

The Impact of Fintech on State's Development: A Focus on China

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ABSTRACT

This paper investigates the effect of fintech firms within a state on the development of economic status of that state. The data collected shows certain relationships between two variables, the increase in number of fintech firms within a state is associated with an increase in the level of development of that state. Also, the result of this paper would help government to sort out their financial investment — whether they need to support this potential market in order to make greater economic return.

Keywords: “Fintech firms,” “state's economic development,” “financial innovations,”

1. INTRODUCTION

The development of society has made fintech an essential part of our lives. Fintech is defined as the convergence of today's technology and finance to fulfil consumers' expectations efficiently. The prevalence of fintech has actually altered people's everyday purchasing habits as they increasingly rely on a plethora of different technologies, which means that it is hard to isolate individuals from technologies nowadays. Observing consumers and many businesses being over-reliant on the automated delivery systems and the use of financial electronic payments systems such as Alipay, Apple and Wechat merchants, these online payment systems have attracted me to investigate the mechanism behind every fintech company, business owner and consumers to better manage their financial decisions by exerting different specialised software and algorithms. Then getting to know them better is a crucial course for everyone since more and more industries have this tight collaboration with those fintech companies. As a result, the purpose of this paper is to investigate how the number of fintech firms within a state would influence the development of that specific state.

The reason for researching the relationship of state's development and the number of fintech firms is shown below. On one hand, the society has become more technological dependent. It sparks my curiosity to discover how an economy has been influenced by such unexpected development and how the fintech has revolutionised the global market. On the other hand,

fintech is said to be the bridge for proper resource allocation because it benefits the poor through better access to financial services. In order to ensure the capability of fintech firms, I choose states' development as a solid measurement.

It is crucial to explore their relationship, which are the impacts brought by fintech firms to each different state, for two reasons. Firstly, their correlation would then be considered as a key reference for the government in deciding whether to subsidise this innovative financial market. With the booming of international trade, the majority of the countries in the world would prioritise the method that would bring back the most returns. Fintech has been considered as a potential market for a long time. An effective scientific analysis would assist the government to find out the best way to invest, reaching economic growth. For example, in China, it helps the government know whether they should allow a lower barrier of entry for those oversee capitals. The economic investment in the financial market would be an opportunity cost in the other field. The government need to ensure the greatest economic efficiency.

Secondly, the expansion of the fintech markets would bring an enormous demand for labour, which helps solve unemployment. The shortage of labour would result in low productivity. With sufficient information on the benefits that fintech firms would bring to a state's economy, the government would provide merit goods (e.g. education) to reduce income inequality, increasing people's overall living standard and happiness.

I find the correlation between the number of fintech firms and the state's development using the regression model, the descriptive data and many studies written by previous investigators. These tools help me to analyse and explain the result.

Results gained from three different regression models and other analysis tools state that there is a strong correlation between the two factors, which is an increase in the number of fintech firms within a state is associated with the level of development of that state. However, the desired causal relationship could be not be proved with the data collected.

2. LITERATURE REVIEW

THIS SECTION WILL PRESENT A BRIEF REVIEW OF THE FINTECH STUDIES THAT OTHER RESEARCHERS HAVE CARRIED OUT.

The relationship of the development of the financial sector and the economic growth of a country has been further proved by Sadigov, Vasilyeva, and Rubanov 2020 [1], use the method of the regression line and correlation analysis to reveal how the trends in digitalisation and technologisation of the financial sector increase the dynamic economic growth. They also believe that the emergence of fintech increases e-commerce turnover and real sector financing, allowing more opportunities for developing other types of startups. However, it is crucial to find out how the development of the fintech companies impacts each different individual state instead of the economy as a whole. Many of the previous studies only focus on certain respects that how those innovative financial tools would positively influence the economy system as a whole. Thus, my study contributes to filling the knowledge gap of how the innovative financial developments would influence each different state by investigating the economic situation in those states and the advance in financial technologies (number of new fintech firms), which provide a much clearer prospect for people to further analyse the significance of the development of innovative financial creations to the economic development to a specific province. Besides using the regression model, the descriptive data is used in my model to find out more of the different figures (maximum value, minimum value, and standard deviation, etc.)

