,

labor, and performance. It was carried out through face-to-face interviews with the firm's owner, top manager or a member on the board of directors. The original goal of the surveyors was to achieve a target sample size of 3000 firms, yet certain shortcomings made this difficult to achieve, thus ending up with 2848 firms instead. Limitations related to the overall responses, refusals, incompleteness and eligibility rates were the main causes which rendered the sample size smaller than desired. Given low response rates, especially in certain cities like Shanghai, the dataset failed to complete the agreed upon sample size. Through a careful study of both, the China 2012 Implementation Report which came out on July 15, 2013 by the World Bank and their codebook which describes the data collection process in detail, this section will discuss the main issues faced and the approaches adopted to deal with them.

Limitations with the survey and dataset

Some problems with the survey rendered the process of collecting information tricky and caused limitations in the dataset. Reasons behind low response rates were mainly refusals of firms to participate because they did not have time, they did not want to share information, or they were concerned about confidentiality matters regardless of assurances from the World Bank team. Other common reasons for non-responses were mainly problems with phone lines such as being out of service or calls not being answered, and problems with addresses such as incorrect firm addresses or moving to new locations. Aside from survey non-response, the dataset also suffers from item non-response where the interviewees refuse to answer a specific question which they consider too sensitive, too confidential, or too personal to share. Yet, the variables for these kinds of questions are not part of this paper's model, so it should not be a very serious issue for this study. As for the non-eligibility rates, several reasons caused the dataset to suffer as well. Primarily, firms that were no longer reachable or those that discontinued their work were the main contributors to that category. Whether firms changed locations, whether they had less than 5 employees, or even whether they failed to reply to several attempts to reach them, all rendered their survey responses ineligible. Finally, quite a few firms refused to participate because of the simple reason that they found the questionnaire too long even though the interviewers explained that in some cases it was done in less than an hour.

Despite the fact that the dataset suffers from these flaws, the problems are not atypical to the common ones faced when dealing with enterprise surveys. Additionally, in comparison to

datasets that could have been brought from other sources like the National Bureau of Statistics (NBS), this dataset is qualitatively better and richer in information as it encompasses a wider range of questions; for example, not all surveys contain questions on employees' number (World Bank, 2013). To that regard, special efforts were taken, to ensure that the exact and accurate number of permanent and temporary employees was reported. For those reasons and for the extensive efforts which will be discussed next, I chose this dataset specifically to test my models.

Efforts to address the limitations

Many efforts were made to try to solve for the problem of non-responses and these successful strategies helped in maximizing the sample size to 2848 firms. First, teams in areas facing difficulties in gaining the desired participation, such as those in Shanghai, were replaced by higher-performing teams in an attempt to correct for that issue. The World Bank offices recruited professionals who were better experienced at conducting interviews and gathering answers to the surveys by encouraging the business owners to participate. They also recruited teams who not only impressed through dressing formally but who also had an impressively good knowledge of the Chinese local business environment and knew how to address top managers and firms' owners. The interviewers' strong understanding of the local firms worked well in favor of the teams and got the most out of the response rates. Second, attractive eventual outcomes were pointed out to the hesitant interviewees to get them to participate in the survey. For instance, interviewers pointed out the advantages gained from participating, such as gaining an insight on the chief restrictions to firms' growth, especially those targeting the private sector. Moreover, studying the survey and testing diverse models can influence China's policymakers to address the limitations and enhance both, firms' performance and employment opportunities. Third, tangible attractive offers to firms' owners and top managers were also used as means to induce participation such as winning tablet computers, choosing a business-related management book among the 8 most popular ones in China, and getting a free 2003 Country Profile. Finally, one last effort was made to convince firms who originally refused to participate to change their minds by re-contacting them after a short while. Also, in an attempt to ensure that the information is reliable and up to date, 1119 out of 2848 callbacks were performed to ask about accuracy and verify that the interview in fact took place.

Given all these tempting offers and interesting efforts, the firms' incentive to participate in the survey increased and the survey process took a surprisingly accelerated speed. Nonetheless, to fully correct for the flaws in the Enterprise Survey due to non-response and non-eligibility rates, more research is needed; yet for the time being, this dataset is the best I could use to test my hypotheses as it is the most recent one. Besides, all the limitations in the dataset are not unique to China's Enterprise Survey alone as all such surveys suffer from similar shortcomings. At least, what is very appealing about this survey is that they made all the weaknesses explicit and clear.

3.2. Model Specification and methodology

Using cross-sectional dataset, the model investigates the type of ownership (POEs or SOEs) effect on human capital quality and further studies how different levels of human capital affect firm's performance. The ordinary least squares (OLS) regression model is used to estimate the estimated equations. This is the most suitable method for this type of hypothesis testing as the independent variables are exogenous and there is no perfect multicollinearity as shown in Appendix 2. To check for the possibility of multicollinearity, the variance inflation factor (VIF) is calculated[1]. Multicollinearity was not likely seen as a problem to this study as the VIF range was from 1.02 to 1.66. Refer to Table 1 in Appendix 2 for the exact results of the VIF derived from the OLS regression. Table 2 in Appendix 2 shows the correlation matrix for the variables. As no correlation among the variables exceeds 0.4, we can rule out the possibility of high correlation. Using OLS for this dataset thus gives us unbiased consistent estimates (World Bank, 2013). In my paper, I use it to first study the effect of ownership type on human capital quality as portrayed in the following equation testing H1:

$$\text{Human Capital proxies} = \alpha + \beta \text{Ownership} + \gamma X + \varepsilon$$

The main estimated equation for the first hypothesis uses three distinct dependent variables as proxies for human capital: workers' education, skilled workers, and trained workers. Also, α is a constant, ε is an error term, and X is a vector of control variables.

