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# SCHUMPETER IN PRACTICE: THE ROLE OF CREDIT FOR INDUSTRIAL POLICY IN CHINA

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## ABSTRACT

Since the late 1970s, the Chinese government has been undertaking major efforts in developing their countries economy by means of industrial policy. However, a more narrow approach to industrial policy has been pursued only since 2010, with the initiation of the 'Strategic Emerging Industries' program. China's state-dominated banking system is seen as playing a vital role in the financing of these endeavors. Based on a self-constructed data set originating from Chinese official statistics, we show in this paper that (1) there is generally a positive relationship between credit provision to the corporate sector and GDP growth in China, (2) this relationship is non-linear in terms of Chinese regions and credit-to-GDP ratio, and (3) that industrial policy targeting could have led to more investment and GDP growth, however, there are differences among industries and firm types. We thus show that the Chinese economic model could be seen as a practical implementation of Schumpeter's growth theory.

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# Schumpeter in Practice: The Role of Credit for Industrial Policy in China

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**Abstract**

*Since the late 1970s, the Chinese government has been undertaking major efforts in developing their countries economy by means of industrial policy. However, a more narrow approach to industrial policy has been pursued only since 2010, with the initiation of the 'Strategic Emerging Industries' program. China's state-dominated banking system is seen as playing a vital role in the financing of these endeavors. Based on a self-constructed data set originating from Chinese official statistics, we show in this paper that (1) there is generally a positive relationship between credit provision to the corporate sector and GDP growth in China, (2) this relationship is non-linear in terms of Chinese regions and credit-to-GDP ratio, and (3) that industrial policy targeting could have led to more investment and GDP growth, however, there are differences among industries and firm types. We thus show that the Chinese economic model could be seen as a practical implementation of Schumpeter's growth theory.*

**Keywords**: Bank-led Growth; Industrial Policy; China; Strategic Emerging Industries; Finance-growth nexus; Finance; Economic growth; Economic development; Bank credit.
**JEL codes**: E22; E65; G21; H81; L52; L62; L9; N15; N4; N65; N75; O11; O25; O47; O53.

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# 1 Introduction

With the COVID pandemic not yet fully overcome, the ongoing energy crisis, but also the long-term problem of climate change, the world is in a state of flux. Given the limits to the free market's ability to solve these problems in the short and medium term, more and more politicians and economists around the world are now discussing a stronger role for the state.

One country that has been establishing a hybrid economic model of market-based state intervention for many decades now, and that has been quite successful in doing so, is the People's Republic of China. Since the late 1970s, the Chinese government has been undertaking major efforts in industrial policy, initially to master the transition from a planned to a market economy, but more recently also to secure global supremacy in strategically important industries and to become more independent from foreign countries. China's **state-dominated banking system** is seen as playing a vital role in the financing of these endeavors (Naughton, 2021). By actively directing (financial) resources to drive the economic development process, the case of China can thus be seen as a particularly interesting application of Joseph A. Schumpeter's *'Theory of economic development'*, as we will show in this paper.

While the relationship between lending and GDP growth on the one hand, and the success of individual industrial policy measures on the other have already been the subject of empirical studies for China (especially in the Chinese literature), to the best of our knowledge, no empirical analysis of the GDP growth effect of credit, as means of financing industrial policy, has been carried out yet. Based on a self-constructed data set from Chinese provincial yearbooks and Chinese industry yearbooks, we will therefore show in this study, that (1) there is generally a positive relationship between credit provision to the corporate sector and GDP growth in China, (2) this relationship is non-linear in terms of Chinese regions and credit-to-GDP ratio, and (3) that industrial policy targeting could have led to more investment and GDP growth, however, there are differences among industries and firm types.

The rest of this paper is organized as follows: in Chapter 2, we introduce Schumpeter's theory of economic development, which is the theoretical framework for this paper; Chapter 3 reviews the characteristics of Chinese industrial policy and the structure of China's banking system over time. Chapter 4 provides a review of the related literature. Based on the methodological approach and the data set, that is described in Chapter 5, we present our empirical results in Chapter 6. We complement our econometric analyses with two case studies for the automotive sector and the (renewable) energy industry to discuss to what extent China has achieved its primary goal of global competitiveness in advanced industries so far. Chapter 7 discusses our empirical results and chapter 8 concludes the paper.

## 2 The Schumpeterian Idea of Finance and Growth

Until today, Joseph Schumpeter's theories form the theoretical basis for most papers on the finance and growth nexus. His theory of credit and growth has been layed out most clearly in his book *'Theorie der wirtschaftlichen Entwicklung'* (*Theory of economic development*) (Schumpeter, 1934a) and can be summarized as follows:

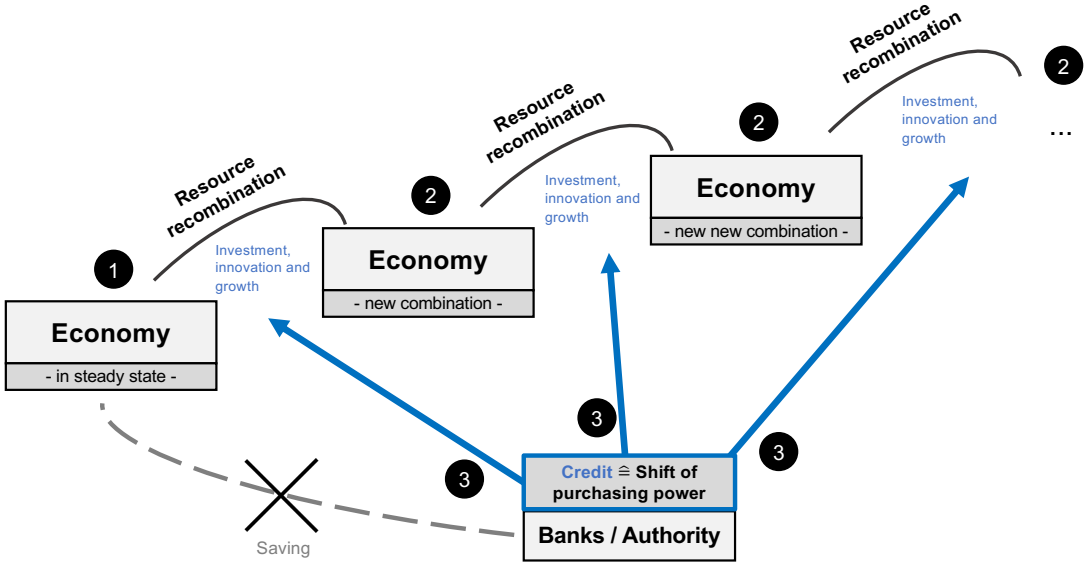



Figure 1: Growth through banks in the Schumpeterian growth model

**1) Economy in equilibrium**

The economy is in equilibrium (fictitious status quo), all resources are bound in existing combinations and are not up for innovative use. New (innovative) firms do not have any money or access to productive resources in the economy.

**2) Economic development**

To create substantial, innovative growth, existing resources in the economy have to be used in a different way. Without credit, this can only be achieved by direct control of a central authority. Substantial growth relies on *'Andersverwendung'*, a reallocation of resources from their use within the steady-state economy towards innovative endeavours. The economy reaches a 'new steady state' - higher than the initial steady state.

**3) Investment financed by credit**

If the *'Andersverwendung'* is not achieved through a central authority, it has to be initiated by credit. Banks create credit themselves. Credit allows a shift of purchasing power that allows firms to access productive resources in the economy.

We will now develop these points made by Schumpeter in detail.

## 2.1 Economy in Equilibrium

Even though Schumpeter's arguments lead to a dynamic view of the economy, he starts to lay out his theory of economic development with an economy in equilibrium and develops his model from this point on. Yet, one of Schumpeter's key elements is that there is no such thing as an equilibrium in a growing economy. This is also closely connected to Schumpeter's concept of 'creative destruction' which opposes a static view of the economy and instead argues that there is a constant process of more productive enterprises taking resources from less productive ones. This leads to the destruction or exit of the less productive enterprises while more productive enterprises flourish.

Nevertheless, in order to initially start the growth process of the economy, Schumpeter first assumes a state of equilibrium that is characterized by all goods and all money already being scheduled for use: *'Thus, in such an economy* [i.e. an economy in equilibrium] *there could be no large reservoirs of free purchasing power to which anyone wishing to impose new combinations could turn - and his own saving would suffice only as an exception. All money would circulate, would be fixed in certain orbits, would be tied up.'* (Schumpeter, 1934a, p. 108)[1]. If an economy is in equilibrium that means that all of its rational agents have already used up all resources for production, or have scheduled the use of future resources for future production. The only rational incentive to save would be to create some cushion for unexpected expenses, retirement, etc., which would be irrational to use for innovative projects.

In this case, no resources are available for innovative processes or will be. Only if individuals decide to change their plans (which should be unlikely given that their initial plans were rational) they could shift resources towards new, innovative projects (compare Schumpeter (1934a, p. 108)). In order to generate substantial growth, resources have to be freed from the intended use within the steady-state economy.

## 2.2 Economic Development

*'Development'* and *'growth'* are often used in a synonymous way but the distinction between both terms is extremely important for the understanding of Schumpeter's theory. While growth belongs to the steady-state sphere as natural phenomenon connected to all economic activity, development is used to describe fundamental changes in the economy. These fundamental changes are what Schumpeter's theory is about: *'[T]he mere growth of the economy, as it presents itself in population and*

[1]Original quote: *'So könnte es in einer solchen Volkswirtschaft keine großen Reservoirs freier Kaufkraft geben, an die sich wenden könnte, wer neue Kombinationen durchsetzen will - und seine eigene Spartätigkeit würde nur ausnahmsweise hinreichen. Alles Geld würde umlaufen, in bestimmten Bahnen festgelegt, gebunden sein'*

*wealth increase, is not called a process of development*' (Schumpeter, 1934a, p. 96)[2]. Schumpeter justifies this distinction by arguing that growth (be it population or wealth) is merely a change in a variable (he calls it 'natural data') that the economy reacts to in a given way. Therefore, growth is different from a fundamental development of economic activity.

If the economy is in equilibrium, all resources will be used or be planned to be used which also means that the money needed for these resources is bound and not free for other purposes. As there are no 'free' resources - a statement that is true for an economy in equilibrium and mostly true for the actual economy - resources for innovative projects have to be taken from other endeavors for which their use was planned originally (Schumpeter, 1934a, p. 102f.). There are two ways for '*Andersverwendung*', i.e. the redistribution of resources: Firstly, a central authority could give the order to allocate resources in a new and potentially more productive way. At the time Schumpeter developed his theses, totalitarianism was globally on the rise and central planners were more than a theoretical argument, so this was seen as one valid option. The other, more favorable option Schumpeter saw was to redistribute resources in a more subtle way through credit creation. As we will see, China today is an interesting hybrid case of these two possibilities.

### 2.3 Investment Financed by Credit

The only way to get access to resources needed for (starting) innovative processes without direct force lies in generating new money, as Schumpeter argues: '*The private and state consumptive loan and also the circulation credit in the cycle, which knows no development, would normally quite depend on the former* [alternative forms of fundraising]. *This other kind of the money procurement* [alternative form of fundraising that is crucial for development] *is the money creation by the banks. No matter what form it takes,* [...] *it is always not a transformation of purchasing power which would have existed with someone before, but the creation of new money out of nothing.*' (Schumpeter, 1934a, p. 108f.) [3]. The role of money is therefore central in Schumpeter's theoretical framework: Not only does it serve as a numeraire good for all available goods and services, but it is also used for the distribution of resources. It is thus necessary to generate purchasing power in order to give entrepreneurs access to the goods they need for innovation and growth (Schumpeter, 1934a, p. 141).

The importance of banks (that is often neglected in modern economic theory) becomes very clear when following Schumpeter's theory, as stressed by Schumpeter (1934b, p.74): '*The banker, therefore, is not so much primarily a middleman in the commodity 'purchasing power' as a producer of this commod-*

[2]Original quote: '*(...) das bloße Wachstum der Wirtschaft, wie es sich in Bevölkerungs- und Reichtumszunahme darbietet, [wird] nicht als Entwicklungsvorgang bezeichnet*'

[3]Original quote: '*Das private und staatliche Konsumtivdarlehen und auch der Zirkulationskredit im Kreislauf, der keine Entwicklung kennt, wäre normalerweise durchaus auf das erstere angewiesen. Diese andere Art der Geldbeschaffung ist die Geldschaffung durch die Banken. Gleichgültig, welche Form sie annimmt,* [...]*immer handelt es sich nicht um Transformation von Kaufkraft, die bei irgendwem schon vorher existiert hätte, sondern um die Schaffung von neuer aus Nichts*'

*ity.*[...] *He stands between those who wish to form new combinations and the possessors of productive means. He is essentially a phenomenon of development, though only when no central authority directs the social process. He makes possible the carrying out of new combinations, authorises people, in the name of society as it were, to form them. He is the ephor of the exchange economy.'*[4]

The difference between a real analysis, where saving finances investment and monetary analysis, where newly created deposits through bank credit finance investment without the need for 'savings' (see e.g. Bofinger, Geißendörfer, Haas, and Mayer (2021)), has also been stressed in detail by Schumpeter (1939, p. 110): '*If innovation were financed by savings, the capitalist method would be analogous, for the way in which saving and lending to entrepreneurs effects a shifting of factors through a shifting of means of payment may, indeed, be linked to the canceling of an old and the issuing of a new 'order' to the owners of factors. But if innovation is financed by credit creation, the shifting of the factors is effected not by the withdrawal of funds* [...] *from the old firms, but by the reduction of the purchasing power of existing funds which are left with the old firms while newly created funds are put at the disposal of entrepreneurs: the new 'order to the factors' comes, as it were, on top of the old one, which is not thereby canceled.*'

By introducing new claims on goods and services (i.e. money), the existing claims are lowered, individuals within the economy experience a '*compression of existing purchasing power*' (Schumpeter, 1934a, p. 156). Those that gained their claim through providing goods or services will not receive their share of other goods and service in return as measured by their wage, but a lower share. As the existing claims are reduced, some goods and services, i.e. resources, are freed for other other use or taken from the circulation of goods (compare Schumpeter (1934a, p. 142)). These other purposes are or at least should be innovative projects leading towards economic growth.