The previous work has measured the development of a country in the improvement in the poverty of that country. Ho, S.Y.; Iyke [2] has discussed whether those financial innovations would reduce poverty (trickle-down hypothesis). Since the improvement of poverty is usually linked with economic growth, this would be an excellent way to prove the fintech companies' attribution to the economic situation of a place. Less poverty in the

country (people's income is relatively sufficient) could prove that the state is better developed. Solving information asymmetry and allowing the poors to have better access to the financial markets by establishing more fintech firms enables a more comprehensive development in different states. However, the state's development could be told by a more evident indicator, which is the GDP of that specific state. Also, we could look at the GDP per capita by considering the population size. Thus, my study adjusted the variable used to investigate the correlation between the fintech and state's development. It reduces the factors that would influence the result.

Also, the potential risks in financial innovations have been analysed thoroughly by previous work. The fluctuations in the financial markets would, to a great extent, influence the fundamental markets suggested by Bilan, Vasilyeva et al., 2019; Levchenko, Boyko et al., 2019; Lyeonov, Kuzmenko et al., 2019; Poliakh, Nuriddin, 2017; Vasilyeva, Harust et al., 2018 [4][5][6][7]. Therefore, the concerns for the majority of the governments' reluctance to promote fintech have been dug out. However, in China's case, some special regulations must be considered thoroughly before relating them to economic issues. Based on those previous study I then try to deduct the concern of the Chinese government on supporting fintech companies. Besides the convenience brought by the online payment systems has still attracted the government and consumers to use such payment systems. The imported financial services have been a significant concern. However, these western (relatively well-developed) financial markets might provide the Chinese society with clearer prospects and different approaches to observe a higher living standard and the economic development of a specific place. The Chinese government would still need to protect those infant industries by limiting the entry of western fintech firms. As those states become better developed, the government would be more likely to make more investment in this field for further research and development, in order to maximise the utility of the fintech companies.

3. DATA ANALYSIS

I collected the data about the number of newly established fintech companies, the GDP and people's average income per month for different states in China from 2000 to 2020. The data that I collect is from the official statistics bureau from each local authority, which has been summarised by a website (<https://gdp.gotohui.com>). I use the long panel data, which means the observation of my statistics is state-year, and there are 20 sets of data in 31 different states.

The dependent variable of my statistics is GDP of the state, GDP per capita and the state's average income. As the development of a state could be positively related to

its capability of producing goods, GDP measured by using the product approach reflects a country's overall production. GDP per capita would be another good indicator for cross-state comparison of average living standard and economic wellbeing. It takes a deeper insight into individual contribution because the population density has been analysed. People's average income shows their living standard by examining the average disposable income, indicating people's purchasing power. This implies people's happiness in a way because it is one of the three methods in calculating the human development index of a state.

The independent variable of my statistics is the number of fintech companies in the market and the number of new startups in the market. The number of such companies is the most evident source in indicating the level of its development, because firms tend to build up in larger cities that can generate more profit. Therefore, the more fintech firms existed within the state, the better developed the state would be. They are positively related to each other.

The control variable in my model is the permanent resident, which indicates the population density of a specific state. This could give people general information about how prevalent that state is in that country, since it would normally have a positive correlation between the population of a state and its economic situation.

My hypothesis would be that more of the fintech companies would potentially mean the state has been relatively better developed. Hence comparing the number of the fintech firms and the GDP with the constant value of the net export would derive a consolidated result, also

for the loan balance, which means the debts that have not been repaid to all kinds of financial institutions. As more of the loan balance means the liquidity in the market would be improved, more money would be invested in the financial market, leading to the establishment of the fintech companies. If I could prove the positive relationship of the GDP and the number of fintech firms with the constant loan balance. Then that would verify my investigatory question that as the number of fintech firms increases, the level of development of the state would be improved.

Since those data are from the local authorities, the reliability of these is pretty strong, which derives from a high response rate. This would provide a relatively solid set of analytical data for us.

However, the number of fintech companies are not found out from any official websites. They are found in one of the biggest Chinese databases for fintech companies(Database to Chinese financial technology business supported by Qixingbao). However, it would not assure that all fintech companies are recorded on the website as some firms may be unaware and unqualified to get themselves into the page. This more or less affects the accuracy of the data collected. Also, for some policy issues, the data in HK, Taiwan, and Macau is not achievable. We cannot go through all the data in China and reach our conclusion. Finally, those fintech companies only developed in the last 25 years, so the dataset is relatively small. It could be seen as less effective, as the sample would not allow the cross-comparison in bulk, in proving the correlation of the number of fintech firms and the development of the states.