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[1] Note that the tests were run for all regressions but Appendix 2 only portrays the results for the first model

Then, I study the association between human capital and firms' performance as I am interested in the effect human capital has on the firm's tendency to expand and grow as mentioned in H2:

$$\text{Firms' performance proxies} = \alpha + \beta \text{HumanCapital*Ownership} + \delta \text{HumanCapital}$$

$$+ \eta \text{Ownership} + \gamma X + \varepsilon$$

The main estimated equation for the second hypothesis uses two distinct dependent variables as proxies for firm performance: sales per employee and fixed assets per sales. Also, α is a constant, ε is an error term, and X is a vector of control variables.

3.3. Variables choice

Dependent Variables

For H1, I use three alternative measures from the dataset to proxy for human capital: 1) average years of education of a worker, 2) skilled workers to total number of employees' ratio, and 3) percentage of trained workers. The first measure serves as a good proxy since Lau et al. (1991) suggest that education is a form of investment in human capital which increases labor's productivity and alternatively their human capital. The second measure is also a possible proxy since the higher the fraction of skilled workers, the better the quality of human capital within the firm. The third measure serves as a proxy for human capital as firms' who train their employees are mainly concerned with adding value to their current labor force and increasing the human capital in their firms (Heckman, 2002). All three measures together form the whole dimensions of human capital as described by Schultz (1961). They are used in order to account not only for the acquired education level of employees through school, but also for their skill level through experience and subsequent training through specific firm programs.

For H2, I also use two alternative measures from the dataset to proxy for firm performance: 1) last year's total annual sales to number of full-time permanent employees' ratio as a proxy for firm growth, and 2) spending on fixed assets to the total annual sales ratio as a proxy for firm expansion. For the first measure, I follow the studies from Datta et al. (2005), Huselid (1995) and Koch and McGrath (1995) who use sales per employee as a proxy for firm performance by dividing the total annual sales by the number of employees. The second measure

is a proxy for expansion since a firm looking to expand its business would invest in fixed durable assets according to Foneska et al. (2014). Together, both measures would account for the firm performance in terms of growth and expansion.

Independent Variables

For H1, ownership type is labeled "Private" and measured using a dummy variable assigned the value of 1 if the biggest shareholder (i.e., >=50%) is a private entity, while zero if more than 50% of ownership is controlled by the state (Wu and Pangakar, 2010; Wu, Xu, and Phan, 2011).

For H2, aside from including human capital and ownership variables separately, I also include an interaction term between human capital and ownership type, labeled "HCOWN", by multiplying them together since I am interested in testing specifically whether private firms which have better access to human capital resources perform better or not. Adding the interaction term indicates that the effect of human capital on firm performance is different for different types of ownership. In other words, the effect of human capital on performance is not only dependent on the value of δ in the equation, but also on the value of β, meaning: $\delta + \beta*$ownership is the total effect of human capital on performance (Verbeek, 2008). Again, three distinct measures are used for the interaction terms found in separate regressions as we have three different human capital proxies: education, skill and training. In other words, each human capital measure is allowed to interact separately with the ownership variable.

Control Variables

To decrease the possibility of confounding effects on the variables of interest and to factor out the possibility that the results are driven by the exclusion of certain other variables, I control for the following set of variables in my regression.

Firm age: The age of the firm is held constant since it might have an effect on the outcome result. An older firm has better capabilities of spending on fixed assets than a relatively younger firm due to its better standing and superior experience in managing its capital. A longer existing, older firm has more chances to formulate connections, networks and links to acquire better human capital (Sharfman et al., 1998; Nee and Opper, 2012). I measure the age of the firm as the number of years it has been operating since registration (Foneska et al., 2014).

Firm size: Several economists suggest that a firm's size impacts its performance (Tan and Peng, 2003; Mishina et al., 2004). Bigger firms might take advantage of economies of scale thus enjoy better access to resources. I measure the firm's size in terms of total number of permanent full-time employees following the World Bank's report for the survey (2013) which states that this variable reflects the reality of the firm very accurately. They suggest it to be the most adequate measure for firm size since, apart from the agriculture sector, temporary part-time employees in the sample firms is not such a common practice. The logic is that a firm with a higher number of employees will spend more on fixed assets in two ways: it will need more equipment for the new employees to operate, and it will need more space to avoid decreasing marginal productivity of labor. Hence, a higher number of employees induces the firm to increase its expenditure on fixed assets and plants. For robustness reasons, I also use an alternative measure for firm size, the natural logarithm of the total annual sales, which was also used in prior studies (Yasuda, 2005; Al-Khazali and Zoubi, 2011). Both measures are conventionally adopted and widely accepted as firm size proxies in research.

