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The importance of innovation and entrepreneurship in China's social transformation

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THE IMPORTANCE OF INNOVATION AND ENTREPRENEURSHIP IN CHINA'S SOCIAL TRANSFORMATION

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ABSTRACT

As world's second largest economy, China has seen tremendous changes since its 1978 "open door and reform" policy. Different reformations in form of policies were planned and rolled out to release the potential of productivity. At the same time, social development also seen a huge progress. How the reformation been transformed to social development and in what degree? This is the question was answered in this dissertation. I studied four major reformations covering: State owned Enterprises (SoE), land, financial liberalization, and science & technology, and their impacts on the social development. At macro level, I identified mediation effects of entrepreneurship activities and innovation activities. Entrepreneurship activities show mediation effect for SoE and financial reformation, on social development; while for land reformation, a partial mediation effect is identified under longer lagging period. Innovation activities shows mediation effect for science & technology reformation, on social development. I did comprehensive robustness checking to test hypothesis under different settings, which including different DVs, IVs, mediator, as well as different lagging periods. At micro level I did a secondary analysis on China's Fintech unicorn company Ant Financial. Both macro and micro level studies suggest that entrepreneurship activities and innovation activities play important role in transforming policies' impact to social development.

CONTENT

ACKNOWLEGEMENT

The completion of the thesis is attributed to many people's support and encouragement.

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My thanks also go to the authors whose books and articles have given me inspiration in the writing of this paper.

Finally, my thanks should be sent to all my classmates, for their endless support and warm hearts, making me feel like living in a united big family.

DECLARATION

I hereby declare that this dissertation is my original work and it has been written by me in its entirety. I have duly acknowledged all the sources of information which have been used in this dissertation.

This dissertation has also not been submitted for any degree in any university previously.

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9 July 2020

CHAPTER 1. INTRODUCTION

1.1 Statement of the Research Problem

In the dissertation, I systematically studied the role of innovation and entrepreneurship in China's social transformation in recent 40 years and how policy interventions affect social development.

Since its 1978 "open door and reform" policy, China has achieved tremendous progress in economy development, and has brought mega changes to its society and people. As a central planner, Chinese government plays key role in leading and gauging such big social transformation. Policies, as important government output, inevitably represent and have significant impact on social reform and changes. In China, especially the following four types of policies which heavily affect the society:

- State-owned Enterprises (SoEs) reformation (Lin et al., 1998; Ralston et al., 2006)
- Land use (Ding, 2003)
- Financial liberalization (Zhang et al., 2012)
- Science and technology (Wilsdon, 2007)

In the dissertation, I am interested in how these policies, which as indicators and driving power of social reform, been absorbed and implemented and in turn contribute to whole society's development, especially people's living standard.

Firms are building blocks of economy, they are engines that push the society moving forward (Demsetz, 1997; Fumás, 2008). They take external knowledge (e.g., policies, market information, and technologies) as input, identify social/market trends, capture strategic directions, serving customers, and provide jobs for people. Among various abilities of a firm, *innovation and entrepreneurship* are considered as key abilities to determine firm's success and value creation (Drucker, 1985; Kuratko et al., 2001; Shane and Venkataraman, 2000). While at macro level, innovation and entrepreneurship (especially high growth potential entrepreneurship) can give competitiveness to countries and regions (Wong, 2005). Thus, I proposed that innovation and entrepreneurship are important mediators in transforming social reform (in forms of policies) into social development. Social development by definition is "about improving the well-being of every individual in society so they can reach their full potential"[1]. From this definition, we can see that the central part of social development is *people*—the most important asset in a society, and should be the ultimate purpose of any social reform and changes. In social development, an important aspect is people's living standard (condition), thus in the dissertation I used

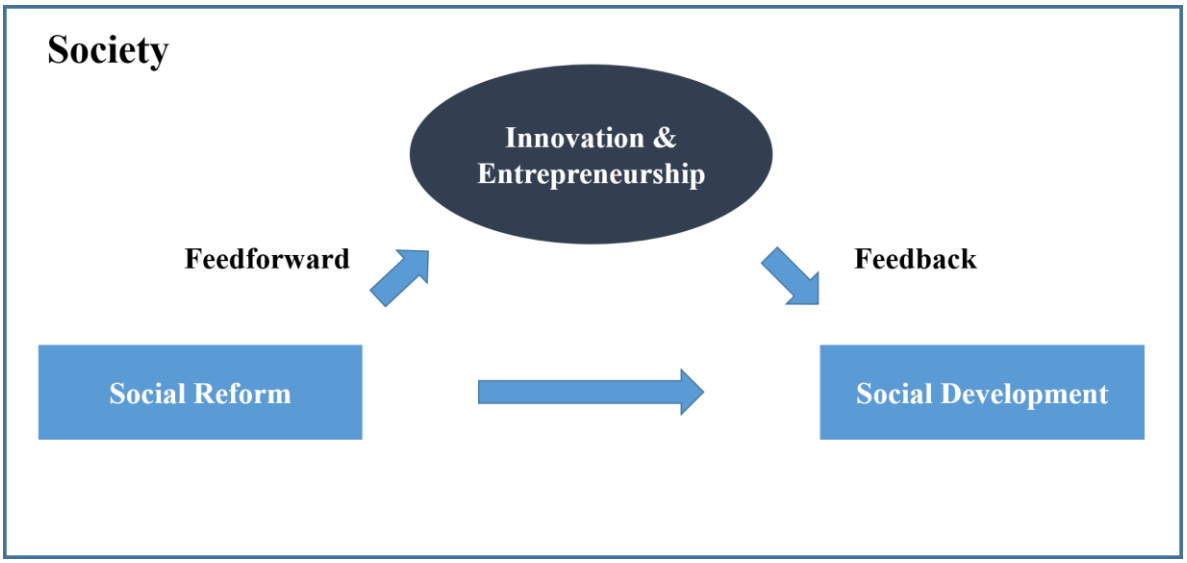
[1] https://www2.gnb.ca/content/gnb/en/departments/esic/overview/content/what_is_social_development.html

people's living standard related indicators as proxy for social development. Specifically, I studied three indicators of people's living standard:

- GDP per capita
- Engel's coefficient
- Human Development Index (HDI)

Figure 1 shows a general framework for the study. By integrating innovation and entrepreneurship, social reform and social development formed a more effective system, where social reform empowers (feedforward to) innovation and entrepreneurship activities, and innovation and entrepreneurship activities then contribute (feedback) to social development.

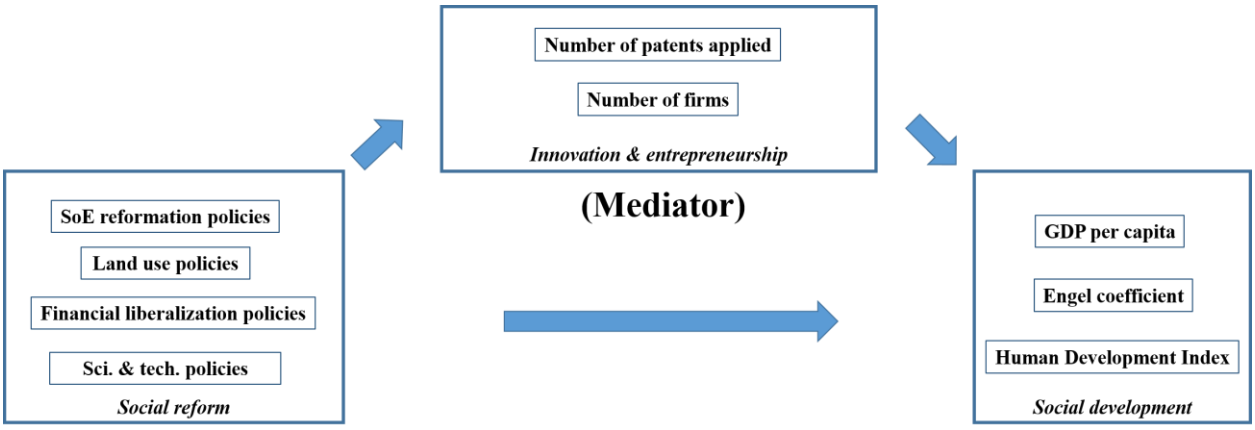
Figure 1. General framework for the study



In this dissertation, I hypothesized innovation and entrepreneurship as a mediator and test the mediation effect of innovation and entrepreneurship on the relationship between social reform and social development. A mediator is an important variable which connects IV (Independent Variable) and DV (Dependent Variable), it takes the impact from IV and transforms the impact to DV.

Innovation is operationalized as number of patents applied before focal year and entrepreneurship is operationalized as number of firms (private-own and sole proprietorship) before focal year. Figure 2 shows the details.

Figure 2. Innovation and entrepreneurship as mediator



Based on both Figure 1 and 2, I proposed that the importance of innovation and entrepreneurship comes from two aspects:

(1) It is an important outcome of social reform

(2) It is an important factor to impact social development (in the dissertation, it is people's living standard)

In a society, through innovation and entrepreneurship activities, the full potential of social reform can be converted into better outcome for people. This is of great interest in China as government (both national and local) are heavily promoting innovation and entrepreneurship activities. These motivate the research problems:

(1) How does social reform (in the form of policies) affect innovation and entrepreneurship activities in China?
(2) How does innovation and entrepreneurship activities contribute to China's social development (specifically, people's living standard)?

My analysis are based on two levels: macro level and micro level. At macro level, I focused on how policies been transferred to macro level entrepreneurship and innovation activities (i.e., number of firms, number of patents applied), and how this transformation affect people's living conditions in average. At micro level, I drilled down to specific firm, from firm's daily business to investigate policies' impact, and in turn how the services and products help improving people's life.

1.2 Purpose of the Study

The purposes of this dissertation study can be classified into three parts, from research, managerial and implication perspectives.

(1) To contribute to the research

This research helps people gain a deeper understanding on the social impact of policies in the context of China, not their direct impact but indirect impact on people's living standard. Also this research contributes to the role of innovation and entrepreneurship, which previous research mainly paid attention to the performance aspect but not social aspect (Shane and Venkataraman, 2000). Furthermore, this research is the first in studying the mediating effects of innovation and entrepreneurship in the context of China.

(2) To give managerial insights to decision makers in China

This research focuses on Chinese firms and I used data and cases from China. The research can give insights to business decision makers and managers as well as policy makers in China, on how to better understand the importance of innovation and entrepreneurship, as well as on how to release the potential of innovation and entrepreneurship. It can also help policy makers in designing future policies, especially China now is heavily promoting its innovation and entrepreneurship activities in order to create more opportunities for younger generation.

(3) To gain an implication and better understanding of the big picture of China's mega change since 1978

China has gained attractive growth since its 1978 "open door and reform" policy. Tremendous firms were created to contribute to the economy development. Among them are many good performers like Yintai Retail, Ant Financial, DiDi, Tencent etc. This research cam help to get an implication on how these firms achieve good innovation and financial performance by take the advantages of China's social reform and contribute back to society to make better social development for people.

The organization of the dissertation is as follows: Chapter 1 is the introduction, Chapter 2 gives the background of study and reviewed related literatures. Chapter 3 describe the methodology and framework. Chapter 4 presents the result and analysis for macro level. Chapter 5 presents secondary analysis of a firm (Ant Financial) at micro level. Chapter 6 closed the dissertation with discussion and conclusion.

CHAPTER 2. BACKGROUND AND LITERATURE REVIEW

2.1 Background of the Study

The recent 40 years saw a large societal change, big technology and science advance, education and culture evolution, as well as demographic change around the world. Human society is evolving from the 1st Industrial Revolution to the 3rd Industrial Revolution which is a revolution of digitization and information sharing. Knowledge creation, representation and dissemination become much easier than any time before, this enabled economy shifting from *Industrial Economy* to *Knowledge Economy*. Knowledge (and technology) rises to become one of the most important powers to facilitate economy development. As Peter Drucker stated that knowledge would replace machinery, capital, materials and labour to become a key production resource (Drucker, 1993, 1999), the importance of knowledge (and technology) was also supported and tested by various economic theories, e.g., endogenous growth theory (Aghion and Howitt, 1992; Grossman and Helpman, 1991; Romer, 1990). In endogenous growth theory, knowledge (and technology) is the power to enhance a country or region's economy growth. This in turn makes innovation and entrepreneurship a strong role in the knowledge economy. As stated in (Audretsch and Thurik, 2001): "The shift to knowledge-based economic activity

is said to be the driving force underlying the emergence of the entrepreneurial economy", and "In the entrepreneurial economy, flexibility and innovation are more important than stability and control".

In this knowledge economy era we should not neglect the most promising emerging economy—China, which has shown strong potential in economy development as well as knowledge creation, innovation and entrepreneurship. Since its 1978 "open door and reform" policy, China has gone through huge social reformation and demonstrated great potential in economy development. As some examples, Figure 3 depicts the GDP growth of China from 1978 to 2016. Regarding on the potential market size, Figure 4 shows the growth of population and urbanization trends in China from 1978 to 2016. And Figure 5 demonstrates the comparison of number of patents filed in China with other 4 major economies from 1980 to 2016. All these confirm China's big potential in knowledge economy. Also entrepreneurship activities are becoming popular in China since the 1978 reform, as Figure 6 shows, the share of SoEs in China declined gradually which is a strong signal that non-SoEs (i.e., private-own enterprises) are rising.

Figure 3. China's GDP and GDP growth rate (1978 to 2016)

(Source: National Bureau of Statistics of China)

Figure 4. Population and urbanization in China (1978 to 2016)

(Source: National Bureau of Statistics of China)

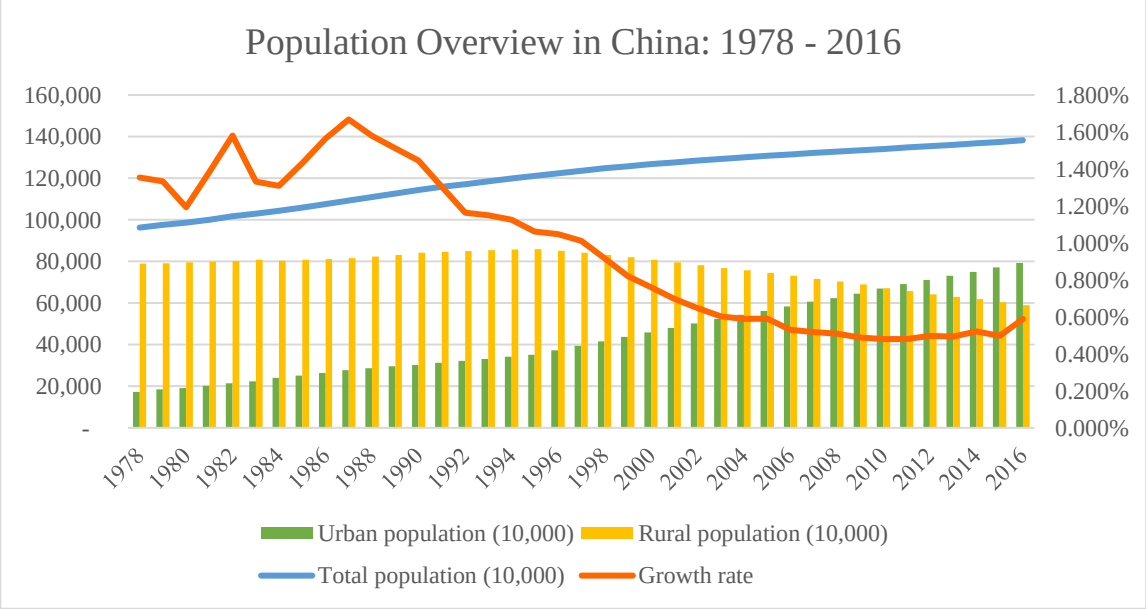


Figure 5. Comparison of number of patent applications in five large economies (1980 to 2016)

(Source: http://www.cbnri.org/news/5440920.html)

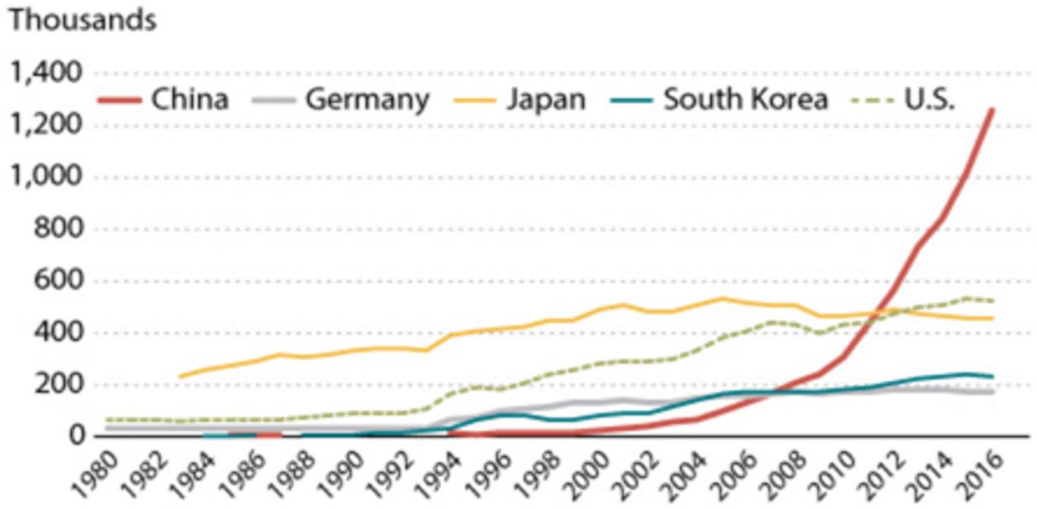
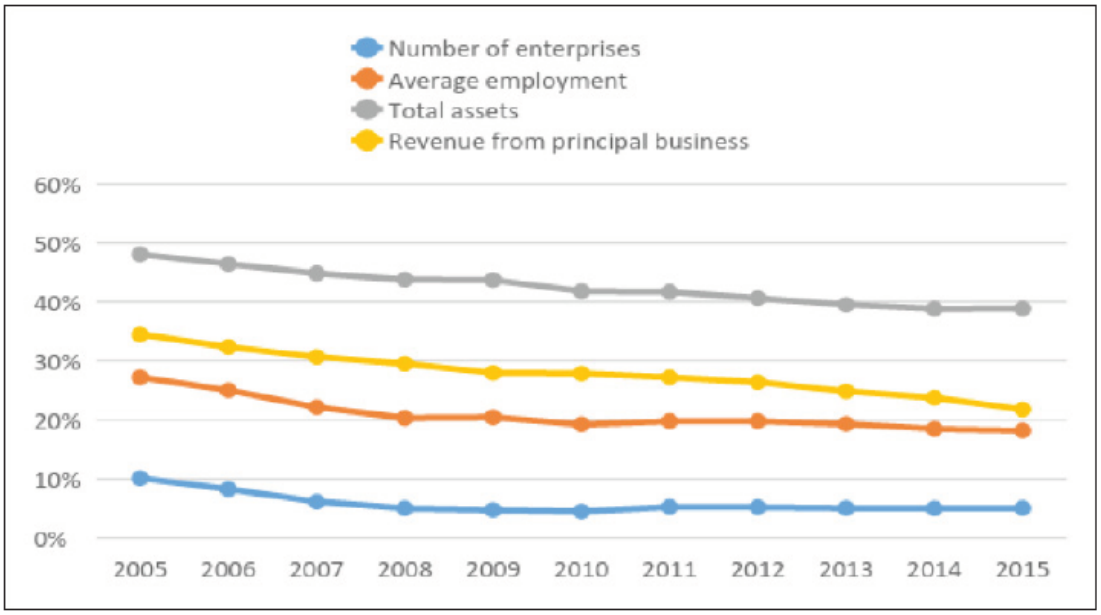


Figure 6. Share of SoE in China (2005 to 2015)

(Source: CIUA, 2018)



The 1978 “open door and reform” policy heavily impacted every aspect of China’s society. And since then, China’s society has undergone mega changes and reforms. During this process, Chinese government has initiated a lot of policies to lead and gauge reformation in economy and other aspects of the society. There are several important types of reformation underline China’s society change, which have been at the focal points of policy design. I classified them into two categories: economic-related reformation and science and technology-related reformation.