The ability to create money out of nothing has of course its limits. Bankers cannot create unbounded amounts of purchasing power, i.e. money, as this would have to lead to inflation at some point. Like any other good, the value of money is determined relative to all other goods. If the amount of money increases significantly without generating a similar rise in other goods, the value of money has to decline. The central point is therefore the productivity of the recipients of credit. Schumpeter is thus very clear that credit creation is only beneficial if the credit is used productively (Schumpeter, 1934a, p. 153). As long as credit is used productively and not for consumption or investment in existing assets (like real estate), however, inflation should not be a problem. In fact, if the resources used by the recipient of the credit result in an overall increase of goods within the economy which is larger than the initial credit (this should be the case if the recipient of the credit has to pay positive interest rates) the result would rather be a deflationary tendency than

[4] Ephors were ancient Spartan magistrates and leaders who controlled the kings.

an inflationary one (see Schumpeter (1934a, p. 159)). The amount of potential credit is therefore not limited by past and present goods in the economy, but rather by realistic production of future goods (Schumpeter, 1934a, p. 165).

What has become clear by all of the above is that an increase in credit is not just the byproduct of a growing economy. Instead, Schumpeter argues that credit has to be the source of all economic growth because it is the only way to free means of production or resources for innovative use: *'The granting of credit causes a new use of the existing productive services by means of a previous shift of the purchasing power within the national economy.'*(Schumpeter, 1934a, p. 156)[5]. This phenomenon was associated with the phrase *'Vorschußökonomie'* (*'advance economy'*) by Schumpeter (see Schumpeter (1934a, p. 142)). *'Development'* is therefore a shift of resources from less productive projects to more productive ones through the provision of newly generated purchasing power - i.e. credit. It is, however, important to note that this only holds for productive use of credit, not for e.g. consumer credit.

# 3 Industrial Policy and the Banking System in China

The Chinese economy is a particularly interesting application of Schumpeter's growth model, as the central role of the creator of credit, and thus purchasing power, is simultaneously taken by banks and the state. The background to this is not only that banking is hardly separable from the state in China, due to the dominance of state-owned banks, but also that the Chinese state, as a 'central authority', takes a highly active role in directing credit according to pre-determined development strategies. In this chapter we will therefore briefly describe the strategies that the Chinese government has pursued in recent decades as part of its industrial policy to identify the 'most innovative endeavors' in the Schumpeterian sense, and the role that the banking system has played in this.

Industrial policy can generally be defined as *'interventions intended to improve structurally the performance of the domestic business sector'* (Criscuolo, Gonne, Kitazawa, & Lalanne, 2022b, p.4). Industrial policy strategies are thus a coherent and articulated set of policy instruments aimed at achieving a specific policy objective (Criscuolo et al., 2022b). While such strategies have traditionally focused on sectoral or regional orientations (with the objective of a catching-up process of less developed regions), more recent strategies are focused on specific technologies or follow a mission-oriented approach, i.e. a formulation of a society-wide goal to be achieved across all sectors (Criscuolo et al., 2022b; Larrue, 2021; Mazzucato, 2015, 2016). This shift can also be observed in the Chinese case.

[5]Original quote:*'Die Kreditgewährung bewirkt eine neue Verwendungsweise der vorhandenen produktiven Leistungen vermittels einer vorhergehenden Verschiebung der Kaufkraft innerhalb der Volkswirtschaft'*

Industrial policy instruments are usually distinguished between horizontal policies (with a main focus on promoting R&D or general market development independently of company sectors, technologies or locations) and vertical policies (explicitly targeting specific business sectors, technologies, or locations) (see e.g., Criscuolo et al. (2022b); OECD (2016); Sachverständigenrat (2019)). A more recent distinction regarding industrial policy instruments is that between demand-side instruments and supply-side instruments (Criscuolo, Gonne, Kitazawa, & Lalanne, 2022a; Criscuolo et al., 2022b; Edler, Gök, Cunningham, & Shapira, 2016).

The goals of industrial policy are usually innovation, productivity or economic growth, and the preservation and strengthening of competition or strategic autonomy. Increasingly, industrial policy strategies also address societal challenges (Anderson et al., 2021; Berlingieri, Calligaris, Criscuolo, & Verlhac, 2020; Criscuolo et al., 2022b; Ding & Dafoe, 2021; European Commission. European Political Strategy Centre, 2019). Following Bofinger (2019) and Mazzucato (2015), public industrial and innovation policies may also be justified in cases of uncertainty, such as when private actors refrain from investing, not because they are seen as fundamentally negative, but because of high uncertainty (H.-J. Chang, Andreoni, & Kuan, 2013). In addition, network effects and externalities, such as innovative technologies that rely on strong interdependencies between multiple industries, can be a reason for active industrial policy (Tassey, 2010). Path dependencies resulting from high fixed costs and the long lifetime of investments in fundamental innovations also imply externalities for firms and lead to sticking to existing solutions (Aghion, Boulanger, & Cohen, 2011). Finally, industrial policy intervention may also be justified when domestic firms compensate for a competitive disadvantage caused by foreign competition policy through industrial policy measures in other countries (Bofinger, 2019; Criscuolo et al., 2022b).

## 3.1 A Short History of Chinese Industrial Policy

The idea of Chinese industrial policy originated in the search for a new economic conception after the death of Mao Zedong in 1976 (Shih, 2014). If one wants to follow a more narrow definition of 'industrial policy', however, China's active industrial policy, in the sense of a future-oriented development strategy ('mission-oriented industrial policy'), began only from the 2010s, while previous measures were fundamentally focusing on transforming a centrally planned system into a market economy (e.g., regional or place-based industrial policy) (Naughton, 2021).

With the publication of the 11th Five-Year Plan (FYP) for the years 2006 to 2010, designated industrial policy strategies were communicated by the Chinese government for the first time (Heilmann & Shih, 2013). The background to this was the Chinese government's objective of creating more independent innovation capacities and thus becoming less dependent on foreign investment (State Council of the People's Republic of China, 2006b). Instead, the internationalization of Chinese

companies was to be promoted, and access to resources abroad was to be secured through Chinese foreign investment (Schüller, 2015).

The first phase of China's more narrow industrial policy is then usually divided into three core elements in the literature: the launch of the *'Medium to Long term Program of Science and Technology'* (MLP), the crisis measures following the financial crisis in 2008, and the formulation of the *'Strategic Emerging Industry'* (SEI) program. The second phase of Chinese industrial policy, which the Chinese government calls the '*Innovation-driven Development Strategy*' (IDDS), also including '*Made in China 2025*' and '*Internet Plus*', is China's effort to bundle and expand its previous industrial policy efforts and rebuild them into a holistic and more binding approach. While many (sub-)industries were added to the IDDS, especially in the high-tech sector, almost all industries from the SEI program can also be found there (Defraigne, 2014; Naughton, 2021). As we will see in detail in a moment, this is one of the reasons why we consider the SEI program as the starting point of China's more targeted and long-term industrial policy in the further course of this paper. Hence, we will now discuss the SEI program and its origins in a little more detail.

Although the MLP could not be seen as an industrial policy strategy in itself, it consists of many smaller programs that provided the impetus for subsequent industrial policy measures. The MLP had a duration of fifteen years (2006 to 2020) and contained, on the one hand, rather general approaches to strengthening the innovation environment, but on the other hand also a list of a total of 16 'megaprojects' to be funded by the government. The purpose of these projects has always been to replicate existing, particularly important products and innovations in developed countries in order to become independent of them (Naughton, 2021).

In the aftermath of the financial crisis at the end of 2008, China was confronted with a situation in which, not only global demand had fallen but also protectionist tendencies coupled with global uncertainty were increasingly in evidence. In addition, China had cyclical and structural problems, such as overcapacities in certain industries, the still lacking independent innovation capacities, high energy consumption and great inter-regional inequality (Jigang, 2017).

Therefore, although China was relatively less affected by the financial crisis compared to the rest of the world, the Chinese government countered the declining GDP growth rates by launching a massive economic stimulus program. As part of this, significantly more capital flowed into industrial policy measures, and China's direct state influence in its own industrial sector rose again significantly, compared to the years before (Naughton, 2021; Schüller, 2015).

However, it was not only the financial capacities for already existing programs that were expanded.

The Chinese government additionally recognized that the country's economic future would depend, on the one hand, on supporting traditional industries (such as the steel or automotive industries) in order to stabilize growth, and, on the other hand, on fostering emerging industries in order to become global pioneers in that fields (Jigang, 2017). This is based on the idea that crises were usually followed by large-scale technological breakthroughs, and that countries that were particularly successful in adapting to these became global leaders (Naughton, 2021). In addition to direct fiscal and monetary policy measures to stimulate domestic demand (e.g. through a massive expansion of bank credit), the Chinese state therefore also started to undertake targeted interventions, including in sectors particularly hit by the crisis (*'industrial revitalization policies'*) and in innovative industries. These measures were the cornerstone of the '*Strategic Emerging Industries*' (SEI) program, that was announced in 2009, and fleshed out a year later in the 12th FYP (Naughton, 2021).

With the *'State Council's Decision on Accelerating the Cultivation and Development of Strategic Emerging Industries'*, published in October 2010, the Chinese government substantiated their idea of the Strategic Emerging Industries Program. The document starts with emphasizing the forward-looking role of the SEI program:

> *'Strategic emerging industries are an important force to guide future economic and social development. The development of strategic new industries has become a major strategy for leading countries in the world to seize the high ground in the new round of economic and technological development. China is in the critical period of building a moderately prosperous society* [...] *Strategic emerging industries are based on major technological breakthroughs and important development needs. They are knowledge- and technology-intensive industries with low consumption of material resources, high growth potential and good comprehensive benefits. Accelerating the cultivation and development of strategic new industries is of strategic importance to the modernization of China.'* (State Council of the People's Republic of China, 2010, p. 1, translated from Chinese)

The program document then goes on to state that the industries that are characterized as SEI's are those that are considered to be particularly important in the future and in which no competitors have yet established themselves worldwide (State Council of the People's Republic of China, 2010). This decision represents a U-turn from China's strategy of learning and adapting from established market players, that they accelerated in previous decades. The SEI's include 20 industries that can be aggregated into the following segments: 1.) Environmental protection and energy conservation, 2.) Information Technology (e.g. Core electronic components and high end software), 3.) Biotechnology (e.g. biopharmaceuticals and biological agriculture), 4.) (Precision) Machinery (e.g. satellites, aircraft and smart manufacturing equipment), 5.) New Energy (e.g. wind and solar power), 6.) New Materials and 7.) New Energy Vehicles (i.e. electric vehicles and hybrid vehicles)

(Naughton, 2021).

There are thus some overlaps with the industries that were considered for the 13 megaprojects. However, while the megaprojects were rather specific, directly government-funded projects, the support framework for the SEI is more complex. The general idea is that the government sets favourable conditions for firms that are part of the SEI, for example through preferential granting of credit (by state-owned financial institutions), increased investment funds (e.g. venture funds), tax exemptions or regulatory facilitation. By these means, in principle all companies within the SEI have access to (mostly indirect) governmental support, whereas with the megaprojects, targeted, direct funding was mostly provided to selected companies or (research) institutes (Naughton, 2021).

To date, the SEIs remain a crucial part of China's industrial policy strategy. Thereby, in contrast to earlier industrial policies, the Chinese government has set quite specific targets and timelines, not only in the presented concept paper, but especially in the subsequent sector-specific five-year plans published in 2012 (covering the years 2011 to 2015) (Naughton, 2021). These are discussed in more detail in the case studies in chapter 6.4, by example of the renewable energy and new electric vehicles sector.

## 3.2 The Role of Banks in Industrial Policy

In the Schumpeterian growth model, the banker, or a 'central authority,' takes the central role in creating purchasing power, innovation and growth. We have already argued that China might be a particularly interesting hybrid model in this theory, mainly due to the strong influence of the Chinese state on the domestic banking system. Thus, based on the structure and the development of the banking system, we now want to show, why we assume that bank lending has played an important role as industrial policy instrument in China.

It is well-known that until today, the Chinese government has a significant influence on the financial system. This has its origins in the fact that, when the communist party under the leadership of Mao came into power in the late 1940s, the Chinese banking system was extensively centralized and put under direct state control. Consequently there was only one bank, the People's Bank of China (PBoC), that performed both central bank and commercial bank duties. In the course of the reform and opening policy under Mao's successor, Deng Xiaoping, China's banking system was then broadly reformed (Tobin & Volz, 2018).

After China abolished the Mono-banking system in 1979, the PboC was authorized to exercise the rights of a stand-alone central bank. Its commercial functions were gradually transferred to the so-called **'Big Four'** banks (Agricultural Bank of China, Bank of China, Construction Bank of

China and Industrial and Commercial Bank of China) that are still dominating the Chinese banking system today, in particular in terms of assets and lending. Even today those banks (plus the Bank of Communications[6], '*Big Five*') are under significant state control and are therefore referred to as 'state-owned commercial banks' (SOCB) (Tobin & Volz, 2018). This state influence is reflected not only in the fact that the state is the clear majority shareholder of SOCB (L. Lu, 2016), but also because all of the bank's board members and senior managers are appointed by the government, i.e. the State Council (Dong et al., 2016).