Access to credit: The variable line of credit or a loan from a financial institution is also controlled for since a firm might be spending more on fixed assets due to its access to credit which influences its overall performance (Ju and Zhao, 2009). This does not mean that a firm is expanding or growing; it merely implies that the amount spent will have to be repaid in the future in some way to cover its account payable. In other words, this variable holds constant access to credit from an external source (bank, financial institution) where firms can take advantage of the extra income to pursue the expansion opportunities faster as they are less resource constrained. Additionally, the banking sector has not undergone reforms and still faces state intervention and power (Woo, 2002). Political authority which favors state firms will lend out to the state sector more than the private one.

Industry type: The firms in the dataset belong to different industries and thus face distinct profit-making opportunities. The nature and degree of complexity of the industry affects the outcome result as well. Firms belonging to the same industry share homogeneous needs that differ from those in other sectors, hence affecting firm expenditures. Depending on the sector it belongs to, a firm will have industry-specific requests for resources and fixed assets whose prices fluctuate from one industry to the other (Foneska et al., 2014). It is measured as a categorical

variable divided according to FTSE Industry Classification Benchmark (2010). Based on FTSE, the 30 industries are divided into 7 main categories and classified as one of the following: consumer goods, basic materials, consumer services, oil and gas, industrials, technology, and state-owned. It is important to note here that the fully government-owned firms are all put in a separate group labeled "state-owned" regardless of the firm's specific industry it belongs to. For instance, a bakery operating primarily in food manufacturing industry but owned by the state would be classified in the state-owned group instead of the consumer goods industry. This is mainly to maintain the private groups' representativeness according to the World Bank report (2013).

Region: Region is being controlled for since a company located in more firm-clustered regions will have a higher opportunity to acquire resources and fixed assets at a lower cost (Foneska et al., 2014). Higher concentration of firms in the same region will cause higher demand for resources and thus, suppliers are obligated to lower their market prices. I suspect that clustering leads to a positive effect on purchase of fixed assets. To control for region fixed effects, I divide the 25 cities from the survey into 5 different regions in China according to their geographical location: North, South, East, West and Middle.

The importance of both, industry and region, in a Chinese context has also been previously established by Bai et al. (2004). Large disparities among levels of education among the different industries and regions imply that labor mobility is restricted and work is inefficient (Garnaut et al., 2012). For the exact division of the diverse industries and cities into categories, refer to Table 1 and Table 2 respectively, in Appendix 1. Even though they are controlled for, I do not report region and industry estimates with the models' results for clearer, more concise tables.

The variables used in the estimation strategy are defined in more details in Table 1 with a focus on their alphanumeric symbol (in parentheses) as coded in the Enterprise Survey, their definition, and their exact measure.

Table 1: Definition of Variables

Variable	Definition
H1: *Dependent Variables*	
Average years of education of a worker (l9a)	Average number of years of education of a typical permanent full-time production worker employed in the firm (in years)
Skilled workers to number of employees ratio (l4a/l1)	The fraction of skilled workers, out of the total number of employees in the firm (ratio)
Trained production employees as a percent of the production full-time employees (l11a)	Percentage of production full-time permanent employees trained (in percent)
H1: *Independent Variable*	
Private [ownership dummy] (b2)	=1 if firm is >=50% privately owned (domestic or foreign), =0 if firm is >= 50% state-owned
H2: *Dependent Variables*	
Last year's total annual sales to number of employees ratio [log] (d2/l1)	Log of total annual sales for all products and services at the end of 2011, out of total number of permanent employees
Spending on fixed assets to the total annual firm sales ratio (n5a/d2)	Spending on purchase of (new or used) machinery, vehicles and equipment out of the total annual firm sales (ratio)
H2: *Independent Variables*	
Human capital*Ownership:	Interaction terms between 3 human capital proxies and ownership type of a firm:
HCOWN1	education-ownership (l9a*ownership)
HCOWN2	skill-ownership (l4a/l1*ownership)
HCOWN3	training-ownership (l11a*ownership)
Control Variables	
Firm size: Full-time, permanent employees log(l1), OR	Log of the number of full time, permanent employees at the end of 2011
Last year's total annual sales to number of employees ratio log(d2)	Log of total annual sales
Firm age: (b5)	Age of the firm until 2012 measured by subtracting b5 from 2012 (in years)
Access to credit [dummy] (k8)	= 1 if firm has a line of credit or a loan from financial institution, = 0 otherwise
Region (a2)	Region included as a categorical variable to account for regional fixed effects for 5 distinct Chinese areas
Industry (a4a)	Industry included as a categorical variable to account for industry fixed effects for 7 distinct industries

Note: The alphanumeric value in parentheses indicates the respective symbol of the variables as labeled in the survey and dataset

3.4. Descriptive statistics

According to the descriptive statistics presented in Table 2, the main variables of interest have more than 1300 observations each. For the dependent variable last year's total annual sales to number of employees' ratio, the missing observations are so few rendering the sample size equal to 2839. Also, note that the mean of the variable average years of education is around 10 years indicating that employees in China have, on average, completed secondary school at least.