(1) Economic-related Reformation

- **SoE Reformation**

  State-own Enterprises (SoEs) usually were the only dominant economy contributor in China before 1978 (CIUA, 2018). Since 1978, Chinese government has started to reform and reposition SoEs, and thus enabled the rising of private-own business, which has become new catalyst to the economy. According to (CIUA, 2018) the reformation of SoEs can be divided into 4 phases:

  Phase 1 (1978 to 1984): this phase were to reform SoE’s supervisory authorities, and encouraged competitions for SoEs by allowing “individuals to operate private business and SoEs were granted more flexibility and autonomy in their operation and management, …, foreign investment was no longer prohibited.” (CIUA, 2018)

Phase 2 (1985 to 1993): the policies in this phase focused on the decentralization of central control on SoEs, and the separation of ownership and management of SoEs started in this phase.

Phase 3 (1994 to 2002): this phase were mainly for privatization of SoEs especially smaller size SoEs. A large number of transfers of ownership of SoEs happened during this phase.

Phase 4 (2003 to present): this phase focuses on the consolidation and strengthen of national-level SoEs. National-level SoEs are now more focus on key industry sectors of the economy.

From the reformation of SoEs, we see that on one side, the power of SoEs in key industries has been strengthened, which allows government to remain the controlling power on economy; on the other side, it also contributes largely to the rising of private-own business which are considered as an important player in entrepreneurship activities; furthermore, the reformation of SoEs also brings themselves competiveness.

- **Land Use Reformation (Land Reformation)**

  In China, land affects not only urban but also rural development. Land is always a key asset in China's economy development and social change. It is always stay in the central stage and impact the society from

fundamental level. According to (Liu, 2018), there are 4 phases in China's land reformation:

Phase 1 (1981 to 1994): this phase comes with the rising of China's rural enterprises (Township & Village Enterprises—TVEs), and government started allowing people to set up business in collective ownership land in rural area. Also this phase witnessed the separation of ownership and land use rights. Land use right can be transferred and this stimulated the economy: investors started to use land for private-own business.

Phase 2 (1995 to 2002): this phase saw the transition from industrialization to urbanization, and the decline of TVEs but the rising of industrial-park based economy growth mode. Industrial park gained big attention. Local governments have a big power in managing land use right transferring, this stimulated the industrial park construction and attracted lot of companies to locate in industrial parks. Also the popular housing allocation plan was terminated during this phase (in 1998), this motivated the development and growth of China's real estate industry, which later become a big contributor to China's economy.

Phase 3 (2003 to 2008): this is a phase which witnessed big progress of urbanization. On one hand, the total area of Chinese cities grow rapidly; on the other hand, the mobility of people from rural area to city and people move in between cities increased significantly. The 2003 "bidding, auction, and listing for profit-oriented land" policy made

income of land use right transfer channelled to local governments and this gave local governments big motivation to do land use right transfer. The income from land use right transfer became the supporting power for infrastructure construction. During this phase, another major movement was the progress of housing marketization.

Phase 4 (2008 to present): this phase is a rapid growth of property market. In 2008, in order to mitigate the impact of financial crisis, China government initialized the "4 trillion stimulus plan" and increased land supply. Another big movement is the relaxation of land mortgage regulations, this makes local governments started to shift from land use right transfer as income to land mortgage as income.

Land use cost plays key role in determining the rental cost, the production cost, amongst others in China, thus heavily affects business operation and entrepreneurship activities. And land related business like real estate industry and property development also contribute a lot to China's economy.

- **Financial Liberalization (Financial Reformation)**

  Financial liberalization is a key process in shaping China's economy. According to (Zhong and Zhang, 2017), China's financial liberalization has 4 phases:

Phase 1 (1978 to 1984): this phase mainly focused on the establishment of financial industry framework, which is a part of the transformation from *Planned Economy* to *Market Economy*. Government established specialized financial institutes which include banks and insurance companies, and started from 1983 the 4 big banks (Industrial & Commercial Bank of China[2], Bank of China, and Agricultural Bank of China, China Construction Bank) were allowed to compete beyond their previous designated specialized industries.

Phase 2 (1985 to 1996): this is the phase of development of modern financial market. Various types of financial institutes were founded, e.g., rural credit cooperative, city commercial banks, and new financial products were allowed to be sold in the market. Foreign exchange centres, stock exchanges (Shenzhen Stock Exchange and Shanghai Stock Exchange) were established in this phase. Also, this phase witnessed a series of financial regulations, and government separated policy functionalities from the big 4 banks.

Phase 3 (1997 to 2007): this phase started with the Asia financial crisis in 1997, which motivated government to establish 4 asset management companies to deal with commercial banks' non-performing asset. This phase also witnessed the establishment of specialized regulation authorities: CBRC, CSRC, and CIRC. State-owned banks' shareholding

[2] Established in 1984

system reformation was also done in this phase. Exchange rate liberalization and reformation started in this phase as well (in 2005).

Phase 4 (2008 to present): the global economy crisis in 2008 substantially impacted China's export-lead economy growth mode. This phase saw the increase of financial innovation activities. Also interest rate liberalization started and exchange rate liberalization continued. Government started the promotion of Rural Finance, Internet Finance, Green Finance, as well as Inclusive Finance. This phase also saw the beginning of internationalization of China's financial industry.

To firms, financial liberalization is a way to help them gain capital in a more effective manner. With such support, firms are able to conduct more entrepreneurship activities and to achieve bigger success.

(2) Science and technology-related Reformation (Science and technology Reformation)

- **Science and technology**

  Chinese government paid a lot of attention to science and technology development since 1949, and has long term planning on science and technology development as well as the promotion of innovation. The reformation of China's science and technology policies after 1978 is a way of decentralization (in a controlled manner), government gradually releases the control and science and technology policies are shifting

from military-oriented to commercial-oriented. The science and technology reformation in China are mainly classified into 5 phases (Jin, 2015):

Phase 1 (1978 to 1984): this is the reformation phase. Chinese government introduced several national level funding frameworks, among them are: 863 project, 973 project, and Starlight project. This phase is the beginning of decentralization: universities, local institutes, and even rural enterprises were allowed to get funding supports from government and with certain degree of freedom to explore areas of their own interest.

Phase 2 (1985 to 1994): this phase mainly focused on to shifting and making science and technology for economy development (i.e., commercial-orientation and market-orientation). This was a big transformation which helped to release the potential of science and technology.

Phase 3 (1995 to 2005): this phase focused on research institute reformation and R&D commercialization.

Phase 4 (2006 to 2012): in this phase, government started mid to long term planning for science and technology strategies, and encouraged self-innovation. Innovation started to become a national strategy. Government also started to establish national innovation framework as well as firm-based technology innovation structure.

Phase 5 (2013 to present): government set the goal in this phase to build a strong innovation-powered country. Several specialized policies have been proposed to encourage strategic technologies like AI, smart manufacturing, and mobile computing, etc.

In China's context, science and technology development are undoubtedly lead to innovation activities and further strengthen the competiveness of Chinese enterprises and entrepreneurship activities.

Besides the above mentioned social reform and related policies, on the other hand of social transformation, China's social development, which is people-centric, also undergone certain big transformation. Here I look at three indicators which are considered as good proxies of people's living standard.

- **GDP per capita**

  Gross Domestic Product (GDP) is an indicator of countries' economic performance and strength[3], while GDP per capita according to the United Nations is defined as by dividing GDP at current market prices by the population[4]. GDP per capita usually is used to measure the standard living of population[5], and "as a proxy of the level of standard

[3] https://www.statista.com/statistics/270180/countries-with-the-largest-gross-domestic-product-gdp-per-capita/

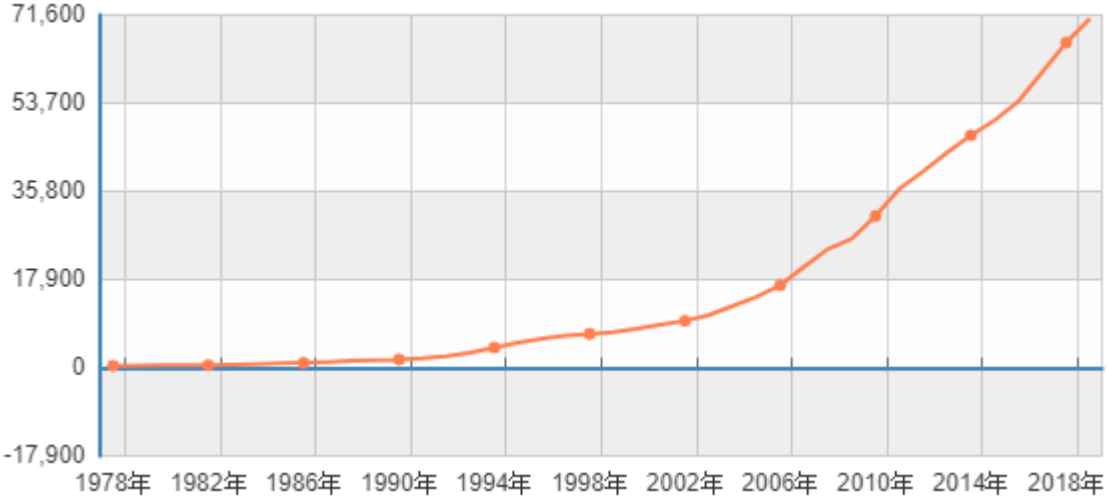
[4] https://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets/econ_development/gdp_percapita.pdf

[5] https://www.statista.com/statistics/270180/countries-with-the-largest-gross-domestic-product-gdp-per-capita/

of living" (Diacon and Maha, 2015). Figure 7 shows the historical GDP per capita data in China (from 1978 to 2019)

Figure 7. Historical GDP per capita data of China (1978 to 2019)

(Source: http://data.stats.gov.cn/)

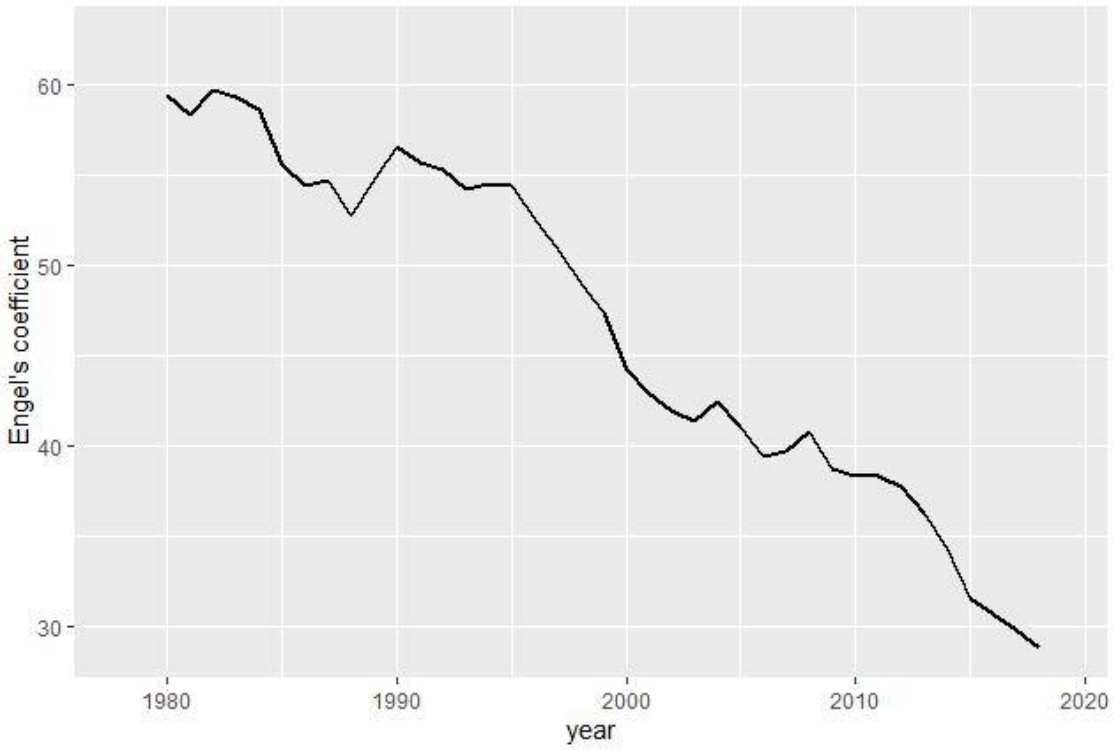


- **Engel's Coefficient**

  Engel's coefficient was proposed by Ernst Engel in his famous study (Engel, 1857), and since then has been widely used as indicator to show people's living conditions. It is defined as ratio of family income that is spend on food. Figure 8 shows the historical Engel's coefficient in China (from 1978 to 2012).

Figure 8. Historical Engel's coefficient of China (1980 to 2018)

(Source: https://data.stats.gov.cn/)



- **Human Development Index**

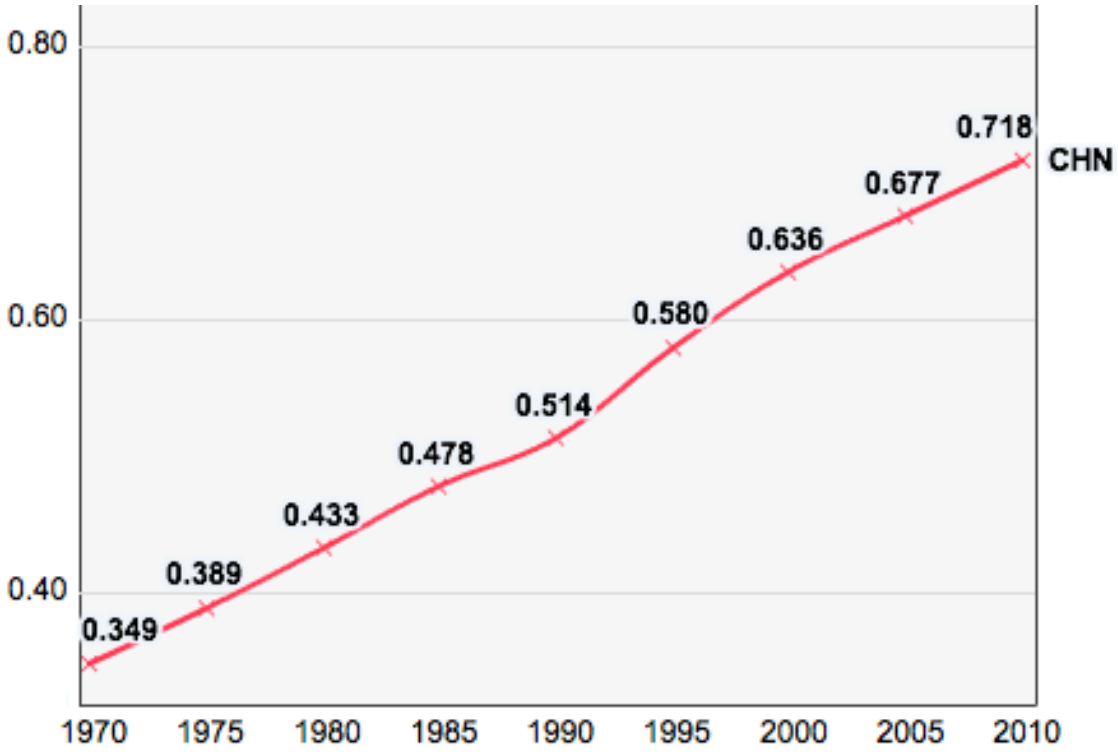
  Human Development Index (HDI) was created by Mahbub ul Haq and first appeared in Human Development report by United Nations Development Programme [6]. This is the indicator to show overall development of people in a society, is a "summary measure of average achievement in key dimensions of human development" [7]. Figure 9 shows the historical HDI in China (from 1970 to 2010).

Figure 9. Historical HDI of China (1970 to 2010)

[6] http://hdr.undp.org/en/content/human-development-index-hdi
[7] http://hdr.undp.org/en/content/human-development-index-hdi

(Source:

https://commons.wikimedia.org/wiki/File:China,_Trends_in_the_Human_Development_Index_1970-2010.png)



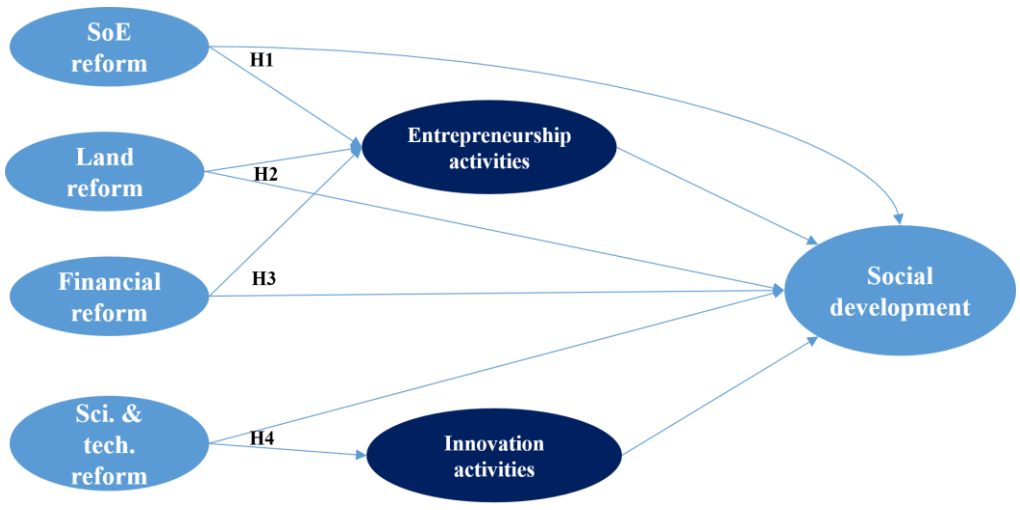
CHAPTER 3. METHODOLOGY AND DATA

3.1 Research Hypothesis

In this section I will elaborate the research hypothesis for the dissertation. As I mentioned in previous section, I proposed that innovation and entrepreneurship activities have mediating effect on the relationship between social reform and social development.