In China, each type of banking institution has been constructed to perform specific and differentiated tasks in order to serve the real economy (Williams, 2018). Whereas the SOCB's purpose is to finance mainly large, state-owned companies in specific branches of the economy, the Chinese banking landscape was also added **'joint-stock banks'** (JSCB, with both state and private shareholding through the stock market) and three state-owned **'policy banks'** in the 1980s and 1990s to finance development objectives respectively (e.g. agriculture, exports and overall economic development). While the higher private share in joint-stock banks should enhance a more active risk management than in the SOCBs, development financing should remain under state control (Tobin & Volz, 2018), so that policy banks are completely state-owned and under direct leadership of the State Council (G. Sun, 2020). Nevertheless, JSCBs are also subject to a not insignificant amount of state influence, as they were often originally founded by Chinese local governments (L. Lu, 2016).

Beside the 5 SOCB's, 12 joint-stock banks and the three policy banks, another major pillar of the Chinese banking system are so-called city commercial banks. **'City Commercial Banks'** (CCBs) were originally intended to support the development of their home cities by a large degree of regionally specialized lending and with focus on small and medium-sized companies. They are also used to finance local government projects (Williams, 2018). CCBs, like many JSCBs, were also originally wholly owned by local governments, though the ownership structure has become somewhat more diversified since the 2000s. Today, the city commercial banks are thus subject to less government influence than the state banks or policy banks (Dong et al., 2016; G. Sun, 2020).

Rural commercial banks, a small amount of foreign banks and an even smaller amount of privately-owned banks complete the picture of banking institutions in China, albeit having a significantly lower weight than the previously mentioned bodies. **Rural Commercial banks** were set up to finance the development of specific regions, mainly in the inland of China, and thereby reduce the huge income gap between the rural and urban regions. Accordingly, those banks are also under considerable state control (Vernikov, 2015). **Foreign banks** and **privately-owned banks** still form a minority in today's banking landscape (Tobin & Volz, 2018).

[6]The Bank of Communications was redefined as a state-owned commercial bank in 2006 by the CBRC (Dong, Firth, Hou, & Yang, 2016)

In summary, the 5 major state-owned banks today remain the backbone of China's financial system (Herr, 2010). Although their dominance has fallen since the 1980s (Q. Ye, Xu, & Fang, 2012), these banks still account for about 37% of total assets in China today (Almanac of China's Finance and Banking, data for 2018). The second largest category of banks includes joint-stock commercial banks (18% of total assets), followed by city commercial banks (13%), policy banks (10%) and rural commercial banks (9.7%). Around 88% of total assets can thus be attributed to financial institutions under full or partial state control. The same holds for lending, where *'[a] few large state-controlled banks form the core of the credit system in China'* (Vernikov, 2015, p. 180). In 2018, the 'Big Five' SOCB's accounted for about 39.4% of total lending (Almanach of China's Finance and Banking and G. Sun (2020)). Andersson, Burzynska, and Opper (2016) show that lending of the four dominating banking forms in 2008 (SOCBs, JSCBs, Policy Banks and rural commercial banks) had a combined market share of about 85% of total lending.

If the government wants to promote the development of certain strategically important industries as part of its industrial policy, one of the most vital aspects is to create a financially favorable environment. Ji and Zhang (2019), for instance, provide evidence, that about 42.4% of the variation in the growth of the Chinese renewable energy sector can be attributed to the development of the financial sector. Thereby bank and credit market lending are the most important sources for firm financing worldwide (Ji & Zhang, 2019). When looking at data for the sources of investment in the Chinese industry sector, however, it becomes clear, that - after self-financing - financing through credit is the most important financial resource in China, accounting for on average 24.8% of all financing (average for the years 2010 to 2017). China's financial system is thus traditionally **characterized as being bank-based** (Herr, 2010), which is also reflected in its relatively low stock market capitalization (average for the years 2010 to 2017: 56% of GDP) (Beck, Demirgüç-Kunt, & Levine, 2000, 2009; Čihák, Demirgüç-Kunt, Feyen, & Levine, 2012). Therefore, bonds account only for about 0.6% of total investment financing (China Provincial Statistical Yearbooks).[7]

Naughton (2021) also points out that an immense share of the financing of industrial policy in China comes from the state banking system. While the megaprojects under the MLP were still predominantly financed directly by the state, the SEI program provided companies with increased indirect support, such as credit from state-owned financial institutions (i.e. at least all major commercial (state-owned) banks and policy banks) (Ji & Zhang, 2019). In addition to traditional credit, industrial guidance funds (IGF) have recently been launched, but state-owned banks, especially the

[7]Other sources of investment finance (averages): self-financed: 60.4%; state-financed: 7.1%; foreign-financed: 7% (China Provincial Statistical Yearbooks).

China Development Bank, also play a leading role in their initiation.[8] In addition, a smaller portion of industrial policy funding is also provided through state investment corporations (Naughton, 2021).

We thus conclude that banks, as vehicle of the state, might have a particular importance in the financing of industrial policy projects in China. As Naughton (2021, p. 122) puts it:

> *'Indeed, the commitment from the banking system inevitably sets the overall framework for the volume of resources flowing through the overall industrial policy program.'*

# 4 Empirical Literature Review

Our paper is related to several strands of the existing empirical literature. While the general finance and growth literature, as well as the literature on industrial policy creates the framework for our paper, we are particularly interested in the conjunction of both literature strands, with special emphasis on the Chinese case. In the following we will provide a concise overview of the related literature.

## 4.1 Literature on Finance and Growth

One of the first empirical analyses of the **finance-growth nexus** was conducted by Goldsmith (1969). However, it was the seminal work of King and Levine (1993) that led to a substantial increase in work on the relationship between the financial system and economic growth. In their research, King and Levine (1993) find a significant positive relationship between economic growth and financial development, which is still considered an important piece of evidence today (Levine, 2021). This positive relationship has been confirmed by several other studies, e.g. Beck, Levine, and Loayza (2000); Levine (2002); Méndez-Heras and Ongena (2020); Rajan and Zingales (1998), and also holds for emerging economies (Garcia-Escribano, Góes, & Karpowicz, 2015). However, some authors also found no relationship or even a negative one (Demetriades & Hussein, 1996; Ram, 1999; Shan & Morris, 2002), especially for advanced economies (De Gregorio & Guidotti, 1995; Leahy, Schich, Wehinger, Pelgrin, & Thorgeirsson, 2001; Pagano & Pica, 2012) and following the financial crisis (Arcand, Berkes, & Panizza, 2012; Cecchetti & Kharroubi, 2012; Rousseau & Wachtel, 2011). The latter studies emphasize in particular that the positive relationship between finance and growth is reversed above a certain size of the financial system (often measured in terms of the ratio of credit to GDP). Bezemer, Grydaki, and Zhang (2016) find negligible or negative effects of financial development (credit stocks) on income growth for large number of economies since

[8] IGFs are funds that are set up as limited partnerships or non-listed joint ventures, with an SOE or a government institution as initiator and managing partner, and with a predetermined purpose in financing a specific industrial policy project (Naughton, 2021).

1990s but positive effects if using credit flows. They explain their findings with an disproportionate allocation of credit to real estate.

While most of the finance and growth literature is dominated by cross-country panel studies, some authors also examine this **relationship specifically for China**. Q. Liang and Jian-Zhou (2006), for example, conduct a study to discuss the relationship between financial development and growth in China using annual data from 1952 to 2001. Based on their VAR analysis, they find **causality** between economic growth and financial development. H. Chen (2006) uses a panel of Chinese provinces between 1985 and 1998 to analyze the development of financial intermediation and its impact on Chinese economic growth, and concludes that while financial sector development generally contributes positively to economic growth, the expansion of credit does not support growth because credit distribution is inefficient. Similarly, using Granger causality tests, T. Chang (2002) finds no correlation between finance and growth in China. Guariglia and Poncet (2008) as well as Y. Ma and Jalil (2008) also find negative effects of finance on growth in China due to inefficiencies.

In contrast, Hasan, Wachtel, and Zhou (2009), using panel data from 31 provinces in China (1986-2002), find that financial markets are one of the elements associated with stronger economic growth. However, they also emphasize the positive effects of financial markets and institutional development on economic growth. Shan and Jianhong (2006) find a two-way causality between finance and growth, but also emphasize the significant contribution of financial development to economic growth. Zhou, Qu, Yang, and Yuan (2020) use a panel of 31 provinces from 2007 to 2017 and find overall significant positive effects of regional credit on provincial economic growth. Han and He (2018) use balance sheet data for commercial banks in China and find that liquidity creation by commercial banks is an important driver of real economic growth in China. Similarly, Allen, Qian, and Qian (2005); Aziz and Duenwald (2002); Jalil, Feridun, and Ma (2010); Xu (2016); Yao (2010); Y. Zhang, Yao, and Zhang (2020) also find positive effects of financing on growth. Guillaumont Jeanneney, Hua, and Liang (2006) and Jun, Wan, and Jin (2007) find significant positive effects of financial development and financial deepening on productivity growth in China. L. Zhang and Bezemer (2016) using provincial data find negative effects of large credit stocks but positive for increase in credit flows. They also find non-linear regional and time effects. They attribute the negative effect of financial development on income growth to over-investment in gross capital formation and net exports relative to investment in resources that support consumption.

In addition to general causality considerations, some studies on the finance and growth relationship in China also focus on the **role of ownership structures** in the banking system. J. Zhang, Wang, and Wang (2012) find a positive impact of financial development on economic growth at the city level in China for the period 2001-2006, so in contrast to the usual conclusions, they find that the

state-owned banking sector in China could have a positive impact on economic growth. However, Andersson et al. (2016) explicitly distinguish between state-owned banks and private banks in their analysis of the Chinese banking system for the period 1997-2008. They conduct Granger causality tests and find that while private banks promote economic growth, state-owned banks do not exhibit Granger causality for GDP growth. Similarly, Wei and Wang (1997) find that China's bank lending favors state-owned industrial enterprises and that this lending bias reduces the effectiveness of other policies to promote growth in non-government sectors. Boyreau-Debray (2003) finds negative effects of lending on provincial economic growth. They attribute this negative effect to the burden of supporting SOEs rather than to the performance of state-owned banks. X. Chen and Wohlfarth (2019) also find a bias in Chinese banks' lending in terms of bureaucratic variables that are important in determining credit growth. Laurenceson and Chai (2001) reach a different conclusion regarding the impact of state-owned bank lending on growth. While conceding that the commercial performance of state-owned banks is poor, they emphasize their nature as development banks, which justifies performance criteria other than profitability or capital adequacy. Analyzing their impact on economic growth against this background, the authors conclude that state-owned bank lending has a positive impact on economic growth and development in China. P. C. Chang, Jia, and Wang (2010) specifically analyzes the impact of state-owned commercial banks for the period 1991-2005 and concludes that the impact of state-owned bank lending on economic growth became more positive over time due to market-oriented reforms. Similarly, He (2012) and Z. Liang (2005) emphasize the positive impact of financial reforms that contribute to a more efficient redistribution of credit across sectors, thereby promoting economic growth.

In addition, there are studies such as that by K. C. Chen, Wu, and Wen (2013), that have a stronger focus on **regional differences**. In their analysis of cross-sectional panel data for 28 provinces in China from 1978-2010, they find a strong positive impact of finance on economic growth in high-income provinces, but a strong negative impact on growth in low-income provinces. The negative influence of bank credit in low-income provinces is explained by the fact that in these provinces the government sector has a large share in industrial production.

A study that is quite close to this work is Tsai, Weng, and Chang (2016), which also base their analysis on Schumpeter's theories. Using panel data for 31 provinces over the period 1978-2004, they find that credit has significant positive effects on China's economic growth across the country and especially in the eastern provinces. They also find negative effects of financing for the central and western regions. They explain these differences by China's east-oriented industrial planning, which led to structural differences and different growth rates between regions. Existing resources were shifted from the central government to the eastern regions, giving them control over these resources. In addition, in the western regions, state-owned banks were the predominant source

of credit, lending mainly to state-owned enterprises, which often used it inefficiently. H.-z. Wang and Bai (2008) focus on the period 1999-2004 and conclude that the change in the banking market structure in the western provinces toward more competition is an important explanation for the accelerated growth of these provinces.

The importance of **bank credit as a source of financing** for enterprise growth in China is emphasized by Du and Girma (2009). In their firm-level study using data from 1998-2005, they find that bank credit is an important source of growth, especially for larger firms. X. Cheng and Degryse (2010) directly compare the impact of bank and non-bank financial institutions on economic growth and conclude that banking sector development has a statistically significant and economically stronger impact on local economic growth. Similarly, Ayyagari, Demirgüç-Kunt, and Maksimovic (2010) compare the effects of formal and **informal channels of finance** and show that firms with access to formal channels of finance grow faster. Raising funds through informal channels is not associated with faster firm growth, but bank financing is.

While some researchers also study the impact of **stock market development** on economic growth (e.g., Levine (1998)), it is often emphasized that due to the underdeveloped stock and capital markets in China, the role of banks in providing liquidity is more important. This weak (or non-existent) relationship between the stock market and the real economy - at least in the short run - is also confirmed by Pan and Mishra (2018).

Thus in general, the finance and growth literature on China finds evidence of positive effects of finance on growth, but also of growth on finance. Some studies, e.g. Maswana (2006), also reports bidirectional causality between financial development and economic growth. While there is also some literature that finds evidence of negative effects, there seems to be a shift in the perception of the influence of finance on growth. The older literature tends to find negative effects, while the newer literature tends to find evidence of a positive influence.

## 4.2 Literature on Industrial Policy and Growth

The second strand of literature related to our paper addresses the relationship between industrial policy and economic growth. In an analysis for 59 countries, Farla (2015) for instance finds **positive effects** of business-friendly policies and innovation and technology policies on economic growth. Similarly, Falck, Heblich, and Kipar (2008) find positive effects for innovation-oriented industrial policies in certain sectors in Germany. Finally, Bartelme, Costinot, Donaldson, and Rodriguez-Clare (2019) also find positive, albeit small, effects of industrial policies in OECD countries. In one of the few papers specifically looking at the causal effects of industrial policy, Criscuolo, Martin, Overman, and Van Reenen (2019) find positive effects of investment subsidies on investment and employment.