Table 2: Descriptive statistics of the variables

Variables	Obs.	Mean	Std. Dev.	Min	Max
Dependent Variables					
Average years of education *(H1)*	1691	10.2	1.9	1	18
Skilled workers to number of employees ratio *(H1)*	1715	0.3	0.2	0	0.9
Trained production employees *(H1)*	1472	91.6	19.1	0	100
Log of last year's total annual sales to number of employees ratio *(H2)*	2839	12.5	1.2	2.0	19.5
Spending on fixed assets to the total annual firm sales ratio *(H2)*	1315	0.3	8.3	0	300
Independent variables					
Private *(H1)* [dummy]	2848	0.9	0.3	0	1
Human capital*Ownership *(H2)*: HCOWN1	1691	9.6	3.0	0	18
HCOWN2	1715	0.3	0.2	0	0.9
HCOWN3	1472	85.2	29.4	0	100
Control Variables					
Firm size: Log of number of employees	2847	4.2	1.4	1.4	10.8
Log of total annual sales	2840	16.7	1.8	9.2	24.4
Firm age	2767	13.1	8.9	0	133
Access to credit [dummy]	2732	0.3	0.5	0	1
Region [categorical]	2848	-	-	-	-
Industry [categorical]	2848	-	-	-	-

4 Results and Discussion

Table 3 shows the estimation results for the first hypothesis testing the effect of ownership type on three distinct types of human capital: workers' education, skills, and training. For robustness, models (1) to (3) are estimated using the region and industry clusters as classified in Appendix 1, while models (4) to (5) account for the fixed effects of the 25 cities and 28 industries separately without clustering. As the firms in China are greatly affected by the industry they belong to or the region they are located in, the interpretation at different levels of clustering makes sense. I cluster regions to account for the different degrees of regional variation in China which is evident through the widening inequality between firms located in inland provinces or coastline cities. According to Li (2009), the efficiency is shaped by different intensities with which firms engage in diverse activities and is among the main reasons behind the regional variations in China. As for the industries, the manufacturing firms that belong to the same category face the same conditions in general, thus it might be better to consider them under the same group instead of separate ones. Also, note that all regressions are run using White-robust standard errors to account for issues that might bias the estimates, in particular the standard errors, when some of the assumptions from OLS are not met such as heteroskedasticity, heterogeneity and lack of normality (Verbeek, 2008).

To start with, regression (1) uses labor's years of education as a proxy for human capital within a firm. With a significant estimate of 0.51 for private at all levels, this model shows that, ceteris paribus, a firm that is privately owned has a labor force who is, on average, 0.51 years more educated as compared to a state-owned firm's workforce. This indicates that hypothesis 1 is rejected when human capital is measured as years of education of the worker; a positive and statistically significant estimate shows evidence that in year 2012, private firms are no longer disadvantaged when it comes to accessing the pool of well-educated workers. As a matter of fact, model (1) asserts that POEs employ higher educated labor compared to their state-owned counterparts.

Regressions (2) and (3) run the same model yet using different dependent variables, mainly the fraction of skilled workers and the percentage of trained workers, respectively, as measures of human capital within a firm. Both models give negative estimates that are statistically significant

at all levels, hence implying a negative association between privately-owned firms and the quality of human capital. Specifically, controlling for other variables, a firm which is privately owned has 13% less skilled and 4.38% less trained labor force than its state-owned counterpart. This result is in line with hypothesis 1 which claims that POEs today are still human capital constrained in certain areas in comparison to state-owned firms. A significant negative estimate shows that private firms are disadvantaged in exploiting human capital when it comes to the type of workers who are skilled and trained. Even though private firms might be getting the educated labor force as portrayed in model (1), they might not be getting the labor force that matters since skills and training contribute greatly to the quality of human capital. As shown by the results from models (2) and (3), SOEs seem to have a superior advantage in acquiring skilled labor and furthermore, training them.

Table 3: Estimation results for the effect of ownership type on human capital quality

	(1) Education	(2) Skilled	(3) Trained	(4) Education	(5) Skilled	(6) Trained
Private	0.51^{***}	-0.13^{***}	-4.38^{***}	0.29	-0.13^{***}	-7.06^{***}
	(0.18)	(0.02)	(1.17)	(0.21)	(0.02)	(1.39)
Firm size	0.07^{*}	-0.01^{*}	0.04	0.05	-0.01^{***}	-0.05
	(0.04)	(0.00)	(0.38)	(0.03)	(0.00)	(0.37)
Firm age	0.00	0.00	0.03	0.00	0.00	0.03
	(0.01)	(0.00)	(0.05)	(0.00)	(0.00)	(0.05)
Access to credit	0.11	-0.03^{**}	-1.98^{*}	0.10	-0.01	1.44
	(0.10)	(0.01)	(1.17)	(0.11)	(0.01)	(1.25)
Constant	9.13^{***}	0.54^{***}	97.78^{***}	8.58^{***}	0.62^{***}	104.13^{***}
	(0.23)	(0.03)	(2.18)	(0.35)	(0.05)	(2.97)
Industry	Clustered	Clustered	Clustered	Non-clustered	Non-clustered	Non-clustered
Region	Clustered	Clustered	Clustered	Non-clustered	Non-clustered	Non-clustered
Observations	1593	1618	1385	1593	1618	1385
Adjusted R^2	0.106	0.045	0.054	0.246	0.270	0.180

Robust standard errors in parentheses
$^{*} p < 0.10,$ $^{**} p < 0.05,$ $^{***} p < 0.01$

Regression (4) is similar to (1) yet the region and industry fixed effect are less constrained as they are no longer clustered into groups. When regional and industrial variations are allowed to be more specific, the estimate for ownership is no longer significant even though it remains positive (0.29). This shows that after all, ownership type might not be greatly associated with the type of labor a firm gets when human capital is measured as years of education.