I proposed four hypothesis to test the mediating effect of innovation and entrepreneurship activities. Figure 10 depicts the hypothesis framework. I use economic-related reformation (include: SoE reformation, land reformation, and financial reformation) and science and technology-related reformation (science and technology reformation) to represent social reform.

Figure 10. Hypothesis framework



The Mediating Role of Entrepreneurship

Regarding on entrepreneurship activities in China, it is an important outcome of economic reform. First, economic reform gives necessary preparations for business creation and operations, which are naturally linked to entrepreneurship activities. E.g., SoE reformation gave big opportunities for the growth of private-own business. Second, firms as building blocks of economy and society, are inevitably strong actors to realize the purpose of economic reformation related policies. Entrepreneurship as one of the factors that beneath firms' success and competiveness, is the product of necessity of the effectiveness and implementation of economic reformation. In China, since 1978, the number of business created are in a steady growth trend. Data in 2018 show that, there are 27 million private-own enterprises which count more than 60% of the economy (GDP)[8], and they contribute to more than 80% of the job market, 70% of technology innovation and new products development[9]. These are strong signals that entrepreneurship activities in forms of private-own firm creation and performance, has an important relationship to economic reform.

On the other hand, entrepreneurship activities also have their impact on the society. People already started study on the social impact aspect of entrepreneurship: e.g., social enterprises (Certo and Miller, 2008). In the dissertation, I argue in a further step that not only those social enterprises have social impact but generally, entrepreneurship activities even from outside of

[8] http://www.gov.cn/xinwen/2018-09/06/content_5319720.htm#1
[9] http://finance.people.com.cn/n1/2018/0501/c1004-29958658.html

social enterprises can contribute to social development. Social development is a result of improvement of individuals, while individuals' living standard are heavily impacted by their financial situation. Big portion of people, their income source are their salary, which are from organizations (majority are firms). Thus from this point of view, entrepreneurship which as one of the key abilities of firms, should contribute to social development.

Therefore,

H1. China's entrepreneurship activities (Mediator) mediate the relationship between SoE reformation and social development.

H2. China's entrepreneurship activities (Mediator) mediate the relationship between land reformation and social development.

H3. China's entrepreneurship activities (Mediator) mediate the relationship between financial reformation and social development.

The Mediating Role of Innovation

Regarding on science and technology reformation, it is naturally thought to be able to impact innovation activities. Also in knowledge economy, innovation is more related to the advance and application of technology, which is considered as driving force of the whole society, and impact on every person's daily life. Technology can help reducing living costs, as well as improving people's living conditions. Thus,

H4. China's innovation activities (Mediator) mediate the relationship between science and technology reformation and social development.

3.2 Methodology

In this section, I will describe the framework for methodology as well as source of data, and how I will operationalize key variables.

(1) Framework

Table 1 lists the methodology framework for macro level analysis.

Table 1. Research methodology framework

Hypothesis	Data collection	Method
H1 H2 H3	• China economic reform (SoE reformation, land reformation, financial reformation) related policies documents (1978 to 2017) • China's firms basic data (1978 to 2017) • China's historical GDP per capita, Engel's coefficient, HDI (1978 to 2017)	Mediation analysis

H4	• China science and technology reform related policies documents (1978 to 2017) • China's firms basic innovation-related data (1978 to 2017) • China's historical GDP per capita, Engel's coefficient, HDI (1978 to 2017)	Mediation analysis

For micro level analysis, I did secondary analysis on Ant Financial to gain insights on how firms perceive social reformation and develop entrepreneurship and innovation activities, and turn that into impacts on people's life (in this case, it is stakeholders).

(2) Key variables

I listed key variables (dependent variables and key independent variables) in Table 2.

Table 2. Key variables and their operationalization

Hypothesis	Variables	Description (Operationalization)
H1 H2	DV: • Social development	• China's GDP per capita of focal year

H3	Key Ind. V: • SoE reformation • Land reformation • Financial reformation	• Corresponding number of China national-level policies released year before focal year
	Mediator: • Entrepreneurship activities	• Number of China private-own firms in focal year
H4	DV: • Social development	• China's GDP per capita of focal year
	Key Ind. V: • Science and technology reformation	• Corresponding number of China national-level policies released year before focal year
	Mediator: • Innovation activities	• Number of patents applied in China in focal year

Besides the variables in Table 2, I used the following variables as control variables:

- Population (for economic reformation related hypothesis, and for science & technology reformation related hypothesis)

- Total amount of trade (both import and export) in USD (for economic reformation related hypothesis)
- Foreign exchange rate to USD (for economic reformation related hypothesis
- Percentage of R&D expenditure in GDP (for science & technology reformation related hypothesis)

(3) Data

I used data published by National Bureau of Statistics of China (for social and entrepreneurship related data), as well as data from National Intellectual Property Administration (for innovation related data) and other data sources. I standardized and centralized the data before analysis. For policy-related data (text) I used the following source: http://search.chinalaw.gov.cn/ and http://pkulaw.cn. Time horizon is from 1978 to 2017. In Table 3 I listed text keywords I used for identification of different types of policies.

Table 3. Keywords used for retrieving policies

Type of policy	Keywords (in Chinese)
SoE	国企+国有企业+国营企业+国有资产
Land	土地+房地产+宅基地+用地
Financial	金融+银行+保险+证券+投资+外汇+信托

Science and technology	科学技术+科技+技术创新+知识+高新

CHAPTER 4. RESULT AND ANALYSIS FOR MACRO LEVEL

4.1 Mediation Analysis

I did mediation analysis to investigate the mediation effect of innovation and entrepreneurship in connecting social reformation and social development. There are four main frameworks for mediation effect testing: Baron & Kenny (Baron and Kenny, 1986), Sobel (Sobel, 1982), Bootstrap and Monte Carlo (Imai et al., 2010a; Imai et al., 2010b), and Structural Equation Modeling (SEM) (Gunzler et al., 2013). There are increasing number of research which have adopted Bootstrap and Monte Carlo framework. I did not use SEM because of SEM is more suitable when the number of observations is larger. To be more specific, in this research, I used quasi-Bayesian Monte-Carlo method because of its advantages (Imai et al., 2010a) compared to Bootstrap. All social reformation variables (i.e., number of policies) are lagged by one year to reflect the latency of policy effect. Besides main analysis, I also performed comprehensive robustness checking to investigate mediation effect under different settings.

I used *mediation* package in R (Tingley et al., 2014) to conduct mediation analysis. Confidence Intervals (CI) (90%) were calculated on the data from 1,000 simulations. I focused on three indicators for evaluating mediation effects: ACME, ADE, and total effect. Below is a description of these indicators.

- Average Causal Mediation Effects (ACME) [*total effect - direct effect*]
- ADE: Average Direct Effects [total effect - indirect effect]
- Total Effect = Direct (ADE) + Indirect (ACME)

4.2 Main Analysis

Mediation effect of entrepreneurship activities

The mediator entrepreneurship activities are operationalized by the number of private-own firms in the focal year. First, I observed that entrepreneurship activities has a positive impact on DV (GDP per capita) (β = 0.55, p = 0.00), this confirms that entrepreneurship as mediator has impact on social development.

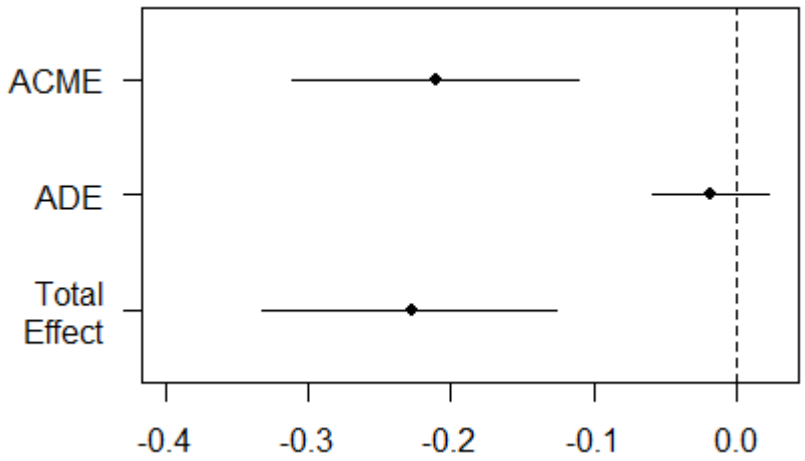
SoE reformation

Table 4 shows the indirect, direct, and total effect of SoE reformation. Figure 11 is the corresponding visualization of the effects. ACME = -0.2098 (p = 0.00, CI is from -0.3111 to -0.11), CI value does not include 0. This indicates that SoE reformation has significant indirect effect. ADE does not show statistically significance (p = 0.48) which suggests there is uncertainty in estimating ADE. Total effect is significant with a value of -0.2272. All these suggest a partial mediation effect of SoE reformation through entrepreneurship activities.

Table 4. Effects and significance

	Value	CI Boundary	*p*
ACME	-0.2098	-0.3111, -0.11	0.00
ADE	-0.0175	-0.0580, 0.02	0.48
Total Effect	-0.2272	-0.3332, -0.13	0.00

Figure 11. Visualization of effects



SoE reformation has negative impact on the mediator—entrepreneurship activities. The purpose of SoE reformation is to strengthen the competiveness and capability of SoEs, thus more active SoE reformation (i.e., larger number of SoE related policies) enables more competitive SoEs.

The nature of SoEs is to ensure government's controllability on certain key areas, so it is not surprise that stronger SoEs affect those private-own firms in SoEs' operation areas. This explains why SoE reformation negatively impact entrepreneurship activities. As entrepreneurship activities have positive impact on GDP per capita, thus it is clear that SoE reformation result in a negative indirect impact on GDP per capita.

This gives policy makers some insights: pushing SoE to a better level is good but at same time need to pay attention to private-own enterprises as well, to make sure that they have enough time to find suitable positions in competing or complementing SoEs.

Land reformation

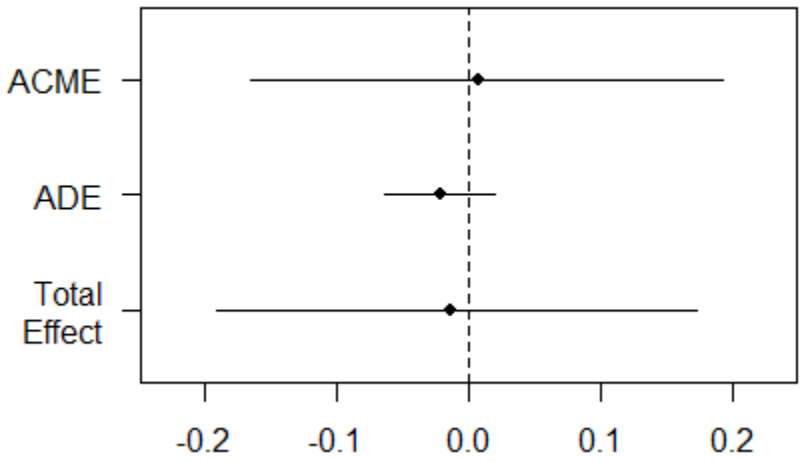
I did not observe mediation effect of land reformation through entrepreneurship activities (both indirect and direct effects are not significant). The reason could be for land policies, it takes long time to have impact. The details of effects are shown in Table 5, and visualization of these effects are shown in Figure 12.

Table 5. Effects and significance

	Value	**CI Boundary**	***p***
ACME	0.00824	-0.16498, 0.19	0.94

ADE	-0.02127	-0.06371, 0.02	0.39
Total Effect	-0.01303	-0.19108, 0.17	0.88

Figure 12. Visualization of effects



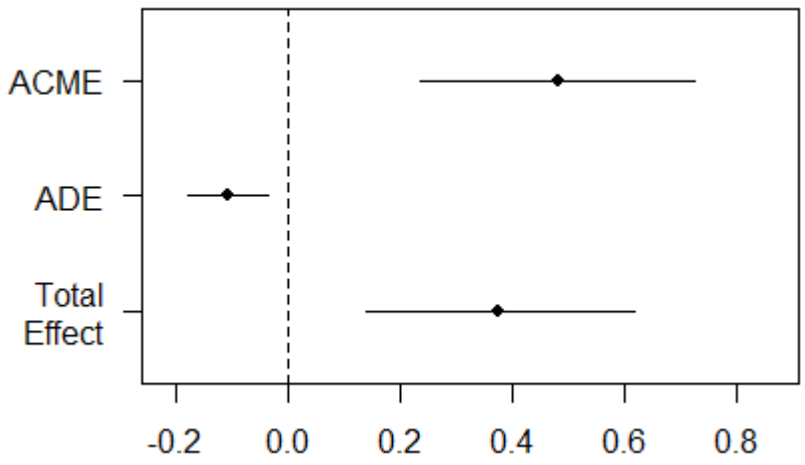
Financial reformation

Table 6 shows the indirect, direct, and total effect of financial reformation. Figure 13 is the corresponding visualization of the effects. ACME = 0.482 (p = 0.00, CI is from 0.235 to 0.72), ADE = -0.108 (p = 0.020, CI is from -0.182 to -0.04), total effect = 0.373 (p = 0.008, CI is from 0.137 to 0.62), all CIs do not include 0. All these indicate significant indirect and direct ef fect and a partial mediation effect of financial reformation through entrepr eneurship activities.

Table 6. Effects and significance

	Value	CI Boundary	*p*
ACME	0.482	0.235, 0.72	0.00
ADE	-0.108	-0.182, -0.04	0.02
Total Effect	0.373	0.137, 0.62	0.008

Figure 13. Visualization of effects



Finance reformation has positive mediation effect on GDP per capita, where a positive impact on entrepreneurship activities. A larger number of

financial reformation policies set a healthier environment for business and give opportunities to private-own firms, thus result in a positive impact on entrepreneurship activities. Financial reformation on the other hand has negative direct impact on GDP per capita. The reason could be more active financial reformation in short term might result in adjustment cost on the society thus a negative impact. Financial industry is highly regulated. Financial reformation, even liberalization related reformation, usually comes with regulation requirement and related regulation activities. This poses certain costs to the society in short term. One of such costs is compliance cost. In order to comply with new regulations, financial institutes need to utilize various resources and do certain adjustments in workflow, product design, risk management, client acquisition etc. This in turn will have impact as well as adjustment cost on financial institutes' stakeholders, e.g., partners, shareholders, end users, and even the society at large. While in a longer term, as shown in later sections, such negative direct impact will disappear.

Mediation effect of innovation activities

Science & technology reformation

I observed that innovation activities (operationalized as number of patents applied) have a positive impact on GDP per capita (β = 0.50806, p = 0.00).

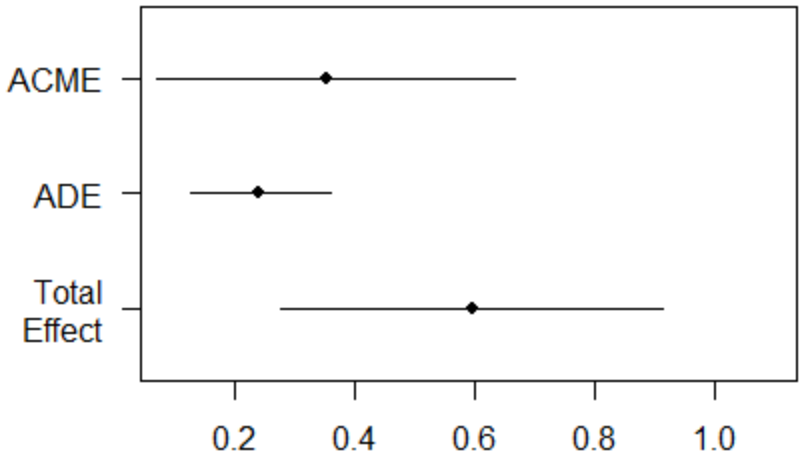
This is reasonable as innovation plays key role in knowledge-based econo my.

Regarding on the mediation effect, ACME = 0.3552 (p = 0.044, CI is from 0.0714 to 0.66), ADE = 0.2406 (p = 0.00, CI is fro m 0.1264 to 0.36), total effect = 0.5958 (p = 0.002, CI is from 0.2776 to 0. 91), all CIs do not include 0. All these suggest significant indirect, direct, and total effect of science & technology reformation. Table 7 and Figure 1 4 show the details and visualization. And it is clear that this is a partial me diation effect of science & technology reformation through innovation acti vities.