Table 1. statistics analysis of the dependent and independent variable (made from data collected in Qixingbao)

variables	counts	mean	median	S.D.	Min	Max
<i>number of recorded fintech firms</i>	676	190.3106509	12	610.7226015	0	4747
<i>the numebr of new fintech startups</i>	642	30.47352025	1	119.593031	0	1308
<i>GDP in ten thousand</i>	675	14768.65013	8587	17669.69042	67.74	110761
<i>GDP per capita</i>	675	36094.86948	29880	27421.74248	2662	164220
<i>average income per person per month</i>	612	3381.191062	2843.665	2231.424072	576.5	12647.67
<i>permanent resident in the state(in ten thousand)</i>	676	4031.84784	3719.17	2934.016418	4.27772	14433.75

Table1 shows the descriptive statistics of each variable. In the first column, we can see that the sample size in my research is about 650. This implies that the result would be relatively valid as it shows representativeness. In the first row of the table 1, the difference between the maximum and minimum of the total number of recorded fintech firms tell that the industry has a strong potential for development. The 25 years could be seen as a development of the infant industry. In the fourth row in table 1, the dispersion of the GDP per capita has the largest range from its mean value of 29880, which can be told from the largest S.D.

of 27421. Together with the greatest differences between the maximum and minimum values (164220-2662), it tells that there is great inequality in terms of dedication to economic growth.

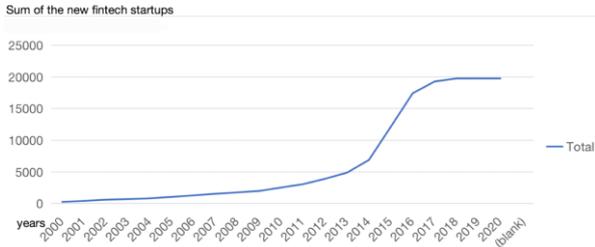


Figure 1 Number of recorded fintech firms.

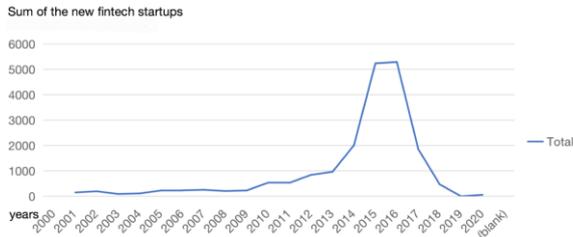


Figure 2 The number of new fintech startups.

From the figure 2, we can observe an increasing number of fintech companies globally. This trend is very dramatic between 2014 to 2017(from 6883 to 19288). The majority of the fintech companies are established within this period of time, before reaching a plateau of the relatively constant stage. In recent years, the increment in the number of firms is very stable, maintained at 2019s value in each state.

The sudden increase in the number of fintech firms might be predicted in two aspects from my point of view (shown in Figure 3):

1. The measurement error. The difficulties in technologies in the early 2000s made the collection of information unachievable; therefore, as soon as the technologies have been advanced, all the existed firms would be accounted as the new startups. This might be one of the reasons why we saw a boom between 2013-2014. Also the private business might start to seriously pay attention to collecting the data on the number of fintech firms from 2013.

2. The change of the government policies on the licence of fintech firms would influence its number. The recently published development plan on fintech firms in the Chinese official government website (http://www.gov.cn/xinwen/2019-08/23/content_5423691.htm), the government aims to realise the stabilisation of the finance industry and control the risks. They have supervised the financial market with stricter regulations to monitor and assess the businesses.



Figure 3 the time trends of GDP per capita and people average income.

Another interesting discovery (shown in Figure 3) would be the trends of the average income per person per month and the average GDP (in ten thousand). Extracting data from different states, there is a similar upward sloping trend for these two data sets. This would intrigue me further to investigate their correlation with the number of fintech firms.

4. RESULT

4.1. Hypothesis

The development of fintech firms has a positive influence on the development of a state's development.

4.2. Analysis

The regression model, usually known as linear regression, is one way of statistical analysis that estimates the conditional expectation of the dependent variable with a given set of values for the independent variable. It is said that with sufficient information input, the regression would give out a casual relationship of the dependent variable and independent variable. Hence, the result could prove our hypothesis.