As for regressions (5) and (6), the results remain consistent with the prior ones from (2) and (3), which had significant and negative estimates for the variable of interest. In more detail, when I do not cluster for the industry and region, model (5) gives the exact same result as model (3) showing that a POE has 13% less skilled workers than SOE, ceteris paribus. As for model (6), the outcome remains statistically significant at all levels, yet becomes even more negative indicating that POEs have 7.06% less trained workers than their counterparts, thus further asserting hypothesis 1.

The control variables also show some interesting outcomes. The firm age seems to have a negligible effect on human capital quality as the estimates are insignificant and close to zero in all the models. Both firm size and access to credit are positive for the models with education as the dependent variables, while negative for the other models, with the exception of access to credit in model (6) which has a positive estimate yet insignificant so it does not have much to say. Regression (1) suggests that an older firm will have more educated labor which might be because it has been operating longer and can be considered well-established and from the workers' perspective. Table 3 also shows that the older the firm is, the less it will have skilled labor, yet the result is very small (-0.01). As for access to credit, models (2) and (3) only show significant results for the estimates hence suggesting that a firm with access to loans will have lower skilled labor and will invest less in training its employees, possibly because it is employing its extra credit elsewhere. The other estimates do not say much as they are insignificant.

The adjusted R^2 seems low for the first 3 models ranging between 5% and 10% yet this should not be viewed as a serious problem as it does not render the model useless. According to Stock and Watson (2012) and Verbeek (2008), the R^2 shows the explanatory power of a model for it indicates what percent of the variability of the dependent variable is explained by the chosen regressors. The low adjusted R^2 might be simply stating that, aside from ownership type and the other listed variables, other factors contribute to the human capital found in a firm as

well. To name a few predictors that could be potential contributors, the situation in a country (economy, war…) or location of a firm (rural, urban…) are among the many other examples that might affect a firm's access to human capital. Yet, the aim of this paper is not to put all factors that might give better predicted outcomes, but to simply check if there is in fact a reliable relationship between the variables of interest. Significance is still meaningful, and important conclusions could still be drawn regardless of the small values of adjusted R^2. Besides, the explanatory power of the model increases to a range between 18% - 27% when industry and region are no longer clustered which further emphasizes that the exact location of a firm is a good predictor of its human capital quality. For instance, model (5) explains 27% of the variability in the data around its mean. In light of China's policy and institutional environment, the justification why non-clustered version give better results might be accounting for the fact that even firms in same region (for example, East) but belonging to a different city within the same region might witness different conditions which renders their access to labor different.

Table 4: The effect of ownership on human capital quality using different measure for firm size

	(1) Education	(2) Skilled	(3) Trained	(4) Education	(5) Skilled	(6) Trained
Private	0.52***	-0.14***	-4.42***	0.30	-0.13***	-7.13***
	(0.18)	(0.02)	(1.17)	(0.21)	(0.02)	(1.38)
Firmsize2	0.08**	-0.01***	-0.10	0.06**	-0.01***	-0.27
	(0.03)	(0.00)	(0.30)	(0.03)	(0.00)	(0.30)
Firmage	0.00	0.00	0.03	0.00	0.00	0.03
	(0.01)	(0.00)	(0.05)	(0.00)	(0.00)	(0.05)
Access to credit	0.09	-0.02	-1.86	0.07	-0.01	1.69
	(0.10)	(0.01)	(1.17)	(0.11)	(0.01)	(1.22)
Constant	8.17***	0.72***	99.64***	7.87***	0.76***	108.31***
	(0.51)	(0.06)	(5.16)	(0.56)	(0.07)	(5.49)
Industry	Clustered	Clustered	Clustered	Non-clustered	Non-clustered	Non-clustered
Region	Clustered	Clustered	Clustered	Non-clustered	Non-clustered	Non-clustered
Observations	1593	1618	1385	1593	1618	1385
Adjusted R^2	0.108	0.052	0.054	0.248	0.273	0.180

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4 runs the same regressions as those in Table 3 but explores a different measure for firm size (Firmsize2). For robustness reasons, I use an alternative measure for firm size: the natural logarithm of the total annual sales, instead of number employees, which is widely accepted in the literature as a potential measure of a firm's size (Yasuda, 2005; Al-Khazali and Zoubi, 2011); basically the more sales a firm has, the more likely it is bigger is size. Both measures are conventionally adopted and widely accepted as firm size proxies in research. My aim is to test whether the results will remain robust and were not driven by the choice of a certain variable. The results using the alternative measure for firm size remain the same in terms of signs of the estimates and level of significance, with approximately the same estimate when rounded to the tenths. Even the direction of the control variables estimates remains consistent. This proves robustness of the results against changing the firm size measure.