Positive effects on economic and productivity growth can also be found for industrial policies that target tax exemptions, feed-in tariffs, and R&D investments, e.g. Bloom, Griffith, and Van Reenen (2002); Clausen (2009); Dang and Samaniego (2022); Jenn, Springel, and Gopal (2018); Kilinc-Ata (2016); Manelici and Pantea (2021); Wee, Coffman, and La Croix (2018); Wilson (2009); Zambrano-Gutiérrez, Nicholson-Crotty, Carley, and Siddiki (2018). Lane (2022) discusses sector-specific industrial policies for the case of the South Korean chemical industry and report positive impacts on Korean manufacturing that persisted after the end of targeted industrial policy support. Yi, Lawell, and Thome (2019) apply a dynamic model of subsidies in the US ethanol industry and find that investment and entry subsidies are effective in triggering investment that would not otherwise have occurred. Aldy, Gerarden, and Sweeney (2018) find in their study of US wind farms that production subsidies are more efficient than investment subsidies. Kobos, Erickson, and Drennen (2006) analyze industrial policies targeting US renewable energy policies and find a positive impact of policy instruments on cost reduction and market adoption of renewable energy sources.

Apart from that, there is a also broad and overall positive strand in the literature on **industry protection**. Krueger and Tuncer (1982), one of the first studies on the protection of infant industries, find no evidence of positive effects in the Turkish economy between 1963-1976, but a later study (Harrison, 1994) with the same data set showed that more protected sectors actually had higher productivity growth. Baldwin and Krugman (1986) find that restricting market access and creating a protected home market was a key advantage for Japanese firms. Similarly, Head (1994) as well as Luzio and Greenstein (1995) reported positive welfare effects of protecting infant industries in the US steel rail industry and Brazilian microcomputers. Hansen, Jensen, and Madsen (2003) find positive effects of protection strategies for young industries in the case of the Danish windmill industry.

There are, however, also authors that do not support those findings. Beason and Weinstein (1996), in their analysis of Japanese industrial policy from 1955 to the 1990s, arrive at a more **negative assessment** of the impact of industrial policy on growth in the targeted sectors. Similarly, Lee (1995) found no correlation between Korean industrial policies such as tax incentives and subsidized credit and total factor productivity growth in the targeted sectors.

Some other empirical studies on industrial policy focus specifically on the **assessment of industrial policy in China**. For example, Wu, Zhu, and Groenewold (2019) show that central government preferences for certain industries are an important determinant of provincial governments' five-year plans. They also show that preference policies have a significant positive effect on industrial output growth while the five-year plan is in effect. However, they find no lasting positive impact beyond the end of a given five-year plan. Aghion, Dewatripont, Du, Harrison, and Legros (2012)

use data for all medium and large firms in China between 1998 and 2007 and find that industrial policies allocated to competitive sectors or designed to promote competition increase productivity growth. Barwick, Kalouptsidi, and Zahur (2021) analyze the Chinese shipbuilding industry over the 1998-2013 period and find overall positive long-term performance effects of production and investment subsidies. Mao, Tang, Xiao, and Zhi (2021) find that China's industrial policies contribute to higher productivity growth, albeit more in the world's emerging high-tech industries. Y. Sun and Ding (2021) analyze strategic policies for emerging industries and find a positive effect on total factor productivity. They also find that non-state-owned enterprises were more affected by industrial policies. Guo, Guo, and Jiang (2016) also examine a government support program and find that firms supported by the fund tend to innovate more than firms that are not supported. Wen and Zhao (2021) analyze the Made in China 2025 program and its impact on R&D investment and find that it had significant positive effects after policy intervention. They also find that the program significantly increased government subsidies and financial credit to treated firms, and even more so to SOEs. Similarly, Boeing (2016) examines the impact of R&D subsidies for Chinese firms between 2001 and 2006 and find a strong crowding-out effect on firms' own R&D investments, but also show that the crowding-out effect is not prevalent for repeated subsidy recipients. J.-j. Liu, Xu, and Li (2021) show that the R&D investment intensity of firms supported by industrial policy is higher than that of unsupported firms. Alder, Shao, and Zilibotti (2016) analyze the effectiveness of establishing special economic zones and find positive effects on economic growth through positive effects on capital accumulation and total factor productivity using a panel data set of Chinese cities from 1988 to 2010. They also find evidence of positive and often significant spillover effects to neighboring regions. As J. Wang (2013) shows, SEZs also attract foreign direct investment from the city. L. K. Cheng and Kwan (2000) show that industrial or preferential policies generally have a positive impact on FDI. Hu and Liu (2021) find positive effects for science and technology financing policies on promoting transformation and improvement of industrial structure. However, they also find regional differences, with more pronounced effects in eastern areas than in western regions. Z. Chen, Jiang, Liu, Serrato, and Xu (2019); Y. Liu and Mao (2019) examine tax incentives for specific industries and firms and find positive effects on investment and productivity. Similarly, Qiu (2015) find a significant and positive impact of industrial policy on technological progress for 34 industrial sectors between 2003 and 2012. Girma, Görg, and Stepanok (2020) examine production-related subsidies and their role on firms' export performance using a firm-level dataset for 2004-2006. They find that the direct impact of subsidies is always positive but has a negative effect on nonsubsidized firms. Weizeng, Jianfeng, and Siqi (2020) conduct an analysis of place-based (or regional) industrial policy in China. Their findings suggest significant positive effects on consumption levels and educational expenditures of children in upgraded development zones.

Some studies also focus on **specific Chinese industries** and their development under the influence

of industrial policy. For us, the automotive and energy industries are of particular interest. Zhao, Li, Zhao, and Ma (2019) examine the innovativeness of industries based on the number of invention patents. Using a difference-in-differences approach, they find that a program to promote the new energy vehicle industry increased the number of invention patents among new energy automobile manufacturers. Similarly, L. Liu, Zhang, Avrin, and Wang (2020) also find positive effects of China's industrial policy on the number of patents in the new energy vehicle industry and overall economic progress in this industry. D. Li et al. (2016) observe that R&D and industrial development policies have contributed significantly to the development of the new electric vehicle industry. S. Li, Zhu, Ma, Zhang, and Zhou (2022) find that policies aimed at electric vehicle sales via consumer subsidies account for more than half of electric vehicle sales in China. They also find positive and even more cost-effective effects for investments in charging infrastructure.

D. Zhang and Kong (2022) find significant effects of industrial policies to promote investment in renewable energy. However, they also find that these policies may lead to overinvestment, which could have more negative long-term effects on SOEs' economic performance. Similarly, Shen and Luo (2015) observe that subsidy policies for renewable energy sources accelerate the development of these industries but may lead to overcapacity. Overproduction or creation of overcapacity is also noted in a more general study by Bu and Tu (2017). They find that firms supported by industrial policies are more likely to create overcapacity, especially state-owned enterprises. Song, Liu, Wei, and Zhang (2021) conduct a study for 30 provinces in China from 2003 to 2017 to investigate the impact of industrial policies on wind energy, and find a positive and significant role of these policies in promoting wind energy development. F. Yu, Guo, Le-Nguyen, Barnes, and Zhang (2016) observe that government subsidies provide significant incentives for R&D investment by SOEs in renewable energy, but can also have a significant crowding-out effect on firms' R&D investment behavior. H. Wang, Zheng, Zhang, and Zhang (2016) analyze the policy impact of downstream feed-in tariffs on the photovoltaic industry and find that these policies significantly increase the inventory turnover of listed firms and improve their profitability. They also find that these measures are more efficient for private firms. Ji and Zhang (2019) show that financial development, particularly in the form of capital market financing and foreign investment, is a key contributor to the growth of the renewable energy sector. Cherif and Hasanov (2019) also show the positive effects of industrial policies in several Asian countries including China.

### 4.3 Literature on the Role of Banks for Industrial Policy and Growth

The last strand of literature, which is the most central for us, deals with the connection of both previous strands of literature, namely the role of the financial system for industrial policy in China.

Only few studies, however, directly address the link between industrial policy and banking in

China. L.-w. Li and Kong (2020) show that Chinese enterprises still rely more heavily on the formal, bank-dominated financial system. They also show that firms supported by industrial policies receive more credit from the banking system, which may encourage these firms to expand their output. Similarly, G. Li and Liu (2020) show that bank credit is an important tool for industrial policy in China and that the impact of industrial policy on credit is stronger for SOEs. W. Ma and He (2017) indicate that firms supported by industrial policies tend to have higher debt levels than firms that are not supported. In a related area, Jiali and Rui (2017) show that industrial policies can alleviate firms' financing constraints, and Z. Zhang, Yu, and Zhang (2020) find that the borrowing costs of industrial firms supported or targeted by industrial policies are lower. Similarly, D. Zhang and Guo (2019) indicate that policy linkages are an important driver of access to bank credit used for innovation by private firms. Yang and Sun (2009) empirically show that bank intermediation has a positive effect on improving industrial structure in China. They find that this effect is more pronounced in the western and central regions than in the eastern regions. C. Ye and Tang (2012) examine the role of interbank competition on industrial upgrading and find that higher competition leads to more efficient inter-industry and inter-provincial lending, thereby promoting industrial upgrading. D. Chen, Li, and Xin (2017) show that state-owned enterprises in targeted industries receive more credit from large national banks. They also show that this preferential access of SOEs comes at the expense of non-state-owned enterprises, which are crowded out. In addition, they show that while government support can lead to more investment, it can also lead to overinvestment, and that supported industries tend to have a higher proportion of nonperforming loans. X. Zhang and Bai (2017) show that financial resources provided through targeted industrial policies can promote the upgrading of regional industrial structures. This effect is more pronounced in western regions. Similarly, Li (2015); H.-B. Li and Gao (2009); X. Liu and Li (2015); Zheng and Shen (2018) show that credit subsidies and development finance in foreign countries may enhance economic growth. One of the few papers with a more negative assessment of industrial policy is Xinmin, Zhang, and Chen (2017), which finds that enterprises, especially non-SOEs and enterprises without political connections, are more tied to finance after local governments implement industrial policy. This would make business investment less efficient.

In summary, there is evidence that Chinese firms are still dependent on formal bank lending, while higher credit provision leads to an improvement in industrial structures. Moreover, **industrial policy increases the availability of credit** and lowers the cost of borrowing for targeted industries, especially for state-owned enterprises. If an industry receives more financial support (including subsidies, amongst others) under industrial policy, this could lead to more economic growth. Our paper contributes to the existing literature by focusing on the question, whether the Chinese banking system has, by providing credit to industries that were targeted by industrial policy (i.e. the SEI program) promoted GDP and investment growth in the past. Thus, while the relationship

between credit and growth, as well as between industrial policy (instruments) and certain indicators of success, such as GDP or productivity growth, has already been examined individually in the empirical literature on China, to the best of our knowledge, no study has yet addressed this question.

# 5 Empirical Approach

Based on Schumpeter's idea of finance and growth, the characteristics of China's development process, and in light of the literature just discussed, the following research questions therefore arise for us:

1. Is there generally a **link between credit growth and GDP growth** in China?
2. If so, was **credit provision to non-financial corporations** in particular even more growth-enhancing than lending overall?
3. Can this be traced back to **industrial policy**?
4. Are there also positive effects observable for **individual industries**?

Our empirical analysis essentially consist of two parts: In the first part, we focus on the question to which extent lending has influenced economic growth in the Chinese provinces over the past 34 years (see chapter 6.2). In the second part, we will then look at the background to this relationship by analyzing whether bank-led industrial policy in China has, by directing credit to selected target industries, influenced the finance and growth channel (chapter 6.3).

## 5.1 Methodology

Due to the nature of our data we resort to standard panel data estimation methods to assess those questions. We would basically choose between three estimation methods: Fixed effects (FE), random effects (RE) and pooled OLS (POLS) estimations. As POLS assumes an independent and identical distribution of residuals, thus pooling all province observations (Bell & Jones, 2015), we can quickly exclude this method from further consideration. Also, with FE and RE we're given a larger number of data points, which increases the explanatory power of our analysis, since we can subdivide our data set with respect to regional or temporal structures as part of our robustness checks.

However, given our data structure (annual observations across 31 provinces), we assume that our individual observations are correlated, so we need estimators that control for this. FE and RE both absorb the correlated, i.e. systematic variability in our data, so that afterwards only the

normal error due to random deviations remains, which is thus uncorrelated and heteroskedastic (Wooldridge, 2020). In (simplified) mathematical terms we have

$$y_{it} = \beta_0 + \beta \cdot X_{it} + \eta_i + u_{it} \tag{1}$$

with the intercept $\beta_0$, $i$ as province identifier, therefore $\eta_i$ as the unobserved province effect (that could also be extended to unobserved time effects) and the error term $u_{it}$. The difference between RE and FE is, that the individual unobserved country (and time) effects are constant, i.e. fixed, over time for FE. Accordingly we have

$$y_{it} - \bar{y}_i = \beta_0 + \beta \cdot (X_{it} - \bar{X}_i) + (\eta_i - \bar{\eta}_i) + (u_{it} - \bar{u}_i) \tag{2}$$

with $(\eta_i - \bar{\eta}_i) = 0$. In the case of RE, on the other hand, the respective time and country effects are assumed to be uncorrelated with the observations, so that $(\eta_i - \bar{\eta}_i) \neq 0$ (Wooldridge, 2020).