Table 7. Effects and significance

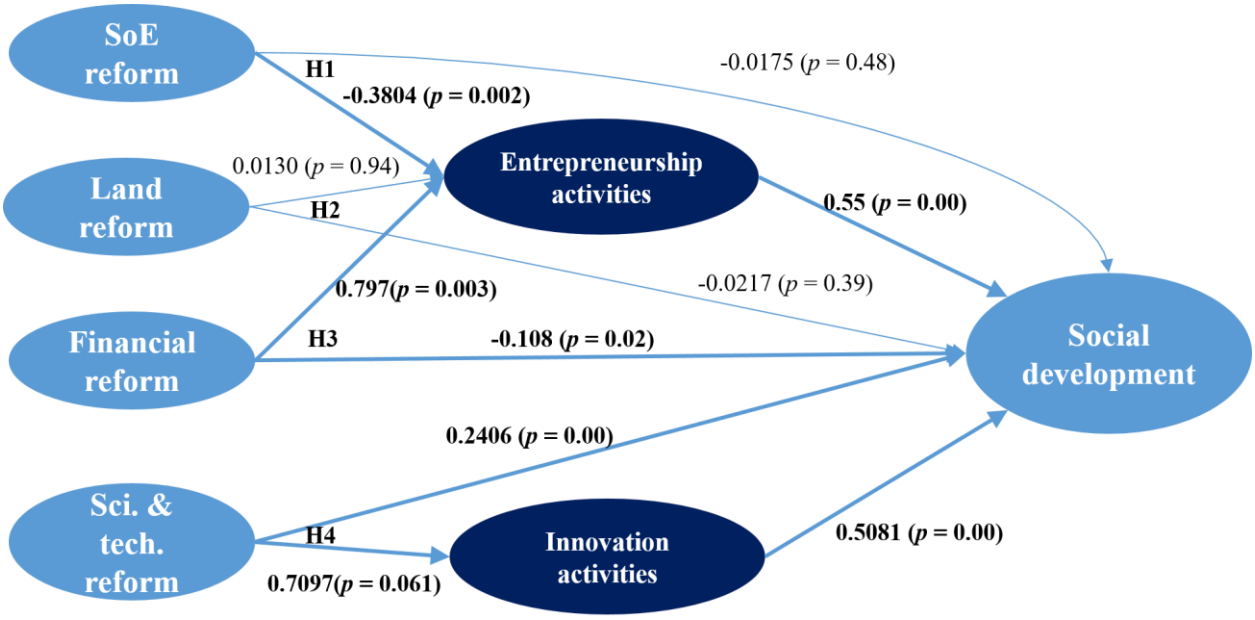
	Value	**CI Boundary**	***p***
ACME	0.3552	0.0714, 0.66	0.044
ADE	0.2406	0.1264, 0.36	0.000
Total Effect	0.5958	0.2776, 0.91	0.002

Figure 14. Visualization of effects



In Figure 15, I present an overall diagram to demonstrate the impact of different reformations. I labelled each link with coefficient value as well as its *p*-value. I highlighted those significant links (*p*-value <= 0.1). Clearly that mediation effects are observed for SoE reformation, financial reformation, and science & technology reformation.

Figure 15. Diagram of mediation effects



In the following, I present results and analysis of comprehensive robustness checking to investigate mediation effects under different settings.

4.3 Robustness Checking

To further investigate the mediating effect of social reformation through innovation and entrepreneurship activities, I did comprehensive robustness checking from five dimensions, by considering different settings for DV, mediator, and IV. Table 8 lists the comparison of what I did in main analysis and in robustness checking.

Table 8. Contents of robustness checking

		In main analysis	**In robustness checking**
DV		GDP per capita	Engel's coefficient, HDI
Mediator (entrepreneurship activities)		Number of private-own firms	Number of private-own firms + number of sole proprietor
IV	Policy types	Number of policies	Number of enabling policies, Number of controlling policies
	Granularity of IV	SoE reformation, Land reformation, Financial reformation	Economic reformation
	Different time lag	Lag 1	Lag 2, Lag 3

(1) Robustness checking for DV

I tested mediation effects of social reformation on another two social development related DVs: HDI and Engel's coefficient.

❖ **HDI**

Entrepreneurship activities do not have significant effect on HDI (β = 0.01558, p = 0.46620). No any mediation effects were identified for the setting of HDI as DV. But SoE reformation, land reformation, and science & technology reformation observed positive direct impact on HDI.

SoE reformation

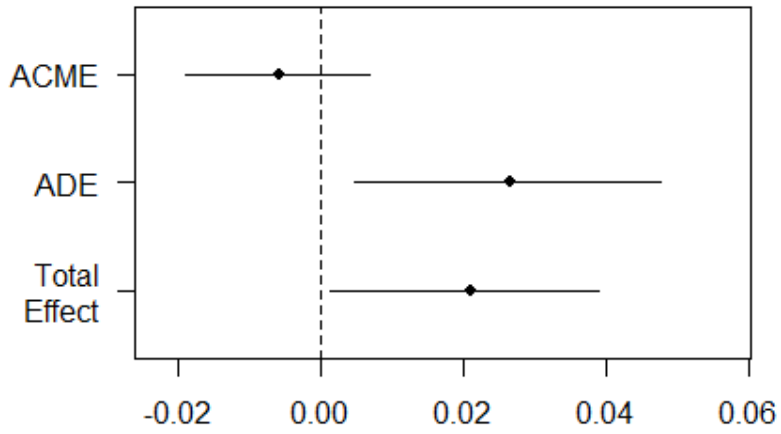
SoE reformation sees no indirect impact while a positive direct impact on HDI with a small power (β = 0.02665, p = 0.050). Table 9 and Figure 16 show the details.

Table 9. Effects and significance

	Value	**CI Boundary**	***p***
ACME	-0.00574	-0.01909, 0.01	0.448

ADE	0.02665	0.00466, 0.05	0.050
Total Effect	0.02091	0.00139, 0.04	0.072

Figure 16. Visualization of effects



Land reformation

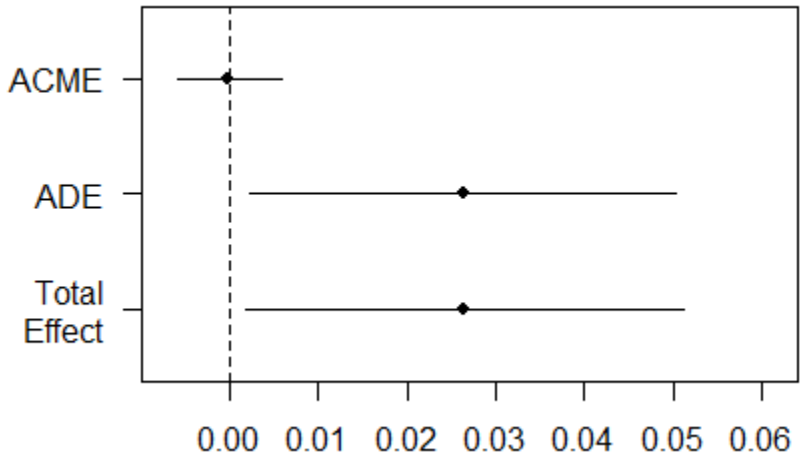
Similar as SoE reformation, land reformation has a direct positive impact on HDI but no any indirect effect being identified. Details are shown in Table 10 and Figure 17.

Table 10. Effects and significance

	Value	**CI Boundary**	***p***
ACME	-0.000169	-0.005885, 0.01	0.976

ADE	0.026462	0.002232, 0.05	0.070
Total Effect	0.026293	0.001768, 0.05	0.076

Figure 17. Visualization of effects



Financial reformation

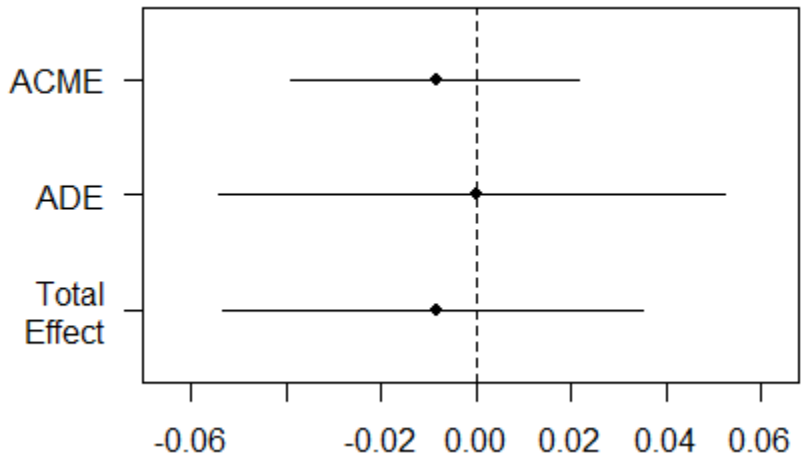
Financial reformation did not observe any significant indirect and direct effect on HDI. Details are shown in Table 11 and Figure 18.

Table 11. Effects and significance

	Value	**CI Boundary**	***p***
ACME	-0.008511	-0.039169, 0.02	0.62

ADE	0.000104	-0.054249, 0.05	1.00
Total Effect	-0.008407	-0.053256, 0.04	0.79

Figure 18. Visualization of effects



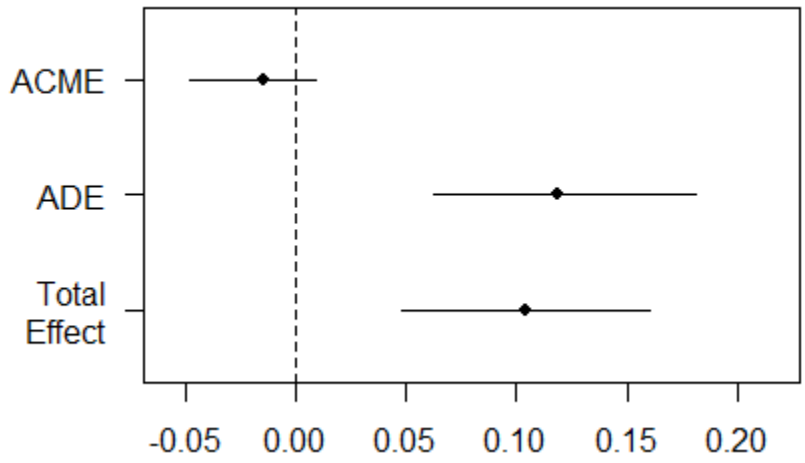
Science & technology reformation

Innovation activities do not have effect on HDI, with β = -0.02037, p = 0.304211. Direct positive impact of science & technology reformation on HDI was observed. Details are shown in Table 12 and Figure 19.

Table 12. Effects and significance

	Value	CI Boundary	*p*
ACME	-0.0149	-0.0480, 0.01	0.306
ADE	0.1189	0.0628, 0.18	0.002
Total Effect	0.1040	0.0480, 0.16	0.002

Figure 19. Visualization of effects



❖ **Engel's coefficient**

Entrepreneurship activities have negative effect on Engel's coefficient: β = -0.13118, p = 0.01297. As for Engel's coefficient,

lower value is better, thus such negative effect is consistent with the case of GDP per capita. Mediation effects were detected for SoE reformation, financial reformation, and science & technology reformation.

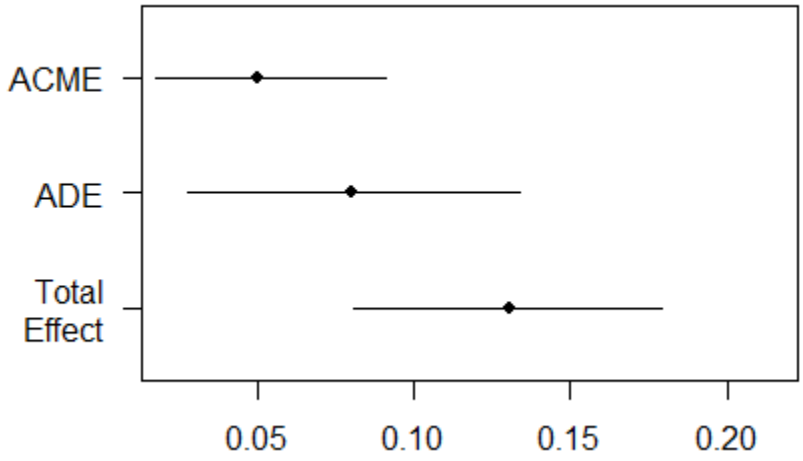
SoE reformation

SoE reformation behaves similar as in the setting of GDP per capita as DV, the only exception is that it has a significant direct impact on Engel's coefficient, which was not observed in the setting of GDP per capita. The direct impact is positive which means more active SoE reformation may not good to social development, this suggests that a more smooth SoE reformation is favoured and decision makers need to carefully find a trade-off for SoE reformation. Details are shown in Table 13 and Figure 20.

Table 13. Effects and significance

	Value	**CI Boundary**	***p***
ACME	0.0505	0.0176, 0.09	0.000
ADE	0.0803	0.0279, 0.13	0.008
Total Effect	0.1308	0.0807, 0.18	0.000

Figure 20. Visualization of effects



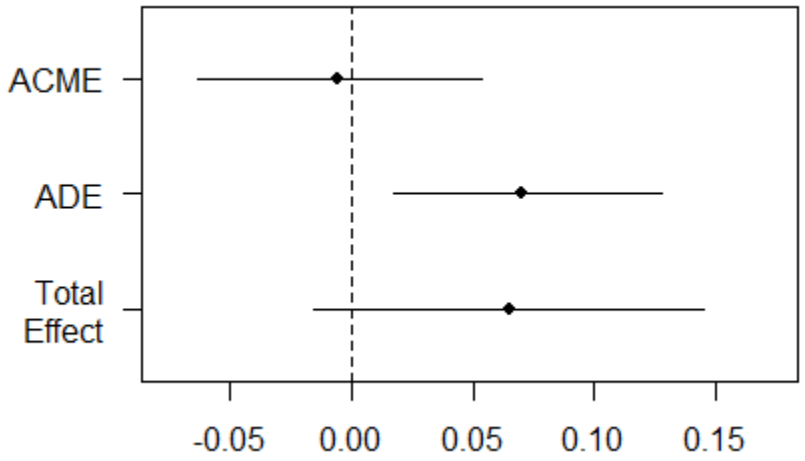
Land reformation

Land reformation does not have any indirect impact on Engel's coefficient, but a positive direct impact. This means more active land reformation results in a higher Engel's coefficient and thus a lower social development. Details are shown in Table 14 and Figure 21.

Table 14. Effects and significance

	Value	CI Boundary	*p*
ACME	-0.00537	-0.06346, 0.05	0.910
ADE	0.07031	0.01733, 0.13	0.036
Total Effect	0.06494	-0.01525, 0.14	0.186

Figure 21. Visualization of effects



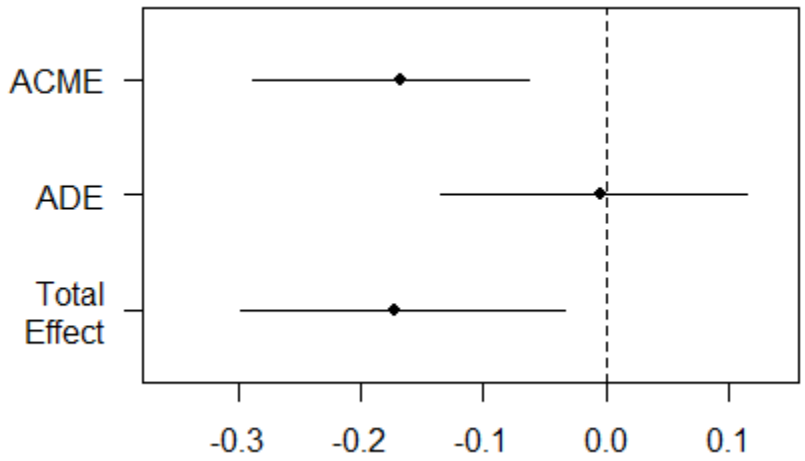
Financial reformation

Financial policies see a negative indirect effect on Engel's coefficient, this is consistent with result in the setting of GDP per capita. Financial reformation does not show a significance of direct impact on Engel's coefficient. Details are shown in Table 15 and Figure 22.

Table 15. Effects and significance

	Value	CI Boundary	*p*
ACME	-0.16706	-0.28789, -0.06	0.000
ADE	-0.00529	-0.13418, 0.11	0.964
Total Effect	-0.17236	-0.29797, -0.03	0.024

Figure 22. Visualization of effects



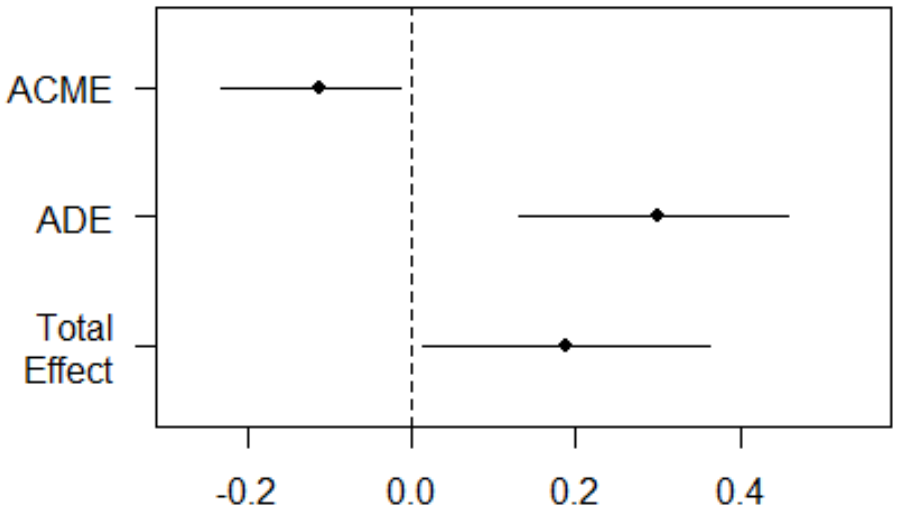
Science & technology reformation

Innovation activities have a negative impact on Engel's coefficient with β = -0.14723, p = 0.00938. This is consistent with the case of GDP per capita. I observed a negative indirect effect of science & technology reformation on Engel's coefficient. This is because of positive direct impact of science & technology reformation on innovation activities, and a negative impact of innovation activities on Engel's coefficient. I observed a direct positive impact of science & technology reformation on Engel's coefficient, this is a bit surprise. The reason could be science & technology reformation improves efficiency and lower the cost of services in people's daily life, so result in a higher Engel's coefficient. Details are shown in Table 16 and Figure 23.

Table 16. Effects and significance

	Value	**CI Boundary**	***p***
ACME	-0.1112	-0.2319, -0.01	0.046
ADE	0.3001	0.1316, 0.46	0.000
Total Effect	0.1889	0.0123, 0.36	0.080

Figure 23. Visualization of effects



To summarize, for HDI as DV, there is no mediation effects being identified; while for Engel's coefficient as DV, I overserved a consistent pattern with GDP per capita as DV. In the setting of Engel's coefficient, social reformation especially SoE reformation and land reformation show more power in making direct impact.

(2) Robustness checking for mediator

In this part, I extended the entrepreneurship activities from private-own firms to include sole proprietors. In China, sole proprietors are also important contributor to non-SoE economy, whose annual sales counts about 1/3 of retail sales of consumer good[10]. Also, with the development of digital technologies, there is a trend that individuals start to have the ability to do business without joining a big

[10] https://idf.pku.edu.cn/bqzt/xw/501534.htm

enterprise (Alipay sustainability report 2019—2020), this further accelerate sole proprietor related business. Thus it is of interest to see the impact of sole proprietors.