I estimated three different models with two specifications for each. The dependent variables in each specification are different. They are GDP (in ten thousand¥), GDP per capita, and the average income per person per month). The independent variable in each specification is the total number of recorded fintech firms and the permanent resident, including a state dummy variable.

Table 2. Regression of total number of fintech firms on total GDP

Dependent variable : GDP (in ten thousand)		
	(1)	(2)
Number of recorded fintech firms :	9.31*** (2.30)	14.02*** (2.04)
Permanent resident in the state (in ten thousand) :	3.55*** (0.22)	0.64 (1.63)
R-square :	0.53	0.67
Adjusted R-square :	0.53	0.66
Fixed effect (states):	No	Yes
Number of observation : 613		
*** p < 0.001; ** p < 0.01; * p < 0.05		

In the first specification of model 1, I regress the total number of all fintech firms on the total GDP of China. The coefficient is positive and statistically significant. This indicates that an increase in one fintech firm in the Chinese financial market is associated with an increase in the country's GDP by ¥931000. This result holds after the control of the total population in China.

In the second specification of model 1, I include states as a dummy variable to measure how the figure of the number of fintech firms would influence the GDP within the states. Therefore, including the state would help us to justify our hypothesis, which may also increase the precision of their relationship. Table 2 (2) indicates that an increase in one fintech firm within the state is associated with an increase in the country's GDP by ¥1402000.

Table 3. Regression of total number of fintech firms on GDP per capita

Dependent variable : GDP per capita		
	(1)	(2)
Number of recorded fintech firms :	29.24 *** (1.97)	20.87*** (2.06)
Permanent resident in the state (in ten thousand) :	-0.32 (0.32)	5.56*** (1.56)
R-square :	0.43	0.61
Adjusted R-square :	0.43	0.59
Fixed effect (states):	No	Yes
Number of observation : 613		
*** p < 0.001; ** p < 0.01; * p < 0.05		

The GDP per capita would be a more reasonable index to look at in terms of telling the relationship between the development of a state and the number of fintech firms. It avoids the situation of a state that focuses

on labour intensive. Whereas only consider the total GDP of a state might not be solid enough, as I neglect the population size of that state.

In the first specification of model 2, I regress the total number of all fintech firms on the GDP per capita of China. Once I look at the individual influences by the number of fintech firms, the significant coefficient seems not that enormous. This indicates that an increase in one fintech firm in the Chinese financial market is associated with an increase in the GDP per capita by ¥29.24. This result holds after controlling the total population in China. In contrast, the total population is not that significant here, as the GDP per capita has no relationship with the permanent resident within a state.

In the second specification of model 2, I also include states as a dummy variable. Table 3 (2) indicates an increase in one fintech firm within the state is associated with an increase in the GDP per capita by ¥20.87.

However, the result for the change of permanent resident number in a state in these two specifications shows two different patterns. In the first specification, it is suggested that the increase in the number of permanent residents in the state is not correlated with the change of the GDP per capita within the state as the regression model would mismatch the data; for example, the number of permanent residents in Beijing would not correlate with the increase in GDP per capita of Guangdong. Therefore, the result is not significant. Whereas, in the specification two, an increase in ten thousand of permanent residents within the state is associated with an increase in GDP per capita by ¥5.56. The net change of the total population within the state would actually influence GDP per capita.

Table 4. Regression of total number of fintech firms on people's average income

Dependent variable : Average income per person per month		
	(1)	(2)
Number of recorded fintech firms :	1.48*** (0.29)	2.25*** (0.18)
Permanent resident in the state (in ten thousand) :	-0.12*** (0.03)	-0.39* (0.18)
R-square :	0.16	0.29
Adjusted R-square :	0.15	0.26
Fixed effect (states):	No	Yes
Number of observation : 613		
*** p < 0.001; ** p < 0.01; * p < 0.05		

The average income of people within the state measures the amount of money earned per person in that region. Compared to the GDP per capita, which focuses

more on the economic production value attributed to each individual citizen, income could reflect people's living standard better. The higher the income, the stronger the purchasing power, leading to a better economic development of that state.

In the first specification of model 3, I regress the total number of all fintech firms on people's average income. This indicates that an increase in one fintech firm in the Chinese financial market is associated with an increase in people's average income by ¥1.48. This result holds after controlling the total population in China. In contrast, there is a negative relationship between the dependent and independent variable here as the increase in one more person living in the state, and there will be less income to each when taking the average.