The standard approach in deciding between FE and RE is the Hausman test, that is, a Wald test of the difference between the FE and RE coefficients in terms of exogeneity, which, as we see above, is a critical assumption for RE, but not for FE (Wooldridge, 2002). Applying it to our data we get a preference for FE modeling, which might be considered as the 'gold standard' in panel data modeling (Schurer & Yong, 2012). Bell and Jones (2015), as well as Clark and Linzer (2015), however, show that carrying out methodological decisions solely based on the Hausman test, due to its strict focus on exogeneity, might be 'neither a sufficient nor a necessary condition for choosing a fixed-effects model'(Clark & Linzer, 2015, p. 406) as FE has some considerable disadvantages over RE, depending on the underlying research issue. They argue that, in order to understand the role of higher-level entities (here: provinces), it requires an econometric model that accounts for effects both within and between those entities. By deleting higher-level differences (between effects), as with FE modeling, one would control out heterogeneity bias, but at the cost of losing information on the underlying entities (Bell & Jones, 2015).

For this reason, we have adopted the following methodological approach: To avoid endogeneity bias, we perform FE estimations whenever possible, but always complemented by RE estimations as robustness checks. After the basic estimations, we then increasingly resort to RE in order to map province- and time period-specific features in particular.

As robustness checks we repeat our estimations with logarithmic credit growth rates and lagged credit variables. Since the literature often resorts to using 3 or 5-year averages to rule out cyclical effects we also include estimations based on 3- and 5-year moving averages. The estimation tables are provided in the Appendix (section 9.2), and the findings are widely in line with the results

presented in section 6. As especially for the effect of industrial policy we're interested in isolating the structural change since the start of the SEI program, we refrain from including 3- or 5-year averages in the industrial policy part of our estimation, but apply lagged variables and logarithmic credit growth rates.

Our representation of the economic growth process in the first part of our empirical analysis is based on the one widely used in the standard finance and growth literature. A major deviation from this lies in the use of growth rates for the credit variables, as dynamic concepts are, in our opinion, better suited to represent the effects of lending on (also dynamic) GDP growth rates than static approaches (see also Dullien (2009), Bezemer et al. (2016) and Bofinger et al. (2021)).

Following King and Levine (1993) in line with Barro (1991) we therefore estimate the following model:

$$GROWTH_{it} = \beta_0 + \beta \cdot FINANCE_{it} + \boldsymbol{\gamma} \cdot \mathbf{X_{it}} + \delta_t + \eta_i + u_{it} \tag{3}$$

again, with the intercept $\beta_0$, $i$ as province identifier and $t$ as year identifier. $GROWTH_{it}$, as the response variable, equals annual real GDP growth and is therefore adjusted for inflation. $FINANCE_{it}$ pictures distinct financial development variables, hence, credit growth variables (total credit growth, $\Delta CREDIT_{tot}$, corporate credit growth, $\Delta CREDIT_{NFC}$, and growth of investment financed by credit, $\Delta INV_{credit}$). $X_{it}$ represents a set of different control variables. This includes, as established in the standard literature (e.g., King and Levine (1993), Beck, Levine, and Loayza (2000), Levine and Zervos (1998), Rousseau and Wachtel (2011)), measures of education, government consumption and trade, as well as the representation of the absolute, initial GDP.

In detail, we include

- log(INITIAL GDP) to control for convergence (as in Barro and Sala-i Martin (1995); Barro and Sala-i Martin (1992)),
- Secondary school enrollment rate (SCHOOL) to capture human capital accumulation (see Solow (1956); Barro and Sala-i Martin (1995))

and macroeconomic indicators, as

- General government expenditure (log(GOV)) (refering amongst others to Easterly and Rebelo (1993); Fischer (1993)), and
- Trade (log(OPENNESS)), as the sum of exports and imports divided by GDP (see Balassa (1978); Krueger (1998))

$u_{it}$ is the random error term, $\delta_t$ includes time fixed effects, and $\eta_i$ controls for province fixed effects. Furthermore we add time dummies to account for trends in our data, and include robust standard errors for heteroscedasticity. All variables are taken from the Chinese Provincial Statistical Yearbooks (see chapter 5.2).[9]

Following our estimations on the relationship between credit and GDP growth, we methodically use the same approach to assess the success of industrial policy through the credit channel in the second part of our empirical analysis. Due to the structure and time availability of our data, it is not possible for us to apply more causal methods, such as those based on differences-in-differences or instrumental variables.[10] Referring to various random effects estimations, we therefore analyze the relationship of credit and GDP growth, as well as of credit and investment growth before and after the start of SEI measures in 2010, as our proxy for (more narrow) industrial policy, and perform various robustness checks with respect to credit type and target industry. To show in more detail, how targeted credit provision as an industrial policy instruments affects firms, we then supplement our GDP growth estimation with the following investment growth equation:

$$INV_{it} = \beta_0 + \beta \cdot FINANCE_{it} + \boldsymbol{\gamma} \cdot \mathbf{X_{it}} + \delta_t + \eta_i + u_{it} \tag{4}$$

with $INV_{it}$ being growth of investment in fixed assets and $FINANCE_{it}$ as financial development variable, i.e., credit growth. The set of control variables $X_{it}$ includes industrial revenues, ownership (volume of state capital, resp. foreign capital in an industry) and dummy variables for Chinese regions.[11] We took the data for estimating the investment equation from the China Industry Statistical Yearbooks, that aggregate firm data at the total industry level, and also by industrial sector.

## 5.2 Data Set

In line with Kerola and Mojon (2021) and Aziz and Duenwald (2002) we argue that using province data to analyze China's development is more informative than using aggregated data for the country as a whole. An advantage of this approach is that the provincial data are usually of better quality and more reliable. Furthermore, we draw on official Chinese statistics for the whole data set, so that the data is internally consistent, even if systematic measurement errors cannot be ruled out. Thus, our main dataset contains data from 31 provinces over the period from 1985 to 2019, all retrieved from the China statistical yearbooks database, which gives us access to the annual

[9] A detailed listing of all variable definitions and sources can be found in Table 16 in the Appendix.
[10] A more detailed discussion of this issue can be found in Chapter 8.
[11] The selection of these variables depends predominantly on the availability of data in the Chinese Industry Statistical Yearbooks.

*'Provincial Yearbooks'* of the National Bureau of Statistics of China (NBS).[12]

Since the variables from the *Provincial Yearbooks* are largely not available as uniform time series, but are provided in individual files of different formats, organized by individual years and individual provinces, the creation of a uniform dataset required the manual review and transformation of these raw data. Thus, machine processing of the official provincial statistics was not possible, particularly due to varying data and file formats, as well as marginally different variable names. To our knowledge, no comparable credit data set based on the Chinese Provincial Statistical Yearbooks exists that would allow a detailed analysis of the finance and growth relationship at the provincial level in China.

While some variables have relatively good availability despite the difficulty of data collection, e.g. data on population, GDP and investment, other data such as sector-level credit variables are only available in a fragmented way.[13] This means that the credit variables provided per province have changed over the years. Specifically, for example, for Anhui province, data for total credit are consistently and uniformly available from 1985 to 2018. Credit data for enterprise sectors are not consistent and explicitly reported. Instead, data for industry credit, commercial credit, enterprise credit, construction credit or innovation credit are available from 1990 to 2009. Between 2010 and 2014, only unit credit data are available, and from 2015 to 2019, these are labeled enterprise or business credit. While the data are internally consistent, structural breaks are unavoidable when they are merged. These would distort our estimation results. For this reason, and because credit growth rates are also the more relevant variables from a theoretical point of view (Bofinger et al., 2021), we first calculated internally consistent growth rates for all individual data series and then merged them into one data series ($CREDIT_{NFC}$). Thus, $CREDIT_{NFC}$ represents a proxy for credit to the non-financial corporate sector. As a large share of business / unit credit flows to the industrial sector, this data series on credit to non-financial corporations is closely related to credit to the industrial sector. We then interpolated the growth rates. Our subsequent results refer to the interpolated credit data series, but are also robust using the non-interpolated data series. Time series for total credit and investment financed by credit were uniformly available.

Below are the descriptive statistics for the variables from the macro-panel set.

[12] The database is not freely accessible and was obtained through the paid service provider CrossAsia.
[13] An overview of all variables used, their definitions and sources can be found in Table 16 in the Appendix.

Table 1: Descriptive statistics (macro panel)

| Variable | n | Mean | Median | Standard deviation | Min. value | Max. value |
|---|---|---|---|---|---|---|
| $\Delta GDP_{real}$ | 1,085 | .1486019 | .1396355 | .0767196 | -.1015 | .5157978 |
| log(INITIAL GDP) | 1,085 | 7.887701 | 7.957527 | 1.734574 | 2.829087 | 11.58977 |
| SCHOOL | 1,111 | .3649428 | .3756213 | .0881579 | .1081185 | .603925 |
| log(GOV) | 1,115 | 6.159305 | 6.114346 | 1.829535 | 1.774952 | 9.765993 |
| log(OPENNESS) | 1,090 | -3.678122 | -4.024214 | 1.162173 | -6.805961 | .795448 |
| $\Delta CREDIT_{tot}$ | 992 | 24.41916 | .1673668 | 539.5656 | -.9998846 | 12327.35 |
| $\Delta CREDIT_{NFC}$ | 1,054 | .1389735 | .1291336 | .1669354 | -.3989602 | 2.885309 |
| $\Delta INV_{credit}$ | 899 | .2066672 | .156876 | .4074168 | -.9997833 | 6.19027 |

Source: China Provincial Statistical Yearbooks.

In addition, we also use aggregate firm balance sheet data in some parts of our analysis, also reported at the 31-province level, and from 1985 to 2020. However, this panel is more fragmented than the previous macro panel. The data also come from the Chinese statistical yearbooks database ('*China Industry Statistical Yearbooks*', various volumes), and include variables for profits and revenues, investments, ownership shares, assets, and liabilities, among others. One advantage of this data set is that the aggregated company data is given for the entire Chinese industrial sector on the one hand, but also subdivided by ownership structure, i.e. by state and private ownership, and by industrial sector, i.e. by automobile or energy sector[14]. Particularly when subdivided by industrial sector, however, the availability of data diminishes, so that observations for the automotive sector do not start until 2012, and for the energy sector not until 2005. Also, there is no data available for other important ownership groups, such as joint ventures or collective enterprises.

For all sectors, the most central variable for us, $CREDIT$, is approximated from the difference in liabilities and owner's equity. The following table shows the descriptive statistics of the variables that we used from this dataset:

Table 2: Descriptive statistics (aggregated firm balance sheet data)

| Variable | n | Mean | Median | Standard deviation | Min. value | Max. value |
|---|---|---|---|---|---|---|
| $\Delta INV_{tot}$ | 1,014 | .1954235 | .1810637 | .1580953 | -.6351365 | 1.162663 |
| $\Delta INV_{auto}$ | 156 | .187439 | .0781992 | .666351 | -.9115297 | 4.777609 |
| $\Delta INV_{energy}$ | 526 | .6200826 | .1482293 | 10.06496 | -.993197 | 230.8935 |
| $\Delta STATECAP_{ind}$ | 589 | .1332996 | .0819591 | .3836459 | -.8606861 | 3.616322 |
| $\Delta FORECAP_{ind}$ | 557 | .2663167 | .0816602 | 2.675658 | -.80000 | 62.33333 |
| $\Delta REV_{ind}$ | 1,052 | .1609298 | .151823 | .1529956 | -.4164921 | 1.333333 |
| $\Delta CREDIT_{firm}$ | 545 | .1434175 | .0825537 | .5407102 | -.9327303 | 8.551471 |
| $\Delta CREDIT_{state}$ | 526 | .1582304 | .0713436 | .5747422 | -.7894853 | 8.257886 |
| $\Delta CREDIT_{private}$ | 419 | 1.384476 | .2556187 | 11.47857 | -.9933515 | 161.0615 |

Source: China Industry Statistical Yearbooks.

# 6 Empirical Analysis

## 6.1 Descriptive Statistics

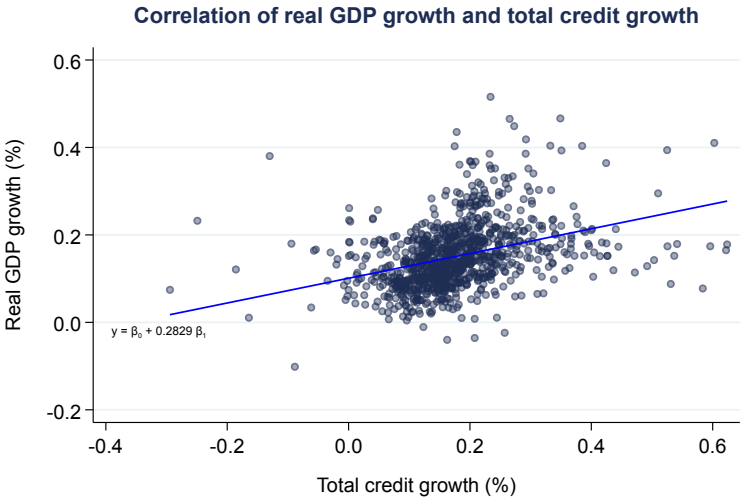
Before we get to the estimation results, we take a first, descriptive look at the data set just described.

[14] In the China Industry Statistical Yearbook, this sector is called 'Production of Electricity, Heat, Gas, Water'.

The first part of our empirical analysis focuses on the general relationship between finance (i.e. credit growth) and GDP growth in China. For this reason, we begin our analysis by showing the simple correlations between real GDP growth ($\Delta GDP_{real}$) and the three credit-related variables that are available to us ($\Delta CREDIT_{tot}$, $\Delta CREDIT_{NFC}$ and $\Delta INV_{credit}$).