Table 5 shows the estimation results for the second hypothesis testing the effect of human capital and ownership on firm's performance in terms of growth and expansion. To proxy for firm performance in terms of growth, I use total annual sales per employee (Sales/empl) as a dependent variable in models (1), (3) and (6). Then, to proxy for firm performance in terms of expansion, I use purchase of fixed assets per total annual sales (FA/sales) as a dependent variable in models (2), (4) and (6). The models also explore the three distinct measures of human capital: workers' education, skills, and training. Furthermore, I conjecture an interaction effect between ownership type and human capital level; thus, an interaction term is also added by multiplying ownership type by each of the human capital measures which are labeled HCOWN1, HCOWN2 and HCOWN3. In each model, the estimate for the interaction term will be the main focus as the interest is whether specifically private firms with better access to human capital resources perform better or not.

First, models (1) and (2) use HCOWN1 which is an interaction term between ownership type and years of education. The estimate 0.01 from models (1) and (2) portray the hypothesized positive sign implied by hypothesis 2, yet the results are not statistically significant at any level; meaning that, hypothesis 2 could be rejected as the model does not predict a reliable association between private firms who have more educated labor force and their performance neither in terms of growth nor expansion.

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Table 5: Estimation results for the effect of human capital and ownership on firm performance

	(1) Sales/empl	(2) FA/sales	(3) Sales/empl	(4) FA/sales	(5) Sales/empl	(6) FA/sales
HCOWN1	0.01	0.01				
	(0.08)	(0.01)				
HCOWN2			1.28*	0.03*		
			(0.66)	(0.02)		
HCOWN3					-0.01	0.00
					(0.01)	(0.00)
Private	-0.18	-0.08	-0.73**	-0.00	1.28	-0.08
	(0.80)	(0.08)	(0.36)	(0.03)	(1.44)	(0.08)
Educated	0.02	-0.00				
	(0.08)	(0.01)				
Skilled			-1.66**	0.02		
			(0.65)	(0.04)		
Trained					0.01	-0.00
					(0.01)	(0.00)
Firmsize	-0.04	-0.01***	-0.04*	-0.01***	-0.03	-0.02***
	(0.03)	(0.00)	(0.03)	(0.00)	(0.03)	(0.00)
Firmage	0.00	-0.00	0.00	-0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Access to credit	0.34***	0.02**	0.34***	0.02**	0.37***	0.02**
	(0.06)	(0.01)	(0.06)	(0.01)	(0.07)	(0.01)
Constant	12.12***	0.14*	13.10***	0.12***	11.03***	0.16**
	(0.78)	(0.08)	(0.39)	(0.03)	(1.44)	(0.08)
Observations	1593	843	1618	853	1385	784
Adjusted R^2	0.048	0.031	0.061	0.023	0.049	0.035

Note: All models include industry and region fixed effects clustered into categories according to Appendix 1.
Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Second, models (3) and (4) use HCOWN2 which is an interaction term between ownership type and the fraction of skilled labor to test whether private firms who have a higher fraction of skilled labor per their total number of employees are better capable of growing and

expanding. The results from model (3) support hypothesis 2 as the estimate for HCOWN2 is positive and significant at the 10% level. This outcome basically says that private firms who have more skilled labor within their workforce are 1.28 times more likely to have higher sales per employee. It is also interesting to note that the estimate for private ownership type separately is negative and significant at the 5% level (-0.73) which implies that private firms tend to have lower sales per employee than their state-owned counterpart. As for model (4), again a positive significant estimate of 0.03 at the 10% level gives more empirical support to hypothesis 2. The result shows that more skilled labor in private firms is associated with more spending on fixed assets as a fraction of total annual sales.

Lastly, models (5) and (6) from Table 5 run the regressions using HCOWN3 which is an interaction term between ownership type and percentage of trained labor from the total number of employees in a firm. With insignificant estimates very close to zero, this variable does not seem to affect firm's performance neither in terms of more sales nor in terms of more spending on fixed assets. Thus, hypothesis 2 does not seem to find strong empirical support except for when the labor force present in private firms is sufficiently skilled.

As for the control variables estimates, the most interesting result is that for the variable "Access to credit" which is always positive and highly statistically significant for all the models. This estimate implies that firms with access to credit tend to perform better both in terms of growth and expansion. For instance, if a firm has access to a line of credit from banks or another financial institution, it will tend to have higher sales and spend more on purchase of fixed assets (machinery, vehicles, equipment…). This is quite intuitive as a firm who is given a loan is better capable of using the credit to ameliorate it performance. Thus, a potential policy implication might be to allow more access to credit for private firms and give out loans which will support their progress. The age of the firm again, does not seem to have any effect on the dependent variables since it is insignificant and almost zero for all regressions. Moreover, the larger the firm is, the less its growth and expansion which is quite surprising given the fact that a larger firm might take advantage of economies of scale which will positively impact its performance (Tan and Peng, 2003; Mishina et al., 2004).