New entrepreneurship activities variable (which include number of sole proprietor) has positive impact on GDP per capita with β = 0.566742 and p = 0.00. As the results are consistent with the main analysis, thus I omit the explanation. The only exception is financial reformation has a significant direct impact on GDP per capita while in this setting, I did not observe the significance.

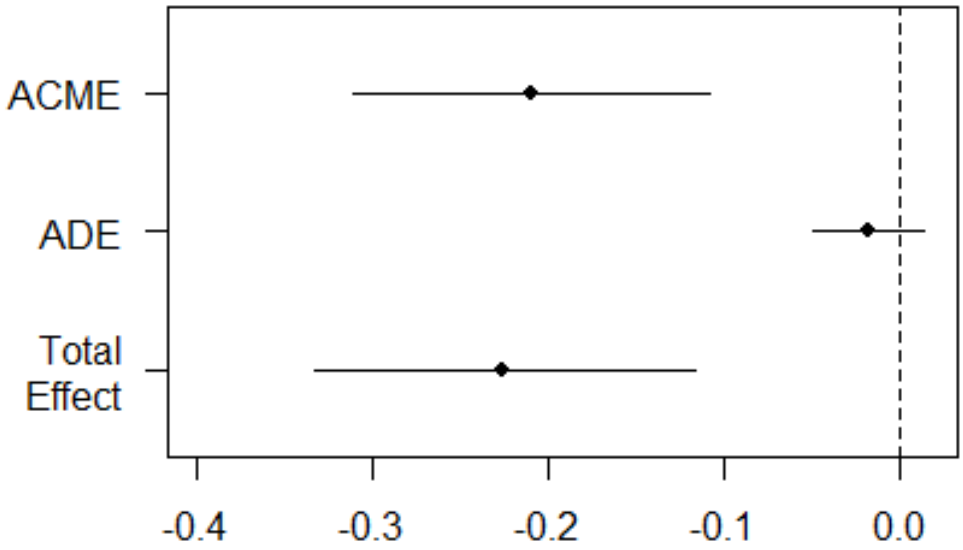
SoE reformation

Details are shown in Table 17 and Figure 24.

Table 17. Effects and significance

	Value	**CI Boundary**	***p***
ACME	-0.2088	-0.3109, -0.11	0.000
ADE	-0.0173	-0.0486, 0.01	0.33
Total Effect	-0.2262	-0.3324, -0.12	0.000

Figure 24. Visualization of effects



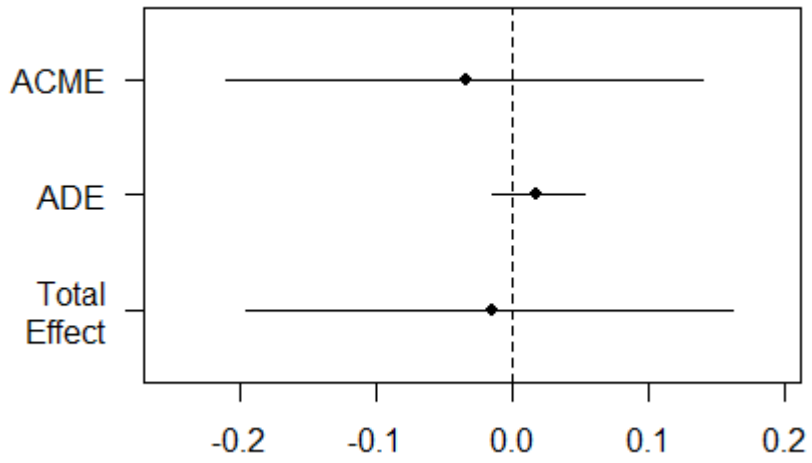
Land reformation

Again, there is no any effect identified for land reformation. Details are shown in Table 18 and Figure 25.

Table 18. Effects and significance

	Value	CI Boundary	*p*
ACME	-0.0327	-0.2099, 0.14	0.78
ADE	0.0185	-0.0141, 0.05	0.40
Total Effect	-0.0142	-0.1955, 0.16	0.90

Figure 25. Visualization of effects



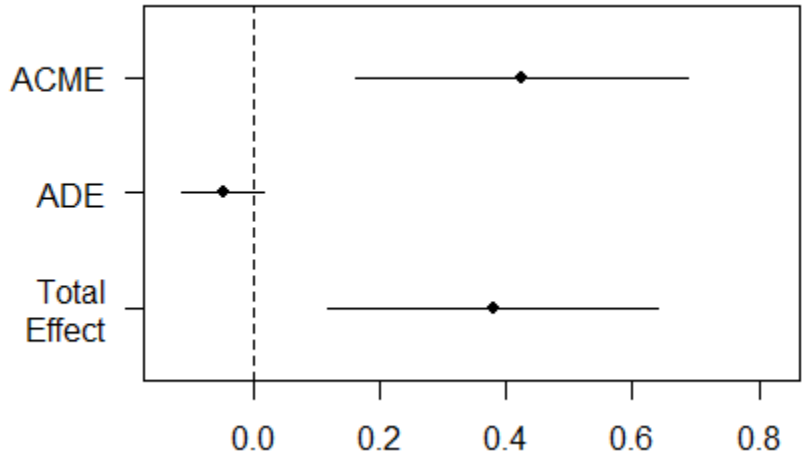
Financial reformation

Details are shown in Table 19 and Figure 26.

Table 19. Effects and significance

	Value	CI Boundary	*p*
ACME	0.4254	0.1628, 0.69	0.002
ADE	-0.0457	-0.1113, 0.02	0.212
Total Effect	0.3796	0.1192, 0.64	0.014

Figure 26. Visualization of effects



To summarize, sole proprietors together with private-own firms as entrepreneurship activities indicator act as a mediator to the relationship between economic reformation (SoE, financial) and GDP per capita.

(3) Robustness checking for IV

As I described in Table 8, the robustness checking for IV includes three parts: different policy types, different granularity of IV, and different lags of IV.

- **Different policy types**

I did robustness checking on two different policy types: enabling and controlling. The enabling type of reformation are to stimulate

related activities while controlling type of reformation are to restrain related activities, while a majority of policies are normal without being enabling or controlling. In Table 20 and Table 21, I listed the keywords used to filter enabling and controlling policies (in Chinese).

Table 20. Keywords used for enabling policies

Type of policy	Keywords (in Chinese)
SoE	促进+加速+鼓励+积极+推进+完善+支持+优化+加快 +增强+加大+培育
Land	促进+加速+鼓励+积极+推进+完善+支持+优化+加快 +增强+加大+培育
Financial	促进+加速+鼓励+积极+推进+完善+支持+优化+加快 +增强+加大+培育
Science and technology	促进+加速+鼓励+积极+推进+完善+支持+优化+加快 +增强+加大+培育

Table 21. Keywords used for controlling policies

Type of policy	Keywords (in Chinese)
SoE	整顿+ 抑制+ 严禁+降温+制止+管控 + 遏制+严控+加强管理
Land	整顿+抑制+ 严禁+降温+制止+调控+管控 + 遏制+严控+加强管理
Financial	整顿+ 抑制+ 严禁+降温+制止+调控+管控 + 遏制+严控+加强管理
Science and technology	整顿+严禁+制止+管控+遏制+严控+加强管理+打击+严肃处理+违规

❖ **Enabling policies**

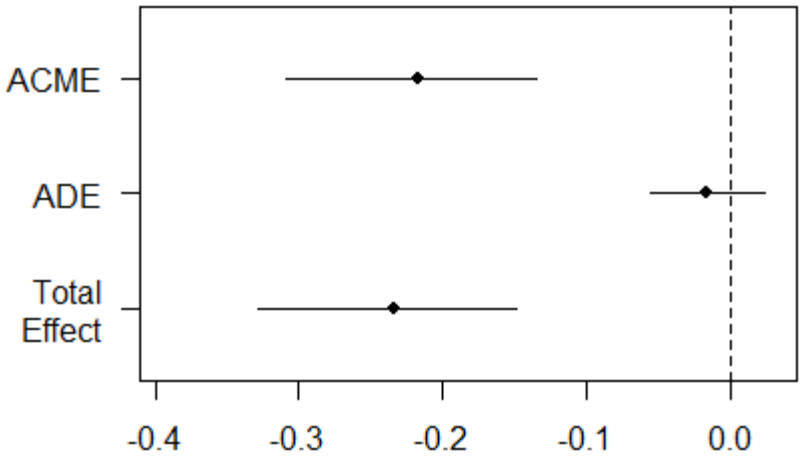
SoE reformation

Enabling SoE policies have similar impact (negative indirect impact and no significant direct impact) as in main analysis on GDP per capita. Details are shown in Table 22 and Figure 27.

Table 22. Effects and significance

	Value	CI Boundary	*p*
ACME	-0.2174	-0.3090, -0.13	0.00
ADE	-0.0162	-0.0553, 0.02	0.48
Total Effect	-0.2336	-0.3278, -0.15	0.00

Figure 27. Visualization of effects



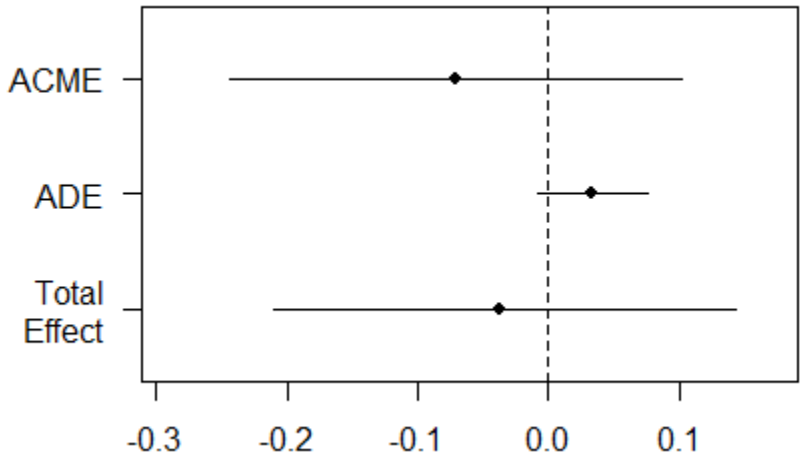
Land reformation

As in main analysis, no any indirect or direct effect was identified for enabling land policies. Details are shown in Table 23 and Figure 28.

Table 23. Effects and significance

	Value	**CI Boundary**	***p***
ACME	-0.07131	-0.24360, 0.10	0.52
ADE	0.03361	-0.00749, 0.08	0.18
Total Effect	-0.03770	-0.20959, 0.14	0.73

Figure 28. Visualization of effects



Finance reformation

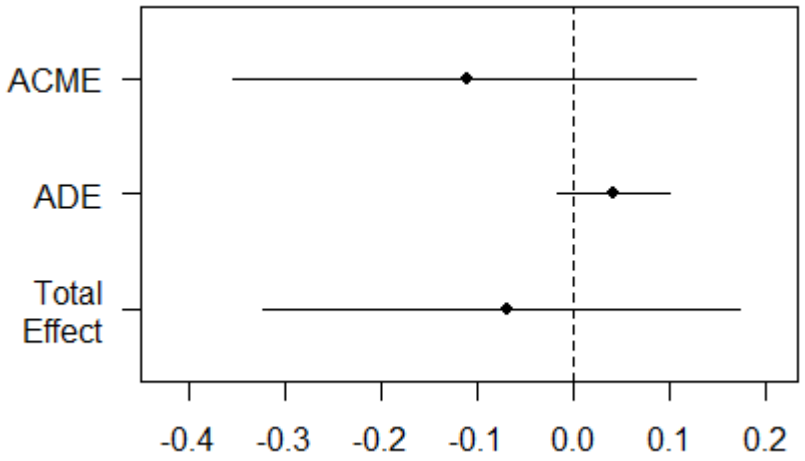
Different with in main analysis, enabling financial policies does not show any indirect or direct effect. Details are shown in Table 24 and Figure 29.

Table 24. Effects and significance

	Value	**CI Boundary**	***p***
ACME	-0.1111	-0.3542, 0.13	0.44
ADE	0.0413	-0.0174, 0.10	0.24

Total Effect	-0.0699	-0.3237, 0.17	0.66

Figure 29. Visualization of effects



Science and technology reformation

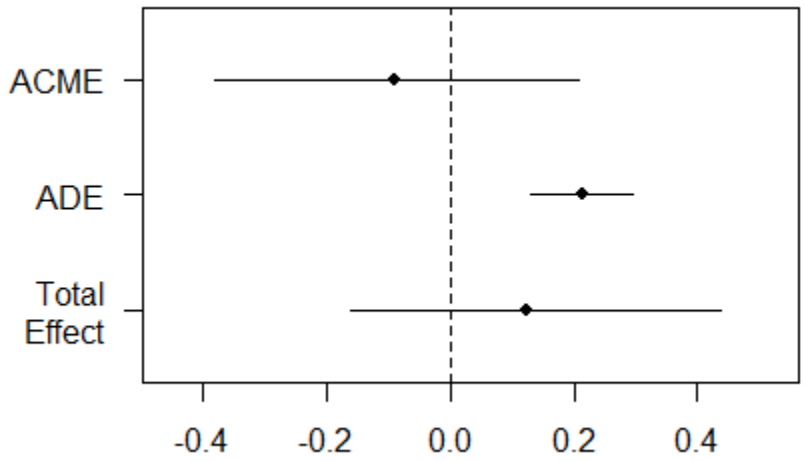
Enabling science & technology policies have direct positive impact on GDP per capita which is consistent with main analysis, but indirect impact is no more significant. Details are shown in Table 25 and Figure 30.

Table 25. Effects and significance

	Value	**CI Boundary**	***p***

ACME	-0.0896	-0.3810, 0.21	0.62
ADE	0.2140	0.1288, 0.30	0.00
Total Effect	0.1243	-0.1605, 0.44	0.50

Figure 30. Visualization of effects



❖ **Controlling policies**

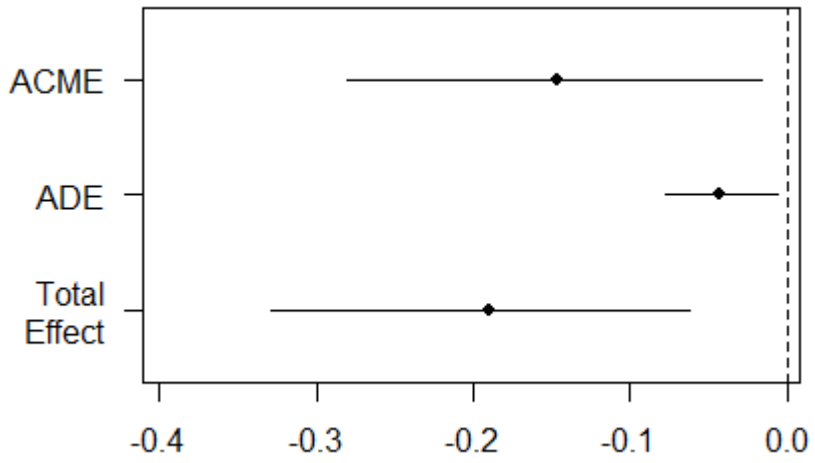
SoE reformation

Controlling SoE policies have similar effect as in main analysis and in enabling case. Details are shown in Table 26 and Figure 31.

Table 26. Effects and significance

	Value	CI Boundary	*p*
ACME	-0.1460	-0.2798, -0.02	0.046
ADE	-0.0433	-0.0772, -0.01	0.054
Total Effect	-0.1893	-0.3290, -0.06	0.016

Figure 31. Visualization of effects



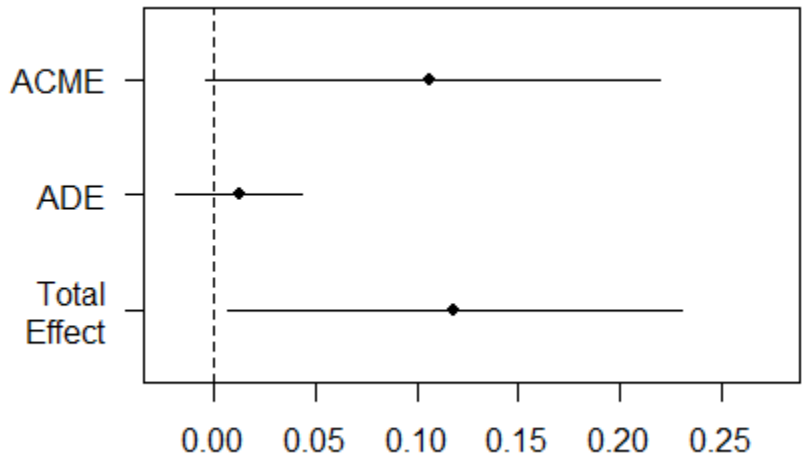
Land reformation

Controlling land policies show no direct and indirect impact as in main analysis and enabling case. Details are shown in Table 27 and Figure 32.

Table 27. Effects and significance

	Value	CI Boundary	*p*
ACME	0.10602	-0.00396, 0.22	0.118
ADE	0.01254	-0.01864, 0.04	0.482
Total Effect	0.11857	0.00675, 0.23	0.080

Figure 32. Visualization of effects



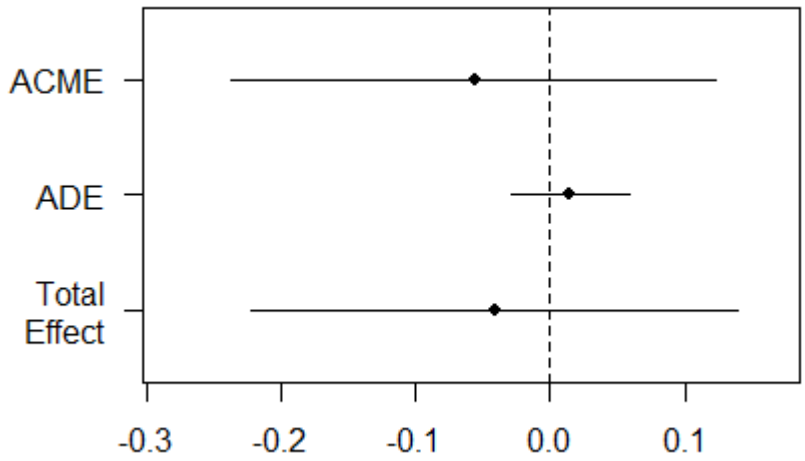
Financial reformation

Similar as enabling policies, here controlling financial policies do not demonstrate any effect. Details are shown in Table 28 and Figure 33.