In the second specification of model 3, a dummy variable is also included. Table 4 (2) indicates an increase in one fintech firm within the state is associated with an increase in people's average income by ¥2.25. For the relationship of the number of the permanent resident within the state and the average income per person per month in two specifications, it shows that an increase in the number of permanent residents is associated with a decrease in people's average income, as the larger total population would disperse the average income each person gained.

They analyzed statistics and the results from the regression model show me that there is a strong positive correlation between the dependent and independent variables. This may suggest fintech firms in contemporary society are very important for the government as a good investment project, if they want to further develop economic growth. As a result, it would give the government a general idea of whether to subsidise this innovative financial market. Their correlation tells that the number of fintech firms in a specific state is associated with the development of the state. The government could invest the money in those relatively well-developed states in order to make a greater economic return. This information is crucial for the Chinese government, if they want to increase the domestic economic growth and international competitiveness, as the statistics shows GDP of China takes account of 16% of the total global GDP in 2018. The Financial Value Added in 2018 takes account of 7.68% of the GDP of China.[from the government official website (<http://data.stats.gov.cn/>)] If the Chinese government could expand the fintech market, the GDP would, to a great extent, increase. The immaturity of these fintech firms in the financial market would bring back considerable potentials to each citizen.

However, we cannot draw a valid conclusion about their relationship. The results could only show people are more likely to go to those states where are more developed. The level of development of a state could be directly shown by the number of fintech firms, as fintech

firms are more likely to generate more revenue in the big city where there is more international trade, and higher disposable income for citizens living there. Therefore, with the data collected, we still cannot derive a direct relationship between the states' development with the number of fintech firms. Hence, we could only prove half of the hypothesis.

The following paragraphs show several drawbacks to the result from the data collected:

It is hard to develop a relationship between the number of fintech firms and states' development. There are too many factors that would affect the economic status of a state. Ways of determining the state's development (GDP, living standard, and people's average income etc.) would never be a uni-variable, which means it is hard for us to tell directly from the statistics we collected whether there is a causation relationship exists.

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In the case of China, which is quite a special one, we need to take the government restrictions and goals (the mixed economy) into consideration. Then for different states, they would be organised towards a specific goal (e.g., agriculture, technology). The number of fintech in such places would then be restricted. This would hinder the state's development.

5. CONCLUSION

My research of whether an increase in the number of fintech companies in the financial market would increase the states' development could tell that they are positively correlated with each other rather than a relationship. The government could focus more on the fintech industries' development to achieve further economic growth and development.

REFERENCES

- [1] FINTECH IN ECONOMIC GROWTH: CROSS-COUNTRY ANALYSIS
- [2] Ho, S.Y.; Iyke, B.N. Finance-growth-poverty nexus: A re-assessment of the trickle-down hypothesis in China. *Econ. Change Restruct.* 2018, 51, 221–247.
- [3] Bilan, Y., Rubanov, P., Vasylieva, T., Lyeonov, S. (2019). The Influence of Industry 4.0 on Financial Services: Determinants of Alternative Finance

Development. Polish Journal of Management Studies, 19 (1), 70-93. DOI: 10.17512/pjms.2019.19.1.06

- [4] Poliakh, S., Nuriddin, A. (2017). Evaluation Quality of Consumer Protection by Financial Markets Services. Financial Markets, Institutions and Risks, 1(3), 75-81. DOI: 10.21272/fmir.1(3).75-81.2017
- [5] Vasylieva, T., Harust, Yu., Vynnychenko, N., Vysochyna, A. (2018). Optimization of the financial decentralization level as an instrument for the country's innovative economic development regulation. Marketing and Management of Innovations, 4, 382-391. DOI: <http://doi.org/10.21272/mmi.2018.4-33>
- [6] Levchenko, V., Boyko, A., Savchenko, T., Bozhenko, V., Humenna, Yu., Pilin, R. (2019). State Regulation of the Economic Security by Applying the Innovative Approach to its Assessment. Marketing and Management of Innovations, 4, 364-372. DOI: <http://doi.org/10.21272/mmi.2019.4-28>
- [7] Lyeonov, S., Kuzmenko, O., Yarovenko, H., Dotsenko, T. (2019). The Innovative Approach to Increasing Cybersecurity of Transactions Through Counteraction to Money Laundering. Marketing and Management of Innovations, 3, 308-326. DOI: <http://doi.org/10.21272/mmi.2019.3-24>