More generally, the results from hypothesis 1 are mixed. The model finds significant evidence supporting the claim that private firms are human capital constrained in terms of skilled and trained labor force. Yet, the evidence displaying that private firms get better educated labor when measured in terms of average years of education suggests that there is something more to the story. It might no longer be the case that private firms are disadvantaged in the *access* to the qualified educated labor, but only in the *utilization* of such labor. What the evidence portrays exactly is that private firms do not properly exploit the educated human capital due to shortages in training them, and subsequently, adding to their experience and skills. In other words, private firms seem to have difficulties in retaining the good human capital which may make it seem like SOEs have richer human capital because of government support and favorable access to these human resources. However, the main weakness that private firms face in keeping the good labor is a lack of investment in their skill level and training. According to the result of the model, state-owned firms seem to be doing a better job in that regard. The outcomes are aligned with prior studies in China claiming that private firms require a minimum level of labor skills to operate in the start since many tasks done by newly existing firms do not require advanced experience (Garnaut et al., 2012). According to Wu (2009), the SOEs are still the number one competitors in the economy occupying the most skilled labor due to the safe vibe they send out with respect to job security. Given this plausible reason, private firms are lacking behind in terms of holding the human capital which makes a difference.

Another plausible explanation to why private firms have access to educated workers but are still disadvantaged in accessing skilled or trained workers is the following. The universal access plan that was proposed by the Higher Education (2004) had put millions of Chinese citizens into education and has increased the number of graduates widely (Wu, 2009). Many graduates will have completed several years of education successfully yet with no actual real life skills or experience (Huang, 2003). In other words, except for having a diploma in a certain field and adding to their years of education, graduates have not received any real training in the work area and do not have the necessary competence in firms. Thus, private firms might have access to the educated labor only because their quantity increased overall which might explain the interesting positive sign for this dependent variable. However, those laborers do not really have any skill or training so they cannot add to the firm's successfulness. All they have is a degree on a paper which states that they have completed specific years of education which might win them

scholarships but may not give them experience and skills. The private firms might be facing a larger pool of educated workers in general who still lack the required skills and training in the job field, hence its better access to the educated workforce. Furthermore, the students are increasingly majoring in the arts section instead of the science since the year 2000 as claimed by the Chinese Ministry of Higher Education. In fact, less than 10 percent of the graduates applying for jobs are from the categories that matter for the Chinese industry such as engineering, financing, accounting, and nursing (Farrell and Grant, 2005). The shortage of talents as Wu (2009) described it, and the unbalanced ratio of major specialization are all factors affecting the access of private firms to the labor that matters.

As for hypothesis 2 studying the effect of human capital on firm performance, the outcomes suggest the following. The estimated results propose that the only type of human capital which makes a difference in private firms is the skilled labor as the other two aspects of human capital did not give significant results. Theoretical background supports the fact that resource constraints in a multiple areas may inhibit firm development; yet, resource abundance is not a sufficient condition on its own for firm success and performance enhancement. The presence of skilled labor in private firms, portrayed by the term "HCOWN2", seem to affect firm's performance in terms of more sales, as well as in terms of more spending on fixed assets. The intuition behind that might be that as the firm realizes that its workforce is skilled, it invests more in machinery and equipment to expand its business. As the skilled employees utilize the new equipment, their productivity increases thus the sales of the firm increase as well. The results are also aligned with prior studies (Kor and Mohoney, 2000; Foneska et al., 2014).

This study's findings may aid state authorities in understanding the need to further target policy measures aiming at a more efficient use of human resource allocation. It has significant implications for both firm employment practices and policymakers' decision making. The shortage does not seem to be in supplying private firms with educated labor, but in ameliorating the workforce by investing in their skills and training them. As skilled workers seem to enhance a firm's performance, the responsible authorities should be keen on targeting this aspect exactly.

5 Conclusion

This paper examined the effect of ownership type on human capital by studying 2848 firms in China from 2012 to determine whether private firms are still human capital constrained. The focus was on the situation of both the labor market and ownership system evolution to be able to analyze why private firms were disadvantaged previously and might still be. The main finding is that private firms still face human capital constraints, yet in only some aspects of human capital and not all. In light of the policy background and China's politicized capitalist economy, the need for a state arises from the need to maximize social gains, make fast decisions, and take decisive actions due to its authority and power. The state is involved in risk-sharing of losses which eases the firm's constraints but negatively affects their efficiency (Kornai, 1990). The Chinese pre-reform socialist system with total government involvement in all affairs made the state become self-undermining as it was determined to central plan hence accumulating inefficiencies, under-delivering and not covering the needs of society. From here emerged the motivation for a modern enterprise market and the steps for reforms.

To what extent has China completed its transition towards a real labor market free from restrictions? The degree to which labor market reforms are successfully implemented is on one hand conditional on other adopted reforms and on the other hand, affecting other intended reforms, thus its important role. Comparative advantage, and ultimately efficiency, is achieved by employing the workforce based on their area of strength and human capital background. Also, generating incentives by rewarding the workers on their skills is a great driver for productivity and the establishment of a market system. However, since forming such a system demands huge political modifications, institutional change, and major structural adjustments, the once socialist state has gone great miles towards a more market-oriented economy but did not yet fully complete its transition.