Table 28. Effects and significance

	Value	CI Boundary	*p*
ACME	-0.0561	-0.2367, 0.12	0.65
ADE	0.0149	-0.0283, 0.06	0.59
Total Effect	-0.0412	-0.2225, 0.14	0.73

Figure 33. Visualization of effects



Science and technology reformation

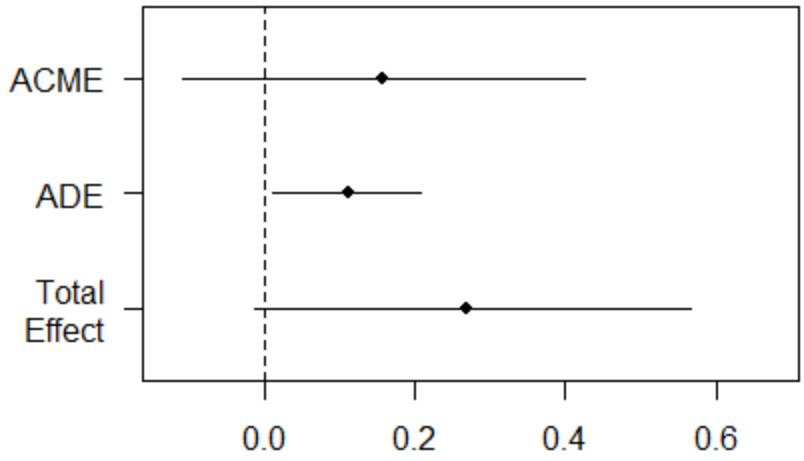
Controlling science and technology policies do not have indirect effect on GDP per capita, but have positive direct impact. This is

consistent with enabling case but weaker impact. Details are shown in Table 29 and Figure 34.

Table 29. Effects and significance

	Value	**CI Boundary**	***p***
ACME	0.1578	-0.1074, 0.42	0.31
ADE	0.1110	0.0100, 0.21	0.07
Total Effect	0.2689	-0.0137, 0.56	0.12

Figure 34. Visualization of effects



To summarize, policy types either enabling or controlling do not fundamentally affect the impact (no change of effect direction), except that for certain cases, the indirect impact no longer significant. This could be because of number of enabling and controlling policies are much lower than total number of policies, thus losing some power of impact to the entrepreneurship and innovation activities.

- **Granularity of IV**

  In this part, I aggregated the three economic related reformations as a variable to indicate the whole economic reformation (Economic reformation) and I also identified mediation effect. I also tested aggregated IV on the other DV: HDI and Engel's coefficient.

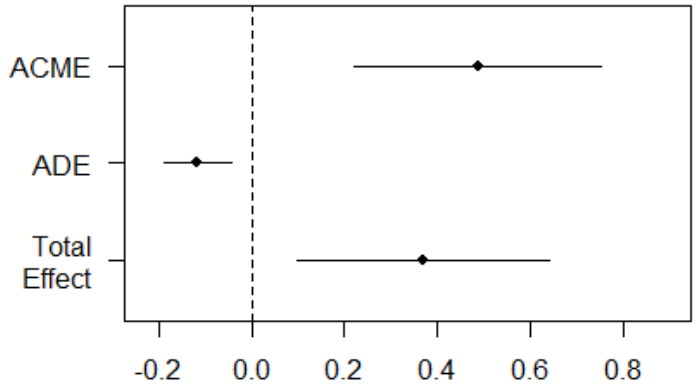
GDP per capita as DV

Economic reformation has a positive indirect effect and a negative direct effect on GDP per capita. Together with the results from main analysis, it is obvious that financial reformation plays key role in contributing to economic reformation. Details are shown in Table 30 and Figure 35.

Table 30. Effects and significance

	Value	**CI Boundary**	***p***
ACME	0.4881	0.2208, 0.75	0.002
ADE	-0.1171	-0.1896, -0.04	0.010
Total Effect	0.3710	0.0983, 0.64	0.018

Figure 35. Visualization of effects



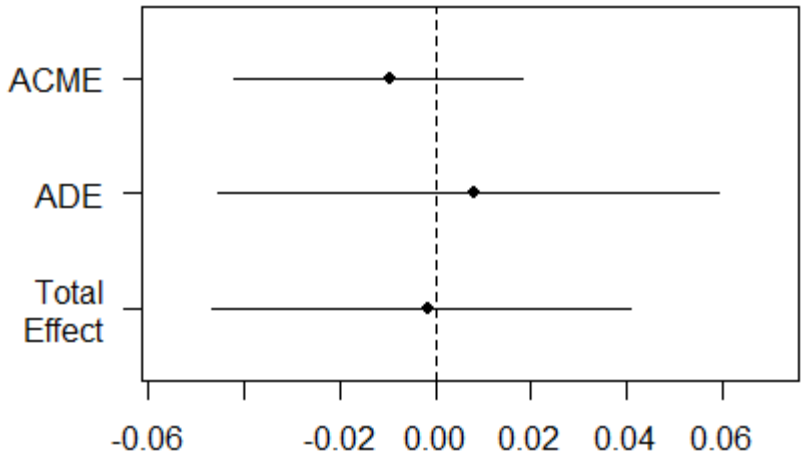
HDI as DV

Economic reformation does not show any indirect effect or direct effect on HDI. Details are shown in Table 31 and Figure 36.

Table 31. Effects and significance

	Value	**CI Boundary**	***p***
ACME	-0.00939	-0.04223, 0.02	0.60
ADE	0.00805	-0.04565, 0.06	0.80
Total Effect	-0.00134	-0.04682, 0.04	0.97

Figure 36. Visualization of effects



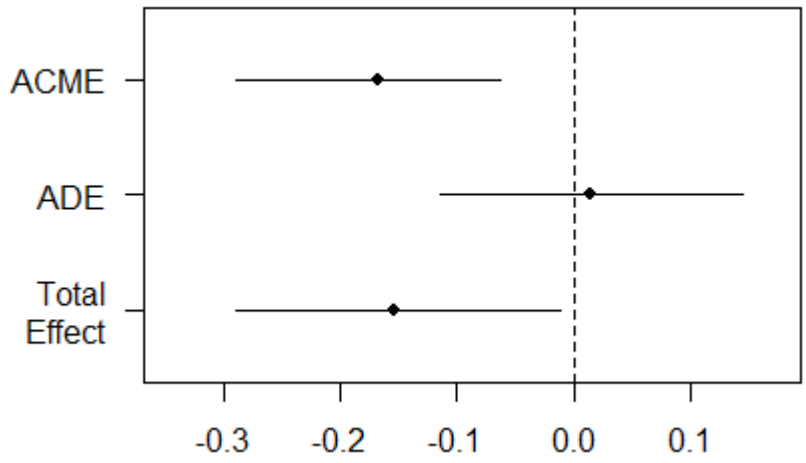
Engel's coefficient as DV

Economic reformation has no direct effect on Engel's coefficient, but has negative indirect impact on Engel's coefficient. More specifically, economic reformation have a positive impact on entrepreneurship activities and entrepreneurship activities has negative impact on Engel's coefficient. So generally speaking, more active economic reformation contribute to better social development (in terms of Engel's coefficient). Together with the analysis at specific reformation level, it is clear that financial reformation takes the major role in economic reformation. Details are shown in Table 32 and Figure 37.

Table 32. Effects and significance

	Value	CI Boundary	*p*
ACME	-0.1682	-0.2890, -0.06	0.000
ADE	0.0146	-0.1150, 0.14	0.854
Total Effect	-0.1536	-0.2886, -0.01	0.076

Figure 37. Visualization of effects



To summarize, financial reformation is important in economic reformation. The tests on GDP per capita and Engel's coefficient both reveals that economic reformation do have significant indirect effect on social development.

- **Different time lag for policies**

Social reformations take time to realize effect. I am interested in how the length of time affect the mediation effects. I tested different lagging period which including two years and three years. The results echo with the explanation I mentioned before. In short time, SoE and financial policies will cause firms and people to adjust but in a longer period, their positive impact starts to emerge. For lag 2, SoE's has positive indirect impact on entrepreneurship activities and positive total effect on GDP per capita, with beta=, CI=, p=. Finance has positive indirect impact and positive total effect. It is interesting to see that land reformation are mediated by entrepreneurship activities while it does not have effect in lag1 setting. The reason is that land is real estate which is not as agile as other factors, thus will take longer time to see the effect.

❖ **Lag 2**

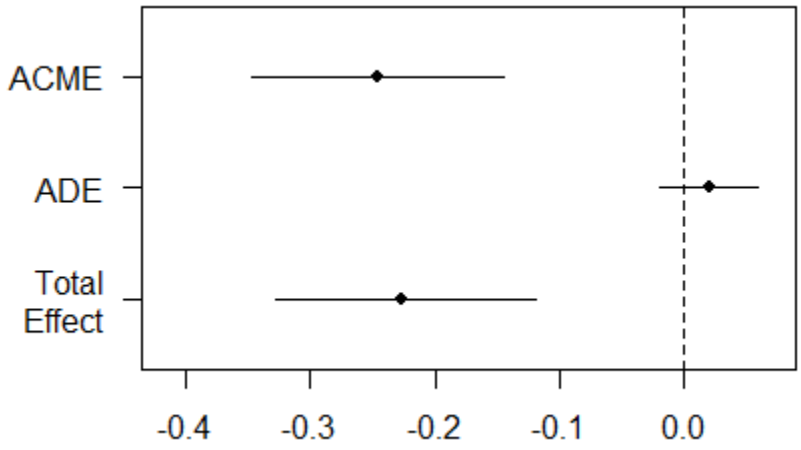
SoE reformation

The mediation effect of SoE reformation is consistent with main analysis. Details are shown in Table 33 and Figure 38.

Table 33. Effects and significance

	Value	CI Boundary	*p*
ACME	-0.2469	-0.3465, -0.14	0.000
ADE	0.0198	-0.0205, 0.06	0.416
Total Effect	-0.2271	-0.3274, -0.12	0.002

Figure 38. Visualization of effects



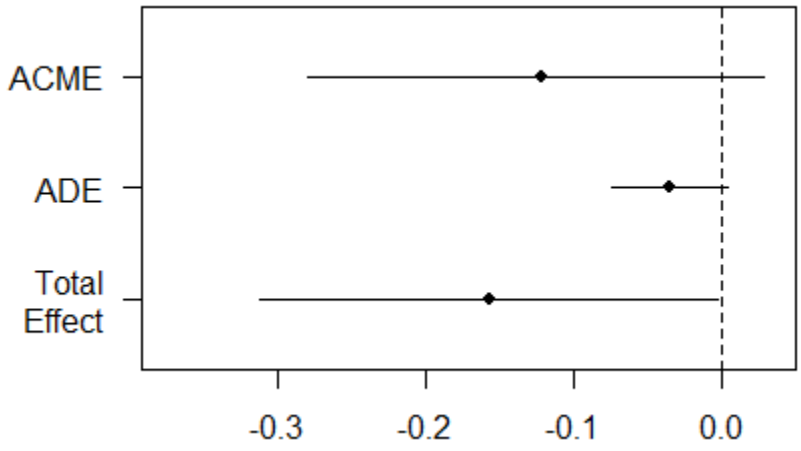
Land reformation

Land reformation did not see any indirect or direct effect as in main analysis. Details are shown in Table 34 and Figure 39.

Table 34. Effects and significance

	Value	CI Boundary	*p*
ACME	-0.1212	-0.2795, 0.03	0.200
ADE	-0.0350	-0.0749, 0.00	0.144
Total Effect	-0.1562	-0.3121, 0.00	0.092

Figure 39. Visualization of effects



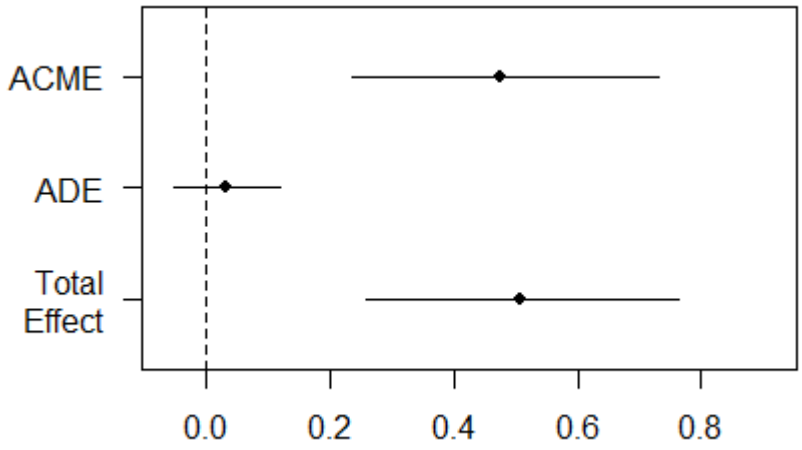
Financial reformation

Financial reformation shows similar indirect effect on GDP per capita as in main analysis, while the direct effect disappeared. Details are shown in Table 35 and Figure 40.

Table 35. Effects and significance

	Value	CI Boundary	*p*
ACME	0.4741	0.2349, 0.73	0.004
ADE	0.0318	-0.0539, 0.12	0.562
Total Effect	0.5060	0.2586, 0.76	0.004

Figure 40. Visualization of effects



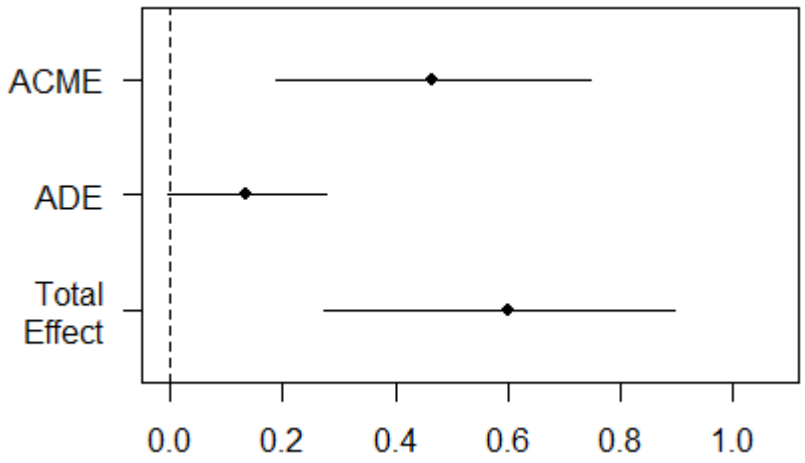
Science and technology reformation

Science and technology reformation sees a similar indirect effect on GDP per capita as in main analysis, the direct effect is no longer significant. Details are shown in Table 36 and Figure 41.

Table 36. Effects and significance

	Value	CI Boundary	*p*
ACME	0.4672	0.1877, 0.75	0.002
ADE	0.1352	-0.0053, 0.28	0.110
Total Effect	0.6024	0.2718, 0.90	0.000

Figure 41. Visualization of effects



❖ **Lag 3**

SoE reformation

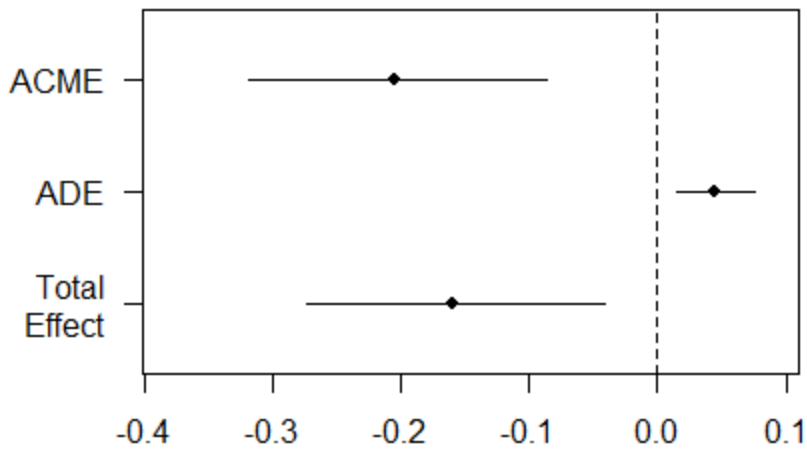
The indirect effect for lag 3 case is quite similar like in main analysis and in lag 2 case. While an interesting observation is that SoE reformation starts to show a positive direct impact on GDP per

capita, while in main analysis and in lag 2 case, such direct impact is not significant. This might demonstrates an insight that SoE reformation takes time to see its impact. Details are shown in Table 37 and Figure 42.

Table 37. Effects and significance

	Value	**CI Boundary**	***p***
ACME	-0.2048	-0.3184, -0.09	0.002
ADE	0.0450	0.0146, 0.08	0.010
Total Effect	-0.1598	-0.2733, -0.04	0.020

Figure 42. Visualization of effects



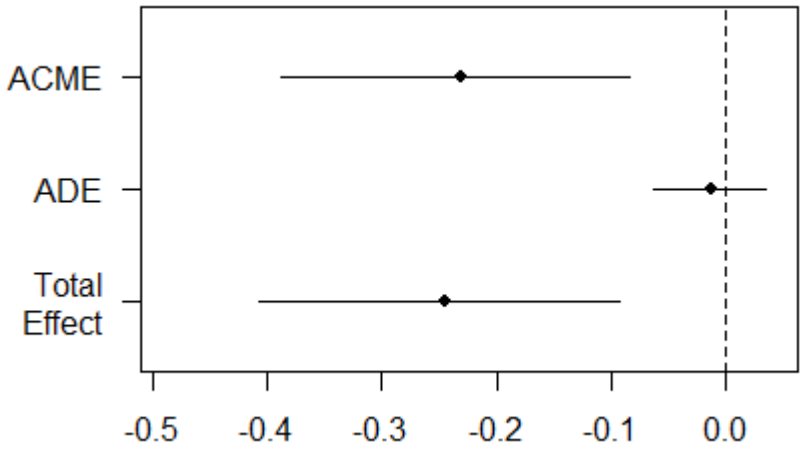
Land reformation

It is interesting to see that land reformation shows mediate effect in a longer lagging period (lag 3) while shorter lagging period does not show any effect (lag 2 and lag 1). This is an indicator that land reformation takes longer time to see effect, which might cause by the fact that land as a real estate usually involves large amount of capital and investment, and related to multiple other factors. Land reformation have negative indirect effect on GDP per capita and no significant direct impact on GDP per capita was identified. Details are shown in Table 38 and Figure 43.