The general correlation between real GDP growth and total credit growth ($\Delta CREDIT_{tot}$) already points to a clearly positive finance-growth relationship in China (see Figure 2). Total credit encompasses all lending, i.e. that by banks, other financial companies and non-financial companies, both domestic and foreign, to all economic sectors (government, corporate sector, households). In addition, all provinces were considered over the entire sample period. This is noteworthy because this credit variable presumably includes a higher proportion of unproductively used (i.e., non-growth-enhancing) credit.[15]

Figure 2: Correlation of real GDP growth and total credit growth for all provinces and years.




Source: China Provincial Statistical Yearbooks.

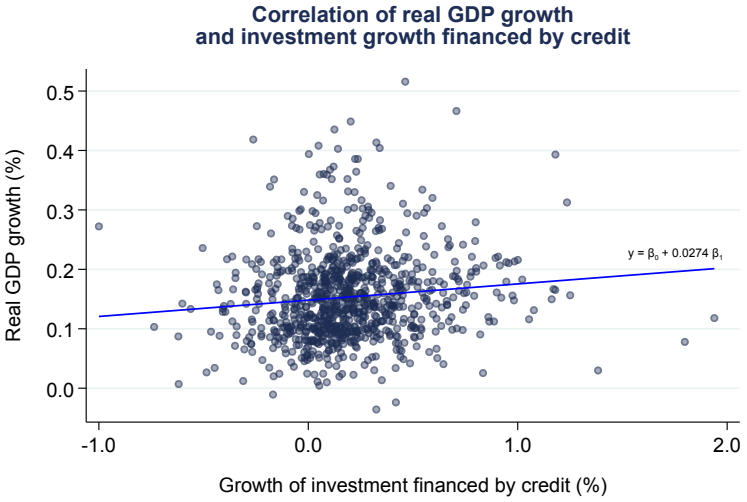
However, since in the later part of our empirical analysis, we are particularly interested in whether the Chinese state (within its industrial policy strategies) was able to significantly influence the growth of individual provinces through targeted lending by (state-owned) banks, only considering total lending would be too inaccurate. We therefore have two further and somewhat more precise variables at our disposal - although aggregate bank credit data at the provincial level were unfortunately not accessible for us.

What we can draw on are, on the one hand, data on investment volumes financed by domestic

[15]This refers for example to credit to households and credit to the government sector, especially provincial government sector.

credit ($INV_{credit}$). This means that it is not direct lending that is shown, but rather the result of this lending, insofar as the credit was used for investment. Once again, the variable refers to the investment of all sectors. We still see a clear positive correlation of this variable with real GDP growth, although there is somewhat more dispersion than when total credit is considered (Figure 3).

Figure 3: Correlation of real GDP growth and growth of investment financed by credit for all provinces and years.




Source: China Provincial Statistical Yearbooks.

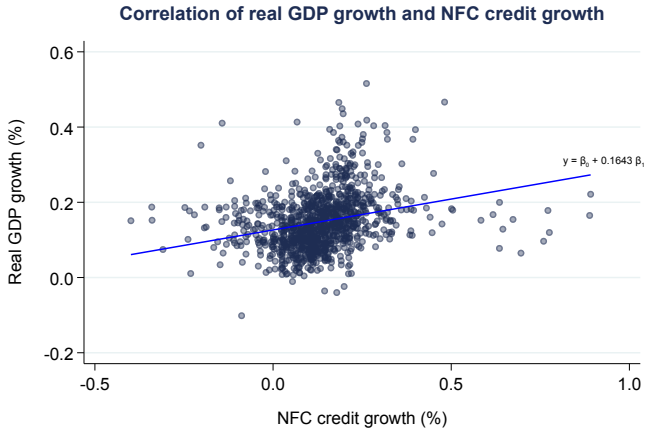
Finally, we can also resort to ($\Delta CREDIT_{NFC}$), i.e., lending to the non-financial corporate sector by banks and non-banks. From our point of view, this variable corresponds most closely to what we need in order to carry out an evaluation of credit allocation (guided by industrial policy decisions) in terms of GDP growth.

A purely visual analysis on the relationship between our corporate credit variable and real GDP growth again shows a positive correlation, that is now stronger than that for $\Delta INV_{credit}$. We note, however, that the strength of the relationship varies with respect to the overall size of the financial system. If the latter is approximated by the ratio of total credit to GDP, which is widely used in the literature, then the relationship between corporate credit growth and real GDP growth appears to be strongest for the lowest decile and then declines. In other words, if a province at time t is among the top 10 percent of the total credit-to-GDP variable, then lending to the corporate sector might be less growth-enhancing than if it had a smaller financial system (see Figure 4).

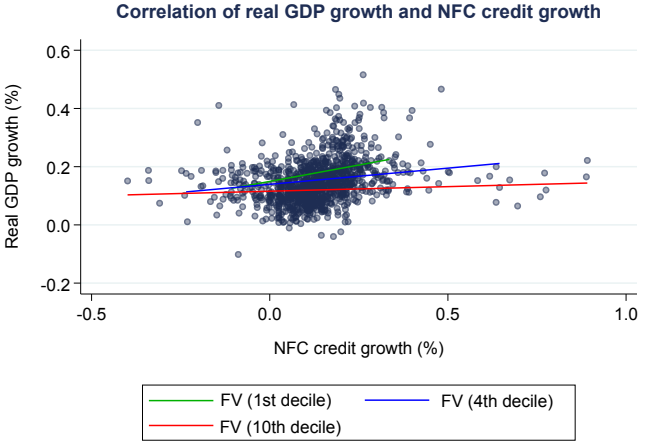
Thus, although the overall picture of lending in China is positive when viewed superficially and without taking into account any control variables, there are structural differences, such as in terms

Figure 4: Correlation of real GDP growth and NFC credit growth for all provinces and years.

(a) Overall correlation




(b) Correlation by selected deciles of total credit to GDP




Source: China Provincial Statistical Yearbooks.

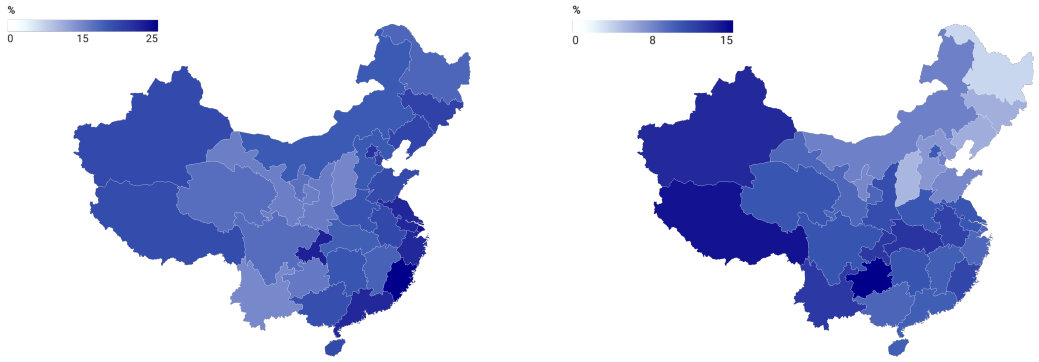
of the size of the financial system of a province.[16]

A look at the real GDP growth rates of all Chinese provinces furthermore suggests systematic regionally different growth dynamics, which we have to take into account in our subsequent estimations. At the median from 2010 to 2019, provincial growth varied significantly, from 3.72 percent annually in Heilongjiang to 15.16 percent in Guizhou. The strongest growth rates were recently observed in the western part of the country (Figure 5). As we will show in more detail later, this is related to the catching-up process of China's western provinces. Between 1990 and 1999, by contrast, the eastern coastal provinces grew much faster, with median growth rates of 26.36 percent

[16] A visual representation of the geographical distribution of total credit to GDP in the last 10 years can be found in Figure 11 in the Appendix.

in Fujian and 24.13 percent in Shanghai, with the central Chinese provinces of Yunnan and Shanxi bringing up the rear with growth rates of about 15 percent. Needless to say, growth rates at the end of the 20th century were much higher than today, averaging 19 percent.

Figure 5: Median values of real GDP growth in the years 1990-1999 (left) and in 2010-2019 (right).




(a) 1990-1999 (b) 2010-2019

Source: China Provincial Statistical Yearbooks.

Therefore, in the remainder of this paper we will work with a geographical classification of all provinces into the regions 'Western China', 'East Coast' and 'Central and Northern China' (see Figure 6). This classification is based on similar economic developments of the provinces in the past that can be described as follows:

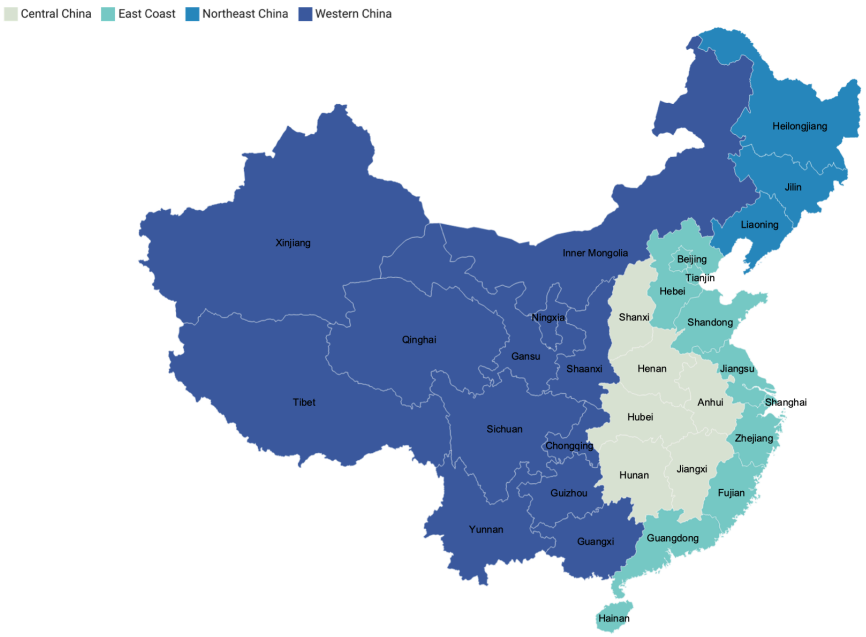
- **East Coast:** During China's transition from a centrally planned to a market economy, the establishment of special economic zones (SEZs) played an important role. Because of their advantageous location for international trade, the east coast provinces of Shanghai, Guangdong, Fujian and Hainan were chosen for this purpose. Based on this, and other preferential policies, the provinces on the east coast are still the most prosperous and populous in the country today (Crane, Albrecht, Duffin, & Albrecht, 2018).

- **Western China:** Since the originally intended spill-over effects of the East Coast region on the other provinces of China did not materialize and the regional disparities became increasingly clear, the government launched the 'China Western Development' program in the late 1990s. As a result, the western regions, which are predominated by agriculture, received support for the expansion of infrastructure, education and health care, as well as preferential policies for foreign direct investment (FDI) (Crane et al., 2018). The Belt and Road Initiative, announced in 2009, is further favouring economic development in China's western regions.

- **Central and Northern China:** Also in central and northern China, only limited spillover effects from the coastal regions could be observed, which is why similar development programs were launched for these regions from the early 2000s (called 'Rise of Central China'

and 'Revitalize Northeast China'). Both regions have structural problems, which, in addition to their poorer location compared to the coastal regions, stem in particular from the many state-owned enterprises (SOEs) located in central and northern China, as these regions are relatively rich in natural resources. For this reason, only few FDI flow there and productivity is lower (Crane et al., 2018). While the central provinces benefit from at least minor spillover effects, however, the northern provinces (especially Heilongjiang and Jilin) are also referred to as China's 'Rust Belt'. This is because these regions are home to a lot of state-owned heavy industry, which has become increasingly unprofitable over time due to decreasing global demand. At the same time, these companies are considered particularly inflexible in adapting to the new market situation (Rechtschaffen, 2017).

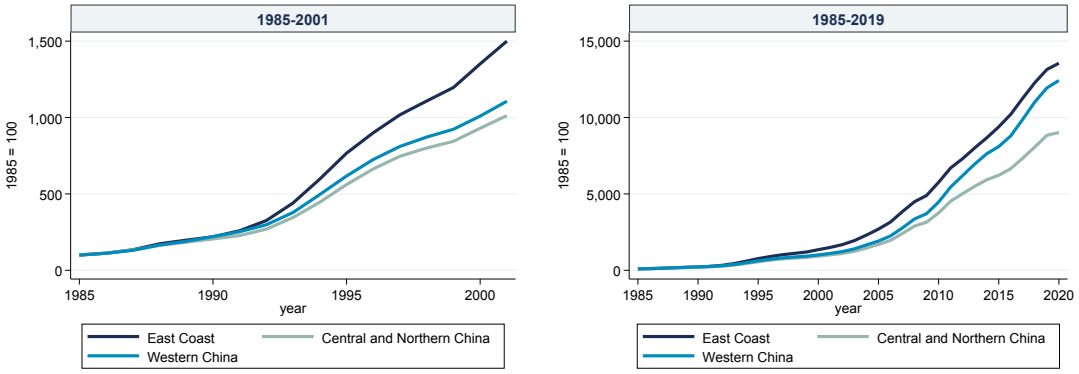
Figure 6: Provinces in China by economic categorization.




Source: China Provincial Statistical Yearbooks.

The structural differences between the individual regions just described are also reflected in their GDP growth rate trajectories (see Fig. 7). Until 2001, the eastern provinces clearly dominated the rest, both indexed and in absolute GDP values. From the mid-2000s onward, the western Chinese provinces began to catch up, whereas central and northern China followed a much flatter development path. However, with a GDP of approximately RMB 50.98 trillion (about USD 7.61 trillion), eastern China still accounts for about 51.9 percent of China's total GDP today (as of 2019). In the same year, central and northern China combined had a GDP of RMB 26.76 trillion (USD 4.0 trillion) and western China had a GDP of RMB 20.49 trillion (USD 3.06 trillion).