The labor market reforms are still far from being perfect, complete, or easy for China which is still expected to undergo a lot of changes to successfully finish its transition. China needs to uphold its reformative effort to preserve its rapidly growing trajectory. The political power needed to divert from a set of policies which once favored urban workers and guaranteed their state-sector jobs is still an obstacle hindering complete institutional change somehow.

Those policies which assured the urban workers their jobs enforced strict constraints on labor mobility especially from the rural areas. Even though the reforms began around the 1980s, up until the mid-1990s managers in POEs were not given total freedom to fire employees as they see fit since the state continued to place the fresh graduates into jobs to prevent unemployment. This is an indication of the slow process reforms go through in order to achieve their aim. Furthermore, although China had low unemployment at that time, the labor resources were allocated inefficiently into the state-sector jobs.

To sum up, there are various challenges still facing the Chinese economy regardless of all the reforms that has been happening. Whether it is the once socialist state, the uncompleted transition, the asymmetric wage and nonwage benefits incentives, or the shortage of skills, private firms still face disadvantages to some extent. To succeed in acquiring the good human capital, it might not be enough to put reforms alone. This study suggests the necessity to carry on with transformation in the labor market. Policy recommendations might consider paying more attention to the pool of talent within the country, to the recruitment channels through which workers enter a firm, and to supplying the private firms with the needed funds for training programs within the firm to enhance employees' skills and abilities.

This research paper examined the human capital-ownership insights and their implications for firm employment practices and policymakers' decision making. It also discussed the theoretical contributions of these findings. However, this study has some inherent shortcomings that might lead to productive future research. Primarily, the focus on the broad types of ownerships in China, mainly POEs and SOEs, ignores the rich variety of Chinese firms' organizational structure such as foreign-owned versus domestic-owned firms and other "hybrid" types combining both. Another limitation might be the fact that the data on the variables of interest all came from the same source: the World Bank Enterprise Survey and lacked diversification. For instance, firms' ROA and ROE measure might have portrayed better measures for firm performance. Also, the flaws with the response rate which induces missing data of firms as mentioned in the Chinese implementation report (2013) might have also been an issue. Also, hypothesis 2 faces a possibility that the effect between the variables of interest works in both directions: X affecting Y and Y affecting X. It could be that not only does the human capital quality affects firm performance as the latter might not be strictly exogenous in the sense

that better standing firms are better able to acquire the good human capital; which further induces the good firms to grow and expand faster. To deal with this problem, introducing lag performance measures might partially solve the issue (Nee and Opper, 2007). Plus, even though China has gone a long way in to transition, the economy is still a niche for bribery actions and malfeasance which also affect both resource allocation and firm performance (Nee and Opper, 2007). Finally, further research is also required to investigate related robustness of the measures used to proxy for human capital.

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Appendix 1

Table 1: Industries classification according to FTSE Industry Classification Benchmark (2010)

Categorized Industry	Industry subgroups from survey
Consumer goods	Food, tobacco, textiles, garments, leather, furniture, recorded media
Basic materials	Wood, paper, chemicals, plastic and rubbers, non-metallic mineral products, basic metals, fabricated metal products
Consumer services	Retail, wholesale, hotel and restaurants, services of motor vehicles
Oil and gas	Refined petroleum product
Industrials	Machinery and equipment, electronics, transport machines, recycling, construction section, transport section
Technology	Precision instruments, IT
State-owned	100% government owned firms

Table 2: Cities classification into 5 Chinese regions

Region	Cities from the survey
North	Beijing, Tangshan, Shenyang, Dalian, Qingdao, Yantai
South	Guangzhou, Shenzhen, Foshan, Dongguan
East	Shanghai, Hangzhou, Ningbo, Jinan, Shijiazhuang, Wenzhou, Nantong, Nanjing, Suzhou, Wuxi, Hefei
West	Chengdu
Middle	Zhengzhou, Luoyang, Wuhan

Appendix 2

Table 1: Variance Inflation Factor (VIF) for variables from regression 1

Variable	VIF	1/VIF
ownership	1.30	0.769637
firm size	1.18	0.849694
firm age	1.12	0.895724
access to credit	1.13	0.887236
region	1.12-1.66	0.896420-0.602544
industry	1.02-1.46	0.983933-0.683928
Mean VIF	1.26	

Table 2: Correlation Matrix for variables

	education	skilled	trained	ownership	firmsize	firmage	credit	region	industry
education	1								
skilled	-0.0656	1							
trained	0.0506	-0.0123	1						
ownership	0.029	-0.1969	-0.0628	1					
firmsize	0.0665	-0.0928	-0.0256	-0.0716	1				
firmage	0.0438	0.0363	0.0229	-0.175	0.2008	1			
credit	0.0156	-0.0797	-0.0746	0.0692	0.2596	0.0217	1		
region	0.0803	-0.0975	0.059	0.1303	0.0719	-0.001	-0.0243	1	
industry	0.0506	0.0481	-0.0094	-0.4333	0.125	0.2008	0.01	-0.0158	1

Graph 1: Histogram of residuals (right skewness)   **Graph 2:** Scatterplot of residuals