Table 38. Effects and significance

	Value	CI Boundary	*p*
ACME	-0.2316	-0.3874, -0.08	0.004
ADE	-0.0125	-0.0643, 0.03	0.674
Total Effect	-0.2441	-0.4070, -0.09	0.002

Figure 43. Visualization of effects



Financial reformation

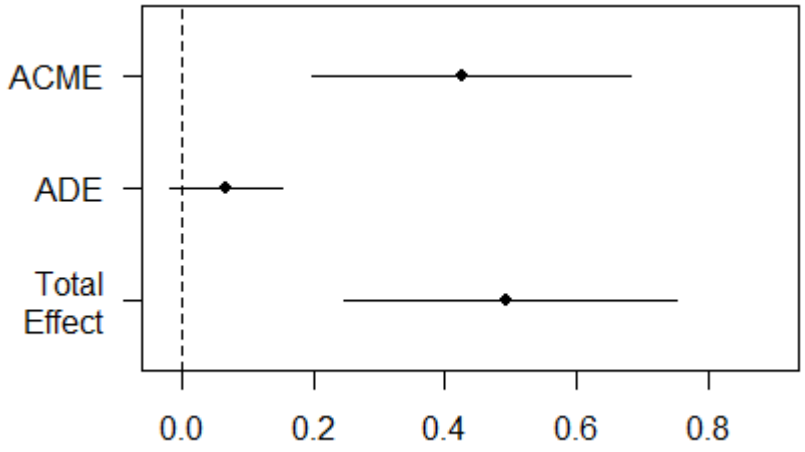
Longer lagging period does not significantly affect financial reformation's indirect effect, but the effect magnitude become smaller. And with longer lagging period, the direct effect of

financial reformation on GDP per capita diminished. Details are shown in Table 39 and Figure 44.

Table 39. Effects and significance

	Value	**CI Boundary**	***p***
ACME	0.4276	0.1968, 0.68	0.002
ADE	0.0671	-0.0191, 0.15	0.190
Total Effect	0.4947	0.2466, 0.75	0.000

Figure 44. Visualization of effects



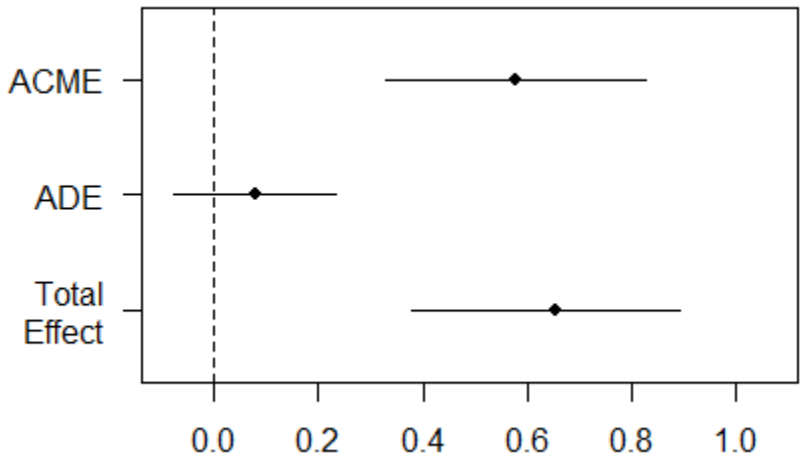
Science and technology reformation

Again, science and technology reformation shows larger indirect effect than shorter period, while have no significant direct impact. Details are shown in Table 40 and Figure 45.

Table 40. Effects and significance

	Value	CI Boundary	*p*
ACME	0.5763	0.3296, 0.83	0.000
ADE	0.0793	-0.0754, 0.23	0.41
Total Effect	0.6556	0.3804, 0.89	0.000

Figure 45. Visualization of effects



To summarize, longer lagging period makes difference. It makes certain direct effects diminished: e.g., financial reformation, science & technology reformation, but it also makes better outcome: e.g., SoE reformation's direct effect as well as land reformation's indirect effect become significant, and science & technology reformation's indirect effect becomes stronger.

- **Additional checking**

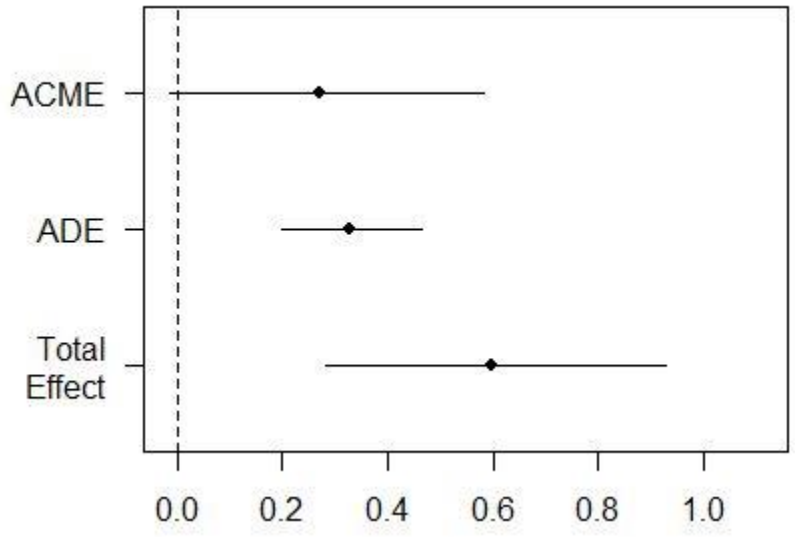
  Besides the above checking, I also tested the role of entrepreneurship activities in the relationship of science & technology reformation and GDP per capita, which I did not hypothesis in the main analysis. Regarding on the mediation effect, ACME = 0.2709 (p = 0.118, CI is from -0.0147 to 0.58), ADE = 0.3276 (p = 0.00, CI is from 0.1972 to 0.46), total effect = 0.5985 (p = 0.002, CI is from 0.2831 to 0.93). This suggested that there is direct effect of science & technology reformation on GDP per capita, but no mediation effect of entrepreneurship activities. Table 41 and Figure 46 show the details and visualization.

Table 41. Effects and significance

	Value	**CI Boundary**	***p***
ACME	0.2709	-0.0147, 0.58	0.118

ADE	0.3276	0.1972, 0.46	0.000
Total Effect	0.5985	0.2831, 0.93	0.002

Figure 46. Visualization of effects



To summarize, I did a systematic and comprehensive robustness checking, which includes different settings on DV, mediator, and IV. Majority of the findings are consistent with result of main analysis, while I did observe certain interesting exceptions, e.g., the different lagging of IV. Table 42 shows a summarization of the findings.

Table 42. Summarization of robustness checking

		SoE	**Land**	**Financial**	**Sci. & Tech.**
DV	Engel's coefficient	Direct impact (+) Indirect impact (+)	Direct impact (+)	Indirect impact (-)	Direct impact (+) Indirect impact (-)
	HDI	Direct impact (+)	Direct impact (+)	No direct and indirect impact	Direct impact (+)
Mediator	With sole proprietor	Indirect impact (-)	No direct and indirect impact	Indirect impact (+)	-
	Entrepreneurship activities on science & technology reformation	-	-	-	Direct impact (+)
IV	Number of enabling policies	Indirect impact (-)	No direct and indirect impact	No direct and indirect impact	Direct impact (+)
	Number of controlling policies	Direct impact (-) Indirect impact (-)	No direct and indirect impact	No direct and indirect impact	Direct impact (+)
	Economic reformation (GDP as DV)	Direct impact (-) Indirect impact (+)			-
	Economic reformation (Engel's coefficient as DV)	Indirect impact (-)			-
	Economic reformation (HDI as DV)	No direct and indirect impact			-
	Lag 2	Indirect impact (-)	No direct and indirect impact	Indirect impact (+)	Indirect impact (+)

	Lag 3	Direct impact (+) indirect impact (-)	Indirect impact (-)	Indirect impact (+)	Indirect impact (+)

CHAPTER 5. SECONDARY ANALYSIS ON ANT FINANCIAL

In previous chapters, I analysed the role of entrepreneurship activities and innovation activities in transforming of social reformation related policies into people's living conditions. The analysis was at macro level where attentions were not paid to internal of a firm. In this chapter, I drilled down to micro level to investigate how economic and science & technology reformation being perceived by a firm, and being converted to various changes and impacts on the firm's stakeholders. Instead of study the impact on people in general as at macro level, at micro level I focused on a smaller group—stakeholders of the firm. I performed the analysis by using secondary study on a pioneer unicorn start-up in China—Ant Financial. Ant Financial is considered as a top unicorn start-up in the world. I choose Ant Financial as the target for analysis is because it is an interesting example where all four social reformations found impacts on it.

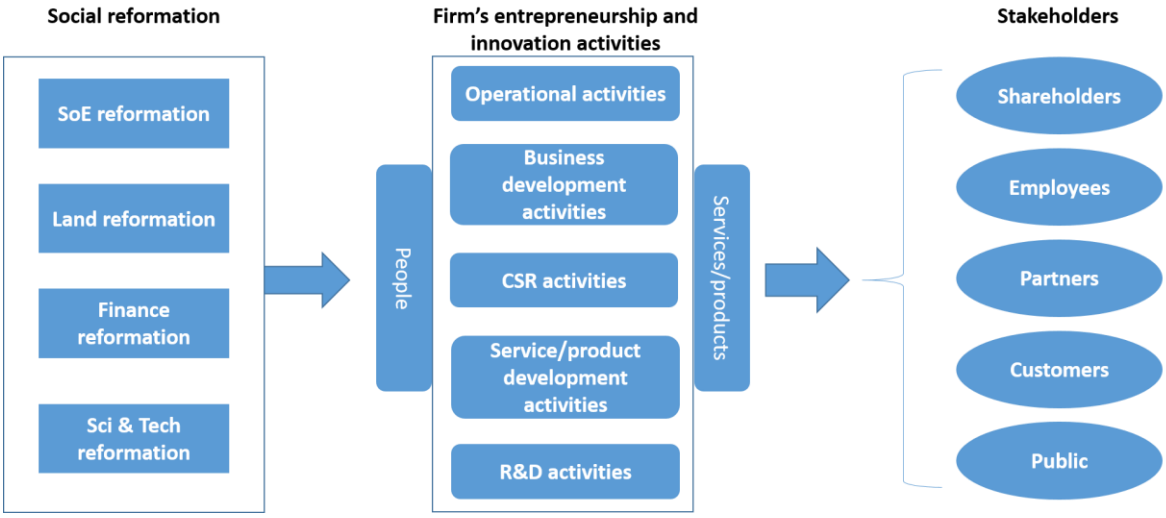
Since Ant Financial's core product Alipay was introduced to the market in 2004, the team of Ant Financial grabbed opportunities from social reformations, and turned these opportunities into amazing results, although the whole journey was not always smooth. Overall, economic and science & technology reformations

provided with Ant Financial a good stage to demonstrate to the world that a firm can play very important roles in a society and have impacts on people's life.

In Figure 47, I showed the framework for micro-level analysis. At micro-level, I focused on the entrepreneurship and innovation activities within a firm, and studied how firm as an active element in the society makes contribution to its stakeholders and in turn brings value to a larger group—public and improve their life. I observed mediation behaviour of firm at micro level. I found that people plays important roles in perceiving external reformation information: reformation triggered mind set of people of the firm (e.g., employees, senior management), and consequently enabled activities and responses within the firm. I also found that service/products are important in delivering impacts and bringing values to stakeholders (including public). All information and cases in this chapter are from published reports from Ant Financial website[11], third party research reports, and academic papers.

Figure 47. Firm connects social reformation and stakeholders

[11] http://www.antfin.com



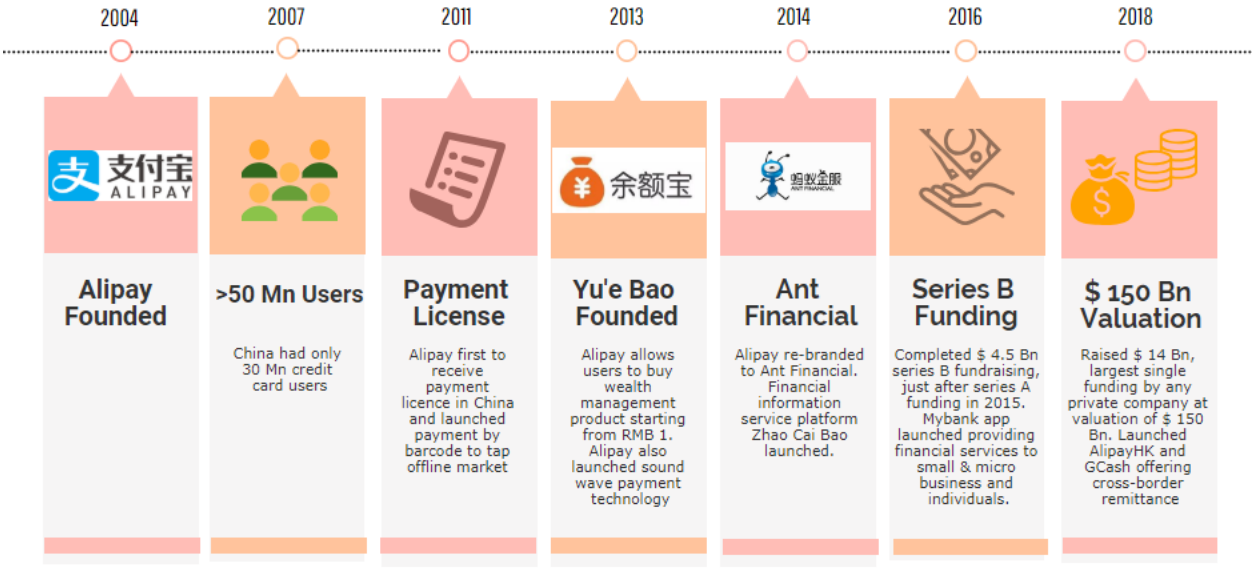
5.1 Background and Introduction of Ant Financial

Ant Financial is originated from Alipay, and has achieved significant milestones and performance (Figure 48). Alipay was established in 2004 and since then has become the most popular e-payment channel in China, and is a pioneer in China's Internet finance industry (Liu et al., 2018). Ant Financial officially registered in October 2014. Ant Financial has three key strategies: inclusive, technology, and internationalization. Its business areas cover payment, investment & wealth management, lending, insurance, credit, technology outsourcing, and business in non-financial areas: artificial intelligence, blockchain, enterprise services, transportation, and media among others (Liu et al., 2018). Ant Financial has built a large close-loop ecosystem, it uses Alipay to drive huge volume of user traffic and redirect to its different businesses (Liu et al., 2018). At the end of 2019, total number of domestic users of Alipay exceeds 900 million (Xiao et al., 2020). Ant Financial is now considered as world's largest unlisted unicorn start-up, and after

C-series funding in June 2018, its valuation exceeds 150 billion USD (Xiao et al., 2020).

Figure 48. History of Ant Financial

(Source: https://www.televisory.com/blogs/-/blogs/rise-of-ant-financial-will-the-success-story-continue-)



Source: Televisory's Research

5.2 Case Analysis

My analysis focused on all four social reformations: SoE, land, financial, and science & technology. For each reformation, I listed several case examples and described how certain policies made changes on Ant Financial's business, and how Ant Financial turned these changes into impacts on its stakeholders. I listed different types of stakeholders of Ant Financial in Table 43. When certain reformation happened, it first impacted firm's decision makers (senior management), and then to the firm's execution layer, and subsequently enabled

changes in services/products to further impact people. During the whole process, non-customer stakeholders like employees and shareholders also got impacted. Please note that for each case example, it might related to multiple reformations. For the ease of presentation and analysis, I organized case examples onto one reformation.

Table 43. Stakeholders of Ant Financial

Type of stakeholder	Description
Customers	People who uses Ant Financial's services or products, e.g., Alipay users, MYBank clients, Yu'e Bao users.
Shareholders	People who owns equity of Ant Financial or its subsidiaries.
Employees	People who works at Ant Financial or its subsidiaries.
Partners	External firms or people which/who have collaboration relation with Ant Financial.
Public	People who are not belong to any of the above categories.

The Impact of SoE Reformation

Since 1949, SoE have accumulated most of China's top resources in terms of market, human resources, funding, etc. Generally speaking, SoE reformation in certain ways make it possible for these resources to be accessible by non-SoE firms. To Ant Financial, it enjoyed a lot of benefits from SoE reformation, although negative impacts were also been identified.

I gave examples from the aspects of talents and collaboration to demonstrate the benefits brought by SoE reformation.

- **Talents**

  Talents are key resources to a firm. The movement of talents can enable spill over effect and bring knowledge, business experiences, business network, and methodologies to the recipient firm. By moving from a SoE to a private-own firm, employee could enjoy a better pay as well as a flexible personal development. In a policy issued by several ministries under the State Council of China in 2002, with title "The opinion on deepening the reformation of SoE's internal human resources management, labour, and profit distribution"[12], it clearly stated that SoE should enable the free movement of talents in and out of SoE. This policy removed constraints of job movement of SoE employees. To Ant Financial, there are quite a number of examples

[12] http://www.gov.cn/gongbao/content/2002/content_61946.htm, In Chinese: 关于深化国有企业内部人事、劳动、分配制度改革的意见（国经贸企改〔2001〕230 号）

on this. Mr. Ge Yongdi worked for a state owned bank—the Industrial and Commercial Bank of China (ICBC) for more than 15 years since 1988. During his stay at ICBC Hangzhou branch, he worked with people from Alipay on multiple projects. In 2006, he quitted his job in ICBC and started his new position as an employee in Alipay (You, 2017). Such job movement won't happen without the support of related policies.

- **Collaboration**

Another opportunity rose from SoE reformation is the collaboration between SoE and non-SoE firms. Such collaboration results from both needs of SoE and non-SoE firms. SoEs usually are more bureaucratic than non-SoE firms, and less flexible and less risk taking in doing business. While non-SoE firms are more flexible and willing to take risks. By collaborated with each other, SoE enjoyed extra profit and non-SoE firms got access to SoE's network and other valuable resources. In Ant Financial, it witnessed different ways of collaboration. One example is SoE contribute funding resource and serve as shareholder of Ant Financial. Data in 2018[13] shows that there are multiple SoE shareholders of Ant Financial. Among them, China Life Insurance Company holds 1.66%, and China Development Bank Capital holds 0.5%. Besides being shareholders of Ant Financial, SoE also collaborate with Ant Financial on doing business. As stated in (You, 2017), "…ICBC is the first bank which assigned strategic collaboration agreement with Alipay",

[13] http://www.tianyancha.com

"…Alipay also collaborates with…China Construction Bank", "…observed from Ant Financial's more than 10 years of growth path, it always closely works with bank system[14]".

Besides the above positive side of SoE reformation, there are also negative impacts of SoE reformation on Ant Financial. As I will elaborate in the following section ("The Impact of Financial Reformation"), the Yu'e Bao[15] case clearly demonstrated a resistance power from SoE financial institutes.