Figure 7: Indexed means of GDP by Chinese region (1985 = 100)




(a) Range 1985 - 2001 (b) Full range

Source: China Provincial Statistical Yearbooks.

## 6.2 Empirical Results - Finance and Growth

We now turn to the results of our empirical analyses. To begin with, we are interested in the general relationship between 'finance' and GDP growth, hence we present the results from estimating the baseline form of the finance and growth equation presented earlier in chapter 5, for now without subdivision by temporal or geographic clusters (see Tables 3 and 4).

Table 3: Growth effects of dynamic credit indicators and lagged credit indicators, estimated with Fixed Effects

| | FE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $log(INITIALGDP)$ | -0.118*** | -0.124*** | -0.131*** | -0.101*** | -0.0974*** | -0.0982*** | -0.109*** | -0.118*** | -0.128*** |
| | (0.0239) | (0.0238) | (0.0237) | (0.0231) | (0.0194) | (0.0230) | (0.0212) | (0.0210) | (0.0185) |
| $SCHOOL$ | 0.0899 | 0.0863 | 0.0790 | 0.0791 | 0.0710 | 0.0913 | 0.0730 | 0.0738 | 0.0727 |
| | (0.0562) | (0.0569) | (0.0563) | (0.0583) | (0.0554) | (0.0583) | (0.0609) | (0.0619) | (0.0624) |
| $log(GOV)$ | 0.118*** | 0.119*** | 0.122*** | 0.107*** | 0.103*** | 0.107*** | 0.114*** | 0.118*** | 0.122*** |
| | (0.0220) | (0.0222) | (0.0219) | (0.0202) | (0.0190) | (0.0206) | (0.0194) | (0.0194) | (0.0183) |
| $log(OPENNESS)$ | -0.00903** | -0.00923** | -0.0106** | -0.00838* | -0.00979* | -0.00724* | -0.00952** | -0.00967* | -0.0125** |
| | (0.00409) | (0.00434) | (0.00458) | (0.00414) | (0.00493) | (0.00382) | (0.00462) | (0.00528) | (0.00502) |
| $\Delta CREDIT_{tot}$ | 7.47e-07** | | | | | | | | |
| | (3.32e-07) | | | | | | | | |
| $\Delta CREDIT_{tot(l1)}$ | | 1.65e-06*** | | | | | | | |
| | | (4.31e-07) | | | | | | | |
| $\Delta CREDIT_{tot(l2)}$ | | | 6.11e-07 | | | | | | |
| | | | (4.16e-07) | | | | | | |
| $\Delta CREDIT_{NFC}$ | | | | 0.0151* | | | | | |
| | | | | (0.00778) | | | | | |
| $\Delta CREDIT_{NFC(l1)}$ | | | | | 0.0162* | | | | |
| | | | | | (0.00916) | | | | |
| $\Delta CREDIT_{NFC(l2)}$ | | | | | | -0.00116 | | | |
| | | | | | | (0.0142) | | | |
| $\Delta INV_{credit}$ | | | | | | | 0.00249 | | |
| | | | | | | | (0.00248) | | |
| $\Delta INV_{credit(l1)}$ | | | | | | | | 0.000559 | |
| | | | | | | | | (0.00287) | |
| $\Delta INV_{credit(l2)}$ | | | | | | | | | -0.00403 |
| | | | | | | | | | (0.00324) |
| Constant | 0.281*** | 0.311*** | 0.340*** | 0.248*** | 0.240** | 0.239** | 0.289*** | 0.323*** | 0.351*** |
| | (0.0960) | (0.0964) | (0.101) | (0.0890) | (0.0876) | (0.0899) | (0.0971) | (0.0991) | (0.0962) |
| Observations | 981 | 957 | 931 | 1,040 | 1,016 | 1,009 | 891 | 877 | 863 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.726 | 0.719 | 0.714 | 0.736 | 0.749 | 0.742 | 0.726 | 0.715 | 0.711 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Growth effects of dynamic credit indicators and lagged credit indicators, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $log(INITIALGDP)$ | -0.0102* | -0.0126** | -0.0206*** | -0.0142*** | -0.0175*** | -0.0144** | -0.0313*** | -0.0212*** | -0.0151** |
| | (0.00549) | (0.00558) | (0.00579) | (0.00548) | (0.00543) | (0.00606) | (0.00697) | (0.00627) | (0.00594) |
| $SCHOOL$ | 0.00352 | 0.0149 | 0.0435 | -0.00208 | -0.00227 | 0.00451 | 0.0296 | 0.00115 | -0.0262 |
| | (0.0618) | (0.0611) | (0.0583) | (0.0621) | (0.0587) | (0.0624) | (0.0624) | (0.0647) | (0.0653) |
| $log(GOV)$ | 0.0179** | 0.0214** | 0.0331*** | 0.0249*** | 0.0298*** | 0.0242** | 0.0502*** | 0.0348*** | 0.0260*** |
| | (0.00862) | (0.00897) | (0.00958) | (0.00923) | (0.00921) | (0.00999) | (0.0111) | (0.0103) | (0.00958) |
| $log(OPENNESS)$ | 0.000609 | 0.000732 | 0.000185 | 0.000656 | 2.15e-05 | 0.000720 | 0.000113 | 0.00109 | 0.00180 |
| | (0.00215) | (0.00222) | (0.00249) | (0.00223) | (0.00236) | (0.00227) | (0.00246) | (0.00243) | (0.00238) |
| $\Delta CREDIT_{tot}$ | 1.66e-06*** | | | | | | | | |
| | (4.62e-07) | | | | | | | | |
| $\Delta CREDIT_{tot(l1)}$ | | 2.91e-06*** | | | | | | | |
| | | (5.41e-07) | | | | | | | |
| $\Delta CREDIT_{tot(l2)}$ | | | 1.77e-06*** | | | | | | |
| | | | (5.08e-07) | | | | | | |
| $\Delta CREDIT_{NFC}$ | | | | 0.0261*** | | | | | |
| | | | | (0.00944) | | | | | |
| $\Delta CREDIT_{NFC(l1)}$ | | | | | 0.0253** | | | | |
| | | | | | (0.0109) | | | | |
| $\Delta CREDIT_{NFC(l2)}$ | | | | | | 0.00939 | | | |
| | | | | | | (0.0175) | | | |
| $\Delta INV_{credit}$ | | | | | | | 0.00590** | | |
| | | | | | | | (0.00274) | | |
| $\Delta INV_{credit(l1)}$ | | | | | | | | 0.00404 | |
| | | | | | | | | (0.00275) | |
| $\Delta INV_{credit(l2)}$ | | | | | | | | | -0.00197 |
| | | | | | | | | | (0.00292) |
| Constant | 0.140*** | 0.138*** | 0.126*** | 0.137*** | 0.129*** | 0.145*** | 0.151*** | 0.166*** | 0.178*** |
| | (0.0334) | (0.0340) | (0.0362) | (0.0375) | (0.0316) | (0.0340) | (0.0288) | (0.0287) | (0.0285) |
| Observations | 981 | 957 | 931 | 1,040 | 1,016 | 1,009 | 891 | 877 | 863 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.715 | 0.707 | 0.701 | 0.724 | 0.740 | 0.732 | 0.713 | 0.701 | 0.697 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results for all control variables are as expected. Due to convergence, $log(INITIAL\ GDP)$ has a significantly negative effect on real GDP growth, secondary schooling is - even though not significantly - positively related to growth, and government expenditure have a significantly positive effect as well. The results for fixed effects (FE) and random effects (RE) estimations are quite similar, except for the trade indicator ($log(OPENNESS)$). However, its effect is approximately zero for both estimation methods.

For the variables that are at the center of our interest, namely $\Delta log(CREDIT_{tot})$, $\Delta log(CREDIT_{NFC})$ and $\Delta log(INV_{credit})$, we find consistently positive effects for the first two variables on real GDP growth. Credit-financed investment is only significant for the RE estimation and insignificant for FE. As the effect of credit on GDP growth could also materialize with a time lag, we also include lagged credit variables in our estimations. Our findings show that our previous results are also robust to using lags up to two years (l1 and l2), although some variables become insignificant for two lags. Our robustness checks for credit-financed investments show a significant negative effect for using log growth rates and one lag. However, we find significant positive effects if we include 3- and 5-year averages for one and two lags for the same variable. For all subsequent estimations we show the effects of lagged credit variables in the Appendix.

**1.) Regional disparities**

As we have seen, however, there are enormous differences among the Chinese provinces on what concerns the dynamic of their economic growth processes. Therefore it is crucial to control for regional disparities in our previous results. Furthermore, as we have shown above, there are

considerable periodic differences in China's development process among its regions. Hence, we repeat our baseline estimation by filtering for Chinese regions (East Coast, Western China and Central China, combined with Northeast China) and controlling for periodic differences, by adding a time dummy ($year_{2001}$) to our panel regression, that equivalences the year of China's WTO accession. Our estimation results can be found in Tables 5 - 7. For all estimation methods and regions the control variables show similar values to those of the baseline estimation. Due to the nature of FE we will now focus more on the RE results.

In China's East Coast region (Table 5) our results show a positive GDP effect for total credit and a mixed one (negative for FE, positive for RE) for credit-financed investment, but both variables are mainly insignificant. For corporate credit we find a positive effect that is significant for the RE estimation. The time dummy is negative throughout and partly significant. This suggests that the development process in eastern China was stronger before 2001 than after 2001. The extent to which lending was responsible for the stronger growth before 2001 will be discussed later. Compared to the baseline panel regression with all regions, we can observe a stronger effect of total and corporate credit growth for eastern provinces.

In Table 6 ($GEO_{centralnorth}$), we find consistently positive growth effects for all credit variables in central and northern provinces on GDP growth, with corporate credit growth being always significant and total credit being partially significant. In contrast to $GEO_{east}$, the growth process tended to take place later, i.e. after 2001. The time effect is not significant, however. Analogous to $GEO_{centralnorth}$, the results from Table 7 ($GEO_{west}$) suggest a later onset of the growth process in western provinces, but again without statistical significance. We still find positive effects of all credit variables on economic growth. Investment financed by credit is now the only variable with partially significant positive values.