The Impact of Land Reformation

As a financial institute, land reformation seems not directly impact on Ant Financial's business. But a closer look reveals that land reformation also have its position in Ant Financial's business.

- **Rural land transferring**

  Rural area in China are of great importance as it is the base of agriculture and related production, and home to 41% of China population[16]. Rural area land policies are important elements in land reformation. One part of the most important rural land policies is about rural area land transferring,

[14] In China, bank system is dominated by state owned banks.
[15] In Chinese: 余额宝
[16] https://data.worldbank.org.cn/indicator/SP.RUR.TOTL.ZS?locations=CN

which releases the potential of land as a key resource in rural area agriculture production. In 2004, a policy issues by the State Council of China, with title "The decision of the State Council of China on deepening the reformation and restrict land administration[17]", explicitly stated that "…collectively owned rural construction-purpose land use right can be transferred". A consequence of such policies is the availability of rural land transaction data (land right, land transfer), which are utilized by Ant Financial as an important data source in evaluation of farmers' credit and the decision to issue loans to farmers. E.g., Ant Financial works with provincial government of Heilongjiang on inclusive finance to provide to farmers instant loans by using various data sources including land transferring data to do farmer profiling and credit evaluation[18]. Land reformation makes it possible for Ant Financial to provide new services to customers (i.e., farmers in this case), which brings convenience and efficiency to customers.

- **Other innovation**

Another land reformation related example is anti-desertification. Desertification is considered as a big threat to normal land. In China. Government has issued multiple anti-desertification related policies in order to mitigate the impact of desertification and to help reclaim of land.

[17] http://www.gov.cn/zwgk/2005-08/12/content_22138.htm, In Chinese: 国务院关于深化改革严格土地管理的决定 （国发〔2004〕28 号）
[18] http://hlj.xinhuanet.com/nycj/2020-03/12/c_138868881.htm

E.g., in 2001, the law of anti-desertification was issued [19], and it encourages entities other than government authorities to participate in the non-for-profit anti-desertification activities; it also clearly stated the land use right of entities/individuals who carry anti-desertification on the land. As reaction to these policies, Ant Financial initiated a project named Ant Forest[20], which allows users to plant virtual trees in the app and turns users' virtual trees into real trees in desert area. Ant Forest not only help anti-desertification but also gives users a sense of satisfaction as well as improves users' social responsibility awareness. At the end of 2019, Ant Forest has attracted more than 550 million of people to virtually plant trees (Alipay sustainability report 2019—2020). Ant Forest is a very interesting example of how land policies are being transformed into a product which contribute to the ecological development of society and people's live.

The Impact of Financial Reformation

As a FinTech company, financial reformation has no doubts with large impact on Ant Financial's business and in turn brings impact to its stakeholders. Financial reformation gives space and flexibility to Ant Financial on the innovation of new services and products. In this section I will give two examples:

[19] http://www.npc.gov.cn/zgrdw/npc/xinwen/2018-11/05/content_2065660.htm, in Chinese: 中华人民共和国防沙治沙法

[20] In Chinese: 蚂蚁森林

Yu'e Bao and MYBank[21] to investigate how Ant Financial reacts to policies and the negative part.

- **Yu'e Bao**

  Yu'e Bao appeared in the market in 2013, and is an innovative financial product which allows users to authorize Ant Financial to manage their small amount of fund within Alipay account. Ant Financial acts as a sales channel of partnered fund management firms which utilize these funds to generate profits and distribute to users. "Yu'e Bao is a very important product to Ant Financial, it helps Ant Financial transformed from a payment company to a real financial company" (You, 2017, p. 141). And Yu'e Bao is considered as marking the first year of Internet-based personal finance management (Liu et al., 2018)

  The founding of Yu'e Bao was initiated by two friends, one worked for Ant Financial (Alipay at that time) and the other worked for a fund management firm—Tianhong fund[22], and was the result of financial reformation where certain qualified firms are allowed to do this type of business. In 2011, a policy with tile "The sales management of securities investment fund[23]" issued by China Securities Regulatory Commission

[21] In Chinese: 网商银行
[22] In Chinese: 天弘基金
[23] http://www.csrc.gov.cn/zjhpublic/G00306201/201106/t20110621_196582.htm, in Chinese: 证券投资基金销售管理办法 （证监会令第 72 号）

broke the monopoly status of banks and set the qualification criteria for fund sales firms. This opened a door for Ant Financial. And in 2013, another guiding policy with title "The tentative management scheme of securities sales by third-party e-commerce platform[24]", issued by China Securities Regulatory Commission set a legal status for Ant Financial to do this business. After that, Yu'e Bao witnessed a fast growth and huge success, and has brought good return to its users. The AUM (Asset Under Management) of Yu'e Bao grow from 578.9 billion RMB at the end of 2014 to 1580 billion RMB at the end of 2017, and number of users exceeded 0.47 billion at the end of 2017 (Liu et al., 2018). At the end of 2018, Yu'e Bao accumulatively generated more than 170 billion RMB profits for its users[25].

From the above example, it is clear that financial reformation enabled internal entrepreneurship activities of Ant Financial and in turn brought economic values to its huge amount of users. But negative part does exist, Yu'e Bao touched profits of existing banks especially SoE banks. Banks started to seek a more restrict regulation on Yu'e Bao from regulator (You, 2017, p. 164), furthermore four major SoE banks took actions to Ant Financial by lowering the amount threshold of daily transaction between Alipay and these banks, this was a big restriction because all the fund in

[24] http://www.csrc.gov.cn/pub/tianjin/tjfzyd/tjjflfg/tjbmgz/201306/t20130627_229731.htm, in Chinese: 证券投资基金销售机构通过第三方电子商务平台开展业务管理暂行规定
[25] http://money.people.com.cn/n1/2018/1219/c42877-30475058.html

Alipay need to be stored in a bank and lowering the daily transaction amount threshold heavily affect users' activities and experience on Alipay. Although this tension was solved later, it is still a significant signal which echoes the findings at macro level, where SoE do have certain negative impact on entrepreneurship activities.

- **Establishment of MYBank**

The birth of MYBank won't be possible without several important policies in 2013. In that year, China government issued several policies which grants private-owned firms opportunities to enter banking industry. Banking is considered as a high-end business in financial industry, and is highly regulated and requires complicated licensing process. Private capitals were not allowed to own a bank in China before. But since 2013, spaces have been made for private capitals to enter this exciting market. In July 2013, the State Council of China issued a policy with title "The instruction on using finance to support economy structural adjustment and transformation"[26], and it was clearly stated in the policy that it allows "private capitals to set up a bank and take full responsibility of its risk".

[26] http://www.gov.cn/zwgk/2013-07/05/content_2440894.htm, in Chinese: 国务院办公厅关于金融支持经济结构调整和转型升级的指导意见 (国办发〔2013〕67 号)

New policies were subsequently rolled out by China Banking Regulatory Commission to further guide the application and operations of private-own banks. The mission of MYBank is to facilitate entrepreneurship activities, and to support SMEs as well as individual entrepreneurs. It is a highly entrepreneurship-oriented bank. Since its inception in June 2015, MYBank has contributed a lot to entrepreneurship activities by serving 10.42 million micro enterprises (at end of June 2018[27]), 139.5 billion RMB assets under management (MYBank 2019 annual report) and has brought to shareholders profit of 10.5 billion RMB (MYBank 2019 annual report). MYBank is a good example of how financial reformation takes effect and turns to bring values to people and improving their life by providing smart and convenient services.

There are other products in Ant Financial which significantly bring values to people. E,g., Hua Bei[28], insurance products etc. I will not give discuss here, but they are all good examples of results of financial reformation.

The Impact of Science & Technology Reformation

[27] http://www.mybank.cn
[28] In Chinese: 花呗

"Technology is the foundation of Ant Financial" (You, 2017). Ant Financial's main business are all technology enabled. Thus science and technology reformation inevitably has a key role in impacting its business.

- **Technology-related employees**

  Science and technology reformation accelerates the accumulation of technology-related human resources within Ant Financial, they are big enabler of innovation activities. 40% of Ant Financial's employees are technology-related, and 25% of core management are technology-related (Liu, 2018). Take another example from MYBank: at the end of 2019, there are 52.2% of employees of MYBank are technology-related. (MYBank 2019 annual report).

- **Services & products innovation**

  Besides its impact on technology-related human resources, science and technology reformation also facilitate the innovation of services and products of Ant Financial. While finance reformation makes new services and products like Yu'e Bao feasible in terms of regulation, science and technology reformation equipped Ant Financial with necessary technologies to implement these new services and products innovation. Deep tech like AI, blockchain, and face recognition have been extensively used in Ant Financial's services and products. Based on these technology

> innovation, Ant Financial are able to innovate in various areas including credit analysis, automatic lending, and smart payment, among others. These technology-savvy services and products bring convenience and value to billions of users. One of the most important things brought by Ant Financial is *trust*, which is impossible without the support of technology. Thanks to technology innovation, the efficiency of trust verification helps facilitating business and establishing a more efficient society. (Alipay sustainability report 2019—2020)

How Ant Financial Makes Impacts to its Stakeholders

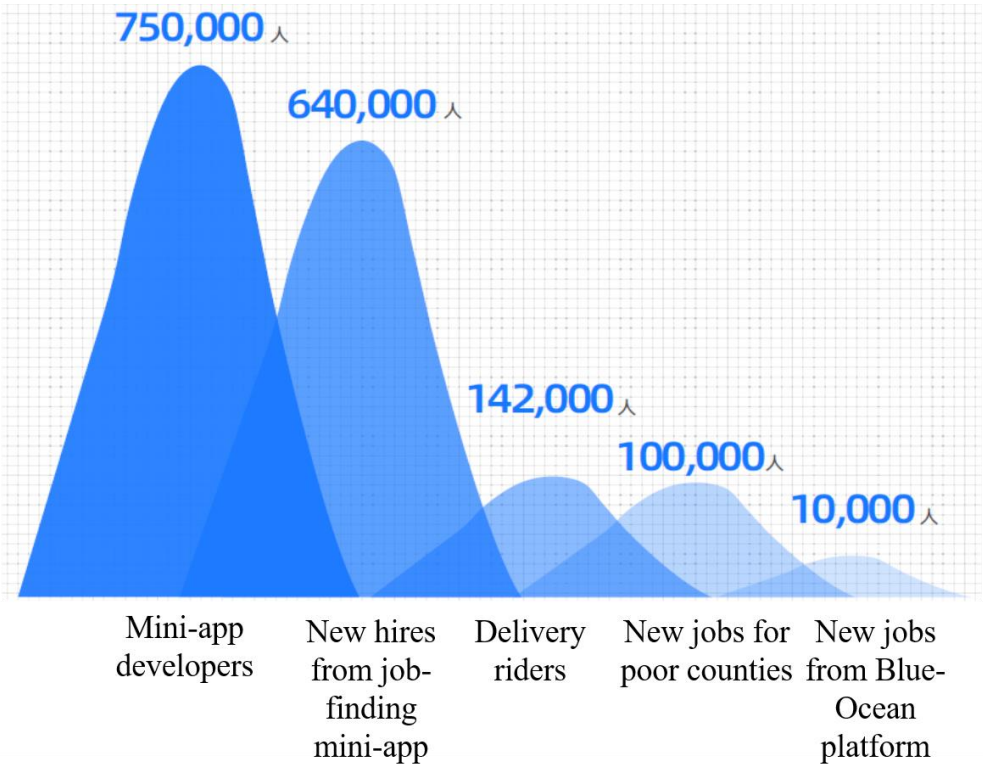
In the above examples, I mainly focused on how social reformation impacts on Ant Financial's entrepreneurship activities and innovation activities. In this section, I focus on how Ant Financial turned these activities into the impact to its stakeholders. I observed that such process can be both direct and indirect.

Example of direct impact is users of Alipay. By using service of Alipay, users save time and cost, improve financial efficiency (can be personal or business), and make life more efficient and convenient.

I do also observe indirect impact of services and products. Again I take Alipay as example. Since 2004, Alipay has stimulated the creation of 40+ new job types and 7 million new job positions for the society (Alipay sustainability report, 2020). This includes 1.1 million payment QR code system developers, 1.7 million payment QR code promoters, 1 million mini-app developers, and other jobs like Ant Forest tree planter and data tagger. These jobs are not directly affiliated with Alipay or Ant Financial, instead are jobs which contribute to the Alipay ecosystem. By taking these jobs, people earned income, gained respects, and established personal satisfaction. Another example is Alipay's contribution during COVID-19 pandemic. Data shows that within two months of COVID-19 pandemic in China, 1.64 million people used Alipay platform to successfully find flexible job opportunities. Figure 49 shows the distribution of these jobs.

Figure 49. Number of flexible jobs created by Alipay during the COVID-19 period in China

(Source: Alipay sustainability report 2019-2020)



I listed in Table 44 for an easier demonstration on the impact channel for different stakeholders.

Table 44. Impact channel of stakeholder

Type of stakeholder	Impact channel
Customers	Services and products
Shareholders	Profit sharing from sales of services and products
Employees	Salary, internal process

Partners	Profit sharing from sales of services and products, business collaboration on services and products
Public	Services and products (indirectly)

To summarize, in this chapter I focused on secondary analysis on Ant Financial from micro-level, and demonstrated that social reformation makes impact to people through firms. I found that at micro level, services/products play very important role in delivering values to stakeholders. Firm is a very important agent in connecting social reformation and social development.

CHAPTER 6. DISCUSSION AND CONCLUSION

6.1 Summary

In this dissertation I looked at the role of innovation and entrepreneurship in China's social transformation from macro-level analysis: how innovation and entrepreneurship play such role by mediating the impact of policies on social development. I answered this important question by using mediation analysis on China's data to systematically study how social reform as a form of policies contribute to the development of the most important asset in a society—individual, which should be the purpose of any social reform. I also performed a secondary analysis on a Chinese FinTech firm—Ant Financial to investigate at micro level how firms can properly reacting to policies and develop innovative and entrepreneurship spirits, and achieve good outcome.

I identified mediation effect of SoE reformation and financial reformation through entrepreneurship activities, as well as mediation effect of science and technology reformation through innovation activities. I also did comprehensive robustness checking to confirm the above findings. I tested different DVs: GDP per capita, HDI, and Engel's coefficient; I tested two settings of mediator; I also tested different IVs from three aspects. Besides the identification of mediation effects in main analysis, an interesting observation I found in robustness checking is that time matters: with increasing of lagging period between social reformation and entrepreneurship/innovation activities, certain direct and

indirect effect change and such change have both positive and negative side. From secondary analysis on Ant Financial, I found that firm is a very important connector to link social reformation and social development. And in such process, services and products are key vehicle to delivery values and benefits which are resulted from social reformation, to stakeholders and even public.

6.2 Contributions to Research

The work in this dissertation is the first study of mediating effects of innovation and entrepreneurship activities in the context of China, from the angle of social aspect. My contributions lie in two folds:

(1) Contribution to the research on entrepreneurship and innovation

As I mentioned in Chapter 1, majority of entrepreneurship and innovation research paid attention to the performance aspect on how entrepreneurship and innovation activities can be improved for the sake of monetary value creation. But people shouldn't forget that entrepreneurship and innovation are meaningful not only because of monetary benefits but also their social role. The work in this dissertation fits the gap by investigating the social role of entrepreneurship and innovation, and added to the existing literature a clear view and analysis of the mechanism (i.e., mediator) of entrepreneurship and innovation in turning social reformation into social development. Another contribution to the existing literature is the comprehensive study of the mechanism, from different setting of dependent

variable, independent variable, and mediator. This makes my findings in the dissertation more robust and more reliable.

(2) Contribution to the research on contemporary China

Also need to mention is the contribution to the research on contemporary China. China has witnessed a high growth of economic and social development since 1978, but the study of entrepreneurship and innovation of China is new. The unique culture, languages, socio-economic environment, and data availability make the related research on China a challenge. A big portion of existing research are qualitative instead of quantitative. I made the contribution by carried a comprehensive quantitative study in the context of China, this gives researchers a deeper and more precise view of entrepreneurship and innovation activities in China.

6.3 Practical Implications

The research findings from this dissertation are not only have its academic values, but also have practical implications for both business decision makers and government authorities. They can rely on the findings and insights from this dissertation to better gauge their decisions.

(1) To business decision makers

Lessons can be learnt from this dissertation for business decision makers from both perceiving of social reformation, and the actions they can do to make social impact to the society.

For example, business decision makers can gain better understanding on the role and opportunities of a firm in facing social reformation. As discussed in Ant Financial cases, SoE reformation can be a good opportunity for private-own firms. As talents in SoE can now move to private-own firms to strengthen private-own firm's competiveness as well as bringing in new resources.

Another example is when a business decision maker is considering Corporate Social Responsibility (CSR) activities as a way to contribute to social development, instead of traditional ways of doing CSR like volunteering in the community, he/she can think about to embed CSR into the firm's service/product as what have been done in Ant Forest by Ant Financial, which creates larger and sustainable social impacts.

(2) To government authorities

To government authorities, they can now have a clearer and comprehensive understanding on the impact of social reformation in form of policies to the society.

For example, the significant of mediation effects of entrepreneurship activities can bring insight to government authorities that attentions need to be paid more to the building blocks of entrepreneurship activities, which is private-own firms. To give private-own firms more flexibility and space will contribute to social development.

Also, insights can be gained from the findings that the effect of social reformation can change with time. E.g., longer time makes land reformation from no indirect effect to GDP per capita to a significant indirect effect to GDP per capita. And for science and technology reformation, longer time resulted in a higher indirect impact on GDP per capita. By considering these findings in the policy making process, government authorities can achieve a better outcome for social development.

6.4 Limitations and Future Directions

There are limitations in this research as well as rooms for future improvement. Besides using GDP per capita, Engel's coefficient, and HDI, there are alternate measurements of social development. For example, Gini coefficient. Gini coefficient (also known as Gini index) was created by Corrado Gini in his 1912 paper *Variability and Mutability* (Gini, 1912). This is a common measurement of inequality. It is possible that policies doing good to the society in terms of total contribution and improvement, but what are the difference of improvement among different individuals and groups in the

society? A closer look at how entrepreneurship and innovation activities act in converting policies into change of inequality would be an interesting and important direction, although this is a more complex topic.

This research also sets several other directions for future work. One direction is to perform analysis at provincial level instead of country level. Considering the fact of China that different provinces have different development stage and resources, it would be interesting to study not only at country level but at provincial level to see what the differences among provinces are. Another interesting direction would be to use text mining technique on policy texts to investigate how policies make impact in a more fine grained level.

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