Table 5: Growth effects of dynamic credit indicators in $GEO_{east}$, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| $log(INITIALGDP)$ | -0.132*** | -0.115*** | -0.162*** | -0.135*** | -0.115*** | -0.163*** | -0.0419 | -0.0353 | -0.0451 | -0.0423 | -0.0352 | -0.0454 |
| | (0.0370) | (0.0340) | (0.0313) | (0.0361) | (0.0338) | (0.0303) | (0.0290) | (0.0251) | (0.0295) | (0.0285) | (0.0249) | (0.0294) |
| $SCHOOL$ | 0.101* | 0.0953** | 0.115** | 0.1000* | 0.0952** | 0.116** | 0.0222 | -0.0219 | 0.0262 | 0.0208 | -0.0220 | 0.0262 |
| | (0.0499) | (0.0398) | (0.0420) | (0.0499) | (0.0396) | (0.0417) | (0.0558) | (0.0515) | (0.0504) | (0.0557) | (0.0514) | (0.0504) |
| $log(GOV)$ | 0.126*** | 0.103*** | 0.122*** | 0.126*** | 0.103*** | 0.122*** | 0.0576 | 0.0513 | 0.0648* | 0.0582 | 0.0512 | 0.0652* |
| | (0.0315) | (0.0316) | (0.0368) | (0.0310) | (0.0314) | (0.0368) | (0.0367) | (0.0314) | (0.0379) | (0.0360) | (0.0312) | (0.0378) |
| $log(OPENNESS)$ | -0.00686 | -0.00528 | -0.00756 | -0.00621 | -0.00517 | -0.00720 | -0.00509 | -0.00273 | -0.00465 | -0.00506 | -0.00269 | -0.00465 |
| | (0.00895) | (0.00942) | (0.00983) | (0.00902) | (0.00934) | (0.00957) | (0.00624) | (0.00549) | (0.00674) | (0.00614) | (0.00548) | (0.00668) |
| $\Delta CREDIT_{tot}$ | 0.00341 | | | 0.00355 | | | 0.00714 | | | 0.00719 | | |
| | (0.00964) | | | (0.00982) | | | (0.0132) | | | (0.0134) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0217 | | | 0.0217 | | | 0.0652*** | | | 0.0652*** | |
| | | (0.0168) | | | (0.0168) | | | (0.0155) | | | (0.0154) | |
| $\Delta INV_{credit}$ | | | -0.00315 | | | -0.00312 | | | 0.00289 | | | 0.00294 |
| | | | (0.00368) | | | (0.00367) | | | (0.00381) | | | (0.00384) |
| $year_{>2001}$ | | | | -0.00386* | -0.000768 | -0.00223 | | | | -0.00356 | -0.00138 | -0.00221 |
| | | | | (0.00180) | (0.00199) | (0.00343) | | | | (0.00242) | (0.00272) | (0.00402) |
| Constant | 0.404* | 0.399* | 0.575** | 0.422* | 0.401* | 0.584** | 0.177*** | 0.171*** | 0.164*** | 0.179*** | 0.172*** | 0.166*** |
| | (0.216) | (0.217) | (0.207) | (0.213) | (0.214) | (0.195) | (0.0209) | (0.0176) | (0.0259) | (0.0217) | (0.0177) | (0.0280) |
| Observations | 315 | 334 | 291 | 315 | 334 | 291 | 315 | 334 | 291 | 315 | 334 | 291 |
| Number of Provinces | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Adj. R-squared | 0.814 | 0.824 | 0.822 | 0.815 | 0.824 | 0.822 | 0.787 | 0.799 | 0.795 | 0.787 | 0.799 | 0.794 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Growth effects of dynamic credit indicators in $GEO_{centralnorth}$, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| $log(INITIALGDP)$ | -0.0896 | -0.0660 | -0.0779 | -0.0872 | -0.0642 | -0.0765 | -0.0378 | -0.0204 | -0.0300 | -0.0374 | -0.0204 | -0.0302 |
| | (0.0549) | (0.0445) | (0.0505) | (0.0555) | (0.0452) | (0.0503) | (0.0304) | (0.0250) | (0.0306) | (0.0307) | (0.0254) | (0.0308) |
| $SCHOOL$ | -0.0888 | -0.0875 | -0.0729 | -0.0864 | -0.0821 | -0.0691 | -0.282 | -0.260* | -0.259 | -0.280 | -0.257 | -0.257 |
| | (0.202) | (0.189) | (0.208) | (0.204) | (0.192) | (0.211) | (0.177) | (0.158) | (0.180) | (0.178) | (0.158) | (0.180) |
| $log(GOV)$ | 0.132** | 0.110** | 0.127** | 0.130** | 0.110** | 0.127** | 0.0576 | 0.0333 | 0.0513 | 0.0574 | 0.0338 | 0.0518 |
| | (0.0450) | (0.0424) | (0.0409) | (0.0470) | (0.0445) | (0.0421) | (0.0392) | (0.0344) | (0.0388) | (0.0398) | (0.0352) | (0.0392) |
| $log(OPENNESS)$ | -0.00870 | -0.0144 | -0.00955 | -0.00843 | -0.0139 | -0.00909 | -0.0187*** | -0.0151*** | -0.0178*** | -0.0185*** | -0.0150*** | -0.0176*** |
| | (0.00769) | (0.00795) | (0.00745) | (0.00832) | (0.00844) | (0.00822) | (0.00357) | (0.00333) | (0.00364) | (0.00364) | (0.00346) | (0.00381) |
| $\Delta CREDIT_{tot}$ | 9.10e-07 | | | 1.24e-06 | | | 2.66e-06*** | | | 2.98e-06*** | | |
| | (9.61e-07) | | | (1.02e-06) | | | (8.52e-07) | | | (8.94e-07) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0184* | | | 0.0187* | | | 0.0216** | | | 0.0219** | |
| | | (0.00819) | | | (0.00813) | | | (0.00883) | | | (0.00904) | |
| $\Delta INV_{credit}$ | | | 0.0115 | | | 0.0115 | | | 0.0150 | | | 0.0149 |
| | | | (0.0188) | | | (0.0183) | | | (0.0187) | | | (0.0181) |
| $year_{>2001}$ | | | | 0.00637 | 0.00674 | 0.00608 | | | | 0.00692 | 0.00665 | 0.00628 |
| | | | | (0.00613) | (0.00545) | (0.00551) | | | | (0.00649) | (0.00588) | (0.00580) |
| Constant | 0.121 | 0.0755 | 0.107 | 0.108 | 0.0609 | 0.0967 | 0.137* | 0.162** | 0.151* | 0.131 | 0.154** | 0.146* |
| | (0.222) | (0.172) | (0.211) | (0.225) | (0.176) | (0.212) | (0.0829) | (0.0770) | (0.0880) | (0.0817) | (0.0768) | (0.0876) |
| Observations | 291 | 305 | 273 | 291 | 305 | 273 | 291 | 305 | 273 | 291 | 305 | 273 |
| Number of Provinces | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| Adj. R-squared | 0.787 | 0.780 | 0.774 | 0.788 | 0.782 | 0.775 | 0.754 | 0.747 | 0.734 | 0.755 | 0.748 | 0.735 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Growth effects of dynamic credit indicators in $GEO_{west}$, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| $log(INITIALGDP)$ | -0.129** | -0.111** | -0.0876*** | -0.128** | -0.111** | -0.0875*** | -0.0123 | -0.0143 | -0.0199** | -0.0123 | -0.0142 | -0.0202** |
| | (0.0470) | (0.0422) | (0.0213) | (0.0472) | (0.0422) | (0.0217) | (0.0108) | (0.0108) | (0.00928) | (0.0108) | (0.0108) | (0.00931) |
| $SCHOOL$ | 0.118 | 0.141 | 0.0968 | 0.118 | 0.141 | 0.0980 | 0.0585 | 0.0728 | 0.0515 | 0.0586 | 0.0726 | 0.0525 |
| | (0.135) | (0.136) | (0.175) | (0.135) | (0.136) | (0.175) | (0.0641) | (0.0725) | (0.0996) | (0.0640) | (0.0726) | (0.100) |
| $log(GOV)$ | 0.0744* | 0.0744* | 0.0617* | 0.0744* | 0.0743* | 0.0619* | 0.0222 | 0.0246 | 0.0299* | 0.0222 | 0.0246 | 0.0303* |
| | (0.0360) | (0.0365) | (0.0287) | (0.0362) | (0.0366) | (0.0288) | (0.0174) | (0.0176) | (0.0159) | (0.0175) | (0.0176) | (0.0159) |
| $log(OPENNESS)$ | -0.00666 | -0.00723 | -0.00829 | -0.00667 | -0.00728 | -0.00830 | 0.00308 | 0.000842 | 0.00298 | 0.00300 | 0.000780 | 0.00299 |
| | (0.00803) | (0.00735) | (0.00898) | (0.00804) | (0.00734) | (0.00906) | (0.00549) | (0.00427) | (0.00509) | (0.00556) | (0.00429) | (0.00509) |
| $\Delta CREDIT_{tot}$ | 0.00149 | | | 0.00147 | | | 0.00109 | | | 0.00101 | | |
| | (0.00238) | | | (0.00242) | | | (0.00278) | | | (0.00276) | | |
| $\Delta CREDIT_{NFC}$ | | 0.00920 | | | 0.00954 | | | 0.0117 | | | 0.0121 | |
| | | (0.0162) | | | (0.0161) | | | (0.0189) | | | (0.0189) | |
| $\Delta INV_{credit}$ | | | 0.00283 | | | 0.00276 | | | 0.00497* | | | 0.00489* |
| | | | (0.00311) | | | (0.00309) | | | (0.00292) | | | (0.00289) |
| $year_{>2001}$ | | | | 0.000385 | 0.00183 | -0.00298 | | | | 0.00133 | 0.00200 | -0.00331 |
| | | | | (0.00495) | (0.00451) | (0.00434) | | | | (0.00520) | (0.00472) | (0.00442) |
| Constant | 0.425** | 0.331** | 0.331** | 0.424** | 0.329** | 0.331** | 0.111 | 0.0917 | 0.176*** | 0.109 | 0.0900 | 0.178*** |
| | (0.150) | (0.149) | (0.134) | (0.149) | (0.148) | (0.136) | (0.0674) | (0.0767) | (0.0394) | (0.0688) | (0.0777) | (0.0389) |
| Observations | 375 | 401 | 327 | 375 | 401 | 327 | 375 | 401 | 327 | 375 | 401 | 327 |
| Number of Provinces | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Adj. R-squared | 0.690 | 0.714 | 0.718 | 0.690 | 0.715 | 0.719 | 0.648 | 0.677 | 0.673 | 0.647 | 0.676 | 0.672 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Instead of splitting up our dataset, we can also map the relative effects of the provinces to each other by using regional dummy variables (see table 8). This has the advantage that we don't lose any data points and that the focus is on provincial differences rather than absolute credit effects. We use the eastern Chinese region as a reference category because it is the most developed today, and because there are strong political efforts to bring the other regions in line with the economic situation of the East Coast.

Table 8: Growth effects of dynamic credit indicators with dummy variable for regions, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Dependent: $\Delta GDP_{real}$ | | | | | year <2001 | | | year >= 2001 | |
| $log(INITIALGDP)$ | -0.0174** | -0.0201*** | -0.0459*** | -0.0141 | -0.00821 | -0.0275** | -0.0325*** | -0.0350*** | -0.0388*** |
| | (0.00793) | (0.00763) | (0.0106) | (0.0148) | (0.0134) | (0.0121) | (0.00903) | (0.00852) | (0.00949) |
| $SCHOOL$ | 0.0431 | 0.0295 | 0.0551 | 0.00384 | -0.0269 | -0.0435 | 0.0599 | 0.0614 | 0.0631 |
| | (0.0552) | (0.0547) | (0.0566) | (0.0705) | (0.0635) | (0.0691) | (0.0530) | (0.0489) | (0.0518) |
| $log(GOV)$ | 0.0292** | 0.0341*** | 0.0698*** | 0.0282 | 0.0212 | 0.0451*** | 0.0505*** | 0.0543*** | 0.0600*** |
| | (0.0114) | (0.0112) | (0.0146) | (0.0190) | (0.0166) | (0.0173) | (0.0140) | (0.0131) | (0.0143) |
| $log(OPENNESS)$ | -0.00613* | -0.00549 | -0.00784** | -0.00171 | 5.40e-05 | -0.00243 | -0.00495 | -0.00432 | -0.00379 |
| | (0.00335) | (0.00334) | (0.00360) | (0.00450) | (0.00418) | (0.00471) | (0.00386) | (0.00370) | (0.00390) |
| $\Delta CREDIT_{tot}$ | 2.41e-06*** | | | 0.00456 | | | 1.47e-06*** | | |
| | (5.93e-07) | | | (0.00418) | | | (3.92e-07) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0256*** | | | 0.0256 | | | 0.0201*** | |
| | | (0.00854) | | | (0.0200) | | | (0.00672) | |
| $\Delta INV_{credit}$ | | | 0.00417 | | | 0.00971 | | | 0.00247 |
| | | | (0.00261) | | | (0.00936) | | | (0.00316) |
| $GEO_{centralnorth}$ | -0.0271*** | -0.0261** | -0.0332*** | -0.0322*** | -0.0298*** | -0.0363*** | -0.0207* | -0.0184 | -0.0171 |
| | (0.0104) | (0.0102) | (0.0124) | (0.0103) | (0.00973) | (0.0122) | (0.0124) | (0.0119) | (0.0128) |
| $GEO_{west}$ | -0.0168 | -0.0167 | -0.0295** | -0.0270* | -0.0225* | -0.0350** | -0.00906 | -0.00933 | -0.00890 |
| | (0.0112) | (0.0110) | (0.0135) | (0.0142) | (0.0127) | (0.0146) | (0.0116) | (0.0111) | (0.0121) |
| Constant | 0.115*** | 0.117*** | 0.144*** | 0.132*** | 0.140*** | 0.182*** | -0.110** | | -0.0609 |
| | (0.0328) | (0.0354) | (0.0256) | (0.0378) | (0.0380) | (0.0300) | (0.0546) | | (0.0662) |
| Observations | 981 | 1,040 | 891 | 402 | 424 | 351 | 579 | 616 | 540 |
| Number of Provinces | 31 | 31 | 31 | 29 | 31 | 30 | 31 | 31 | 31 |
| Adj. R-squared | 0.715 | 0.724 | 0.713 | 0.700 | 0.705 | 0.708 | 0.691 | 0.713 | 0.658 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results from this relative analysis are in line with the previous results in Tables 5 - 7. We see that economic growth in eastern provinces slowed over the last two decades in comparison to those provinces that are currently in the development process, so that after 2001, we cannot observe any statistically significant differences from the GDP growth of western and central-northern provinces to the GDP growth of eastern provinces, except for total credit in the central-northern provinces. This illustrates the convergence process that regions outside the East Coast have been undergoing in recent decades. What we are particularly interested in now is what role (bank) lending has played in this process.

We therefore extend our baseline credit and growth estimations with an interaction of the regional dummy variables and our credit variables (Table 9). In that way we are able to capture the combined growth effect of these variables. As before, the eastern region serves as our reference category.

Table 9: Growth effects of dynamic credit indicators with dummy variable for regions, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Dependent: $\Delta GDP_{real}$ | | | | | year <2001 | | | year >= 2001 | |
| $log(INITIALGDP)$ | -0.0171** | -0.0191** | -0.0522*** | -0.0134 | -0.00769 | -0.0277** | -0.0262*** | -0.0343*** | -0.0320*** |
| | (0.00796) | (0.00748) | (0.0116) | (0.0142) | (0.0133) | (0.0117) | (0.00932) | (0.00833) | (0.00883) |
| $SCHOOL$ | 0.0386 | 0.0185 | 0.0589 | 0.0178 | -0.0265 | -0.0393 | 0.0539 | 0.0524 | 0.0591 |
| | (0.0567) | (0.0546) | (0.0564) | (0.0673) | (0.0640) | (0.0683) | (0.0554) | (0.0521) | (0.0540) |
| $log(GOV)$ | 0.0287** | 0.0332*** | 0.0783*** | 0.0275 | 0.0208 | 0.0452*** | 0.0423*** | 0.0536*** | 0.0501*** |
| | (0.0114) | (0.0111) | (0.0156) | (0.0183) | (0.0166) | (0.0168) | (0.0139) | (0.0130) | (0.0139) |
| $log(OPENNESS)$ | -0.00606* | -0.00502 | -0.00842** | -0.00206 | -0.000133 | -0.00286 | -0.00488 | -0.00404 | -0.00430 |
| | (0.00332) | (0.00310) | (0.00361) | (0.00410) | (0.00413) | (0.00469) | (0.00378) | (0.00357) | (0.00381) |
| $\Delta CREDIT_{tot}$ | 0.0125 | | | 0.0755 | | | 0.00398 | | |
| | (0.0162) | | | (0.0732) | | | (0.00539) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0878*** | | | 0.0611*** | | | 0.0589*** | |
| | | (0.0165) | | | (0.0220) | | | (0.0220) | |
| $\Delta INV_{credit}$ | | | 0.00972* | | | 0.0284 | | | 0.000555 |
| | | | (0.00558) | | | (0.0238) | | | (0.00520) |
| $GEO_{centralnorth}$ | -0.0245** | -0.0154 | -0.0333*** | -0.0348* | -0.0211** | -0.0339** | -0.0185 | -0.0129 | -0.0151 |
| | (0.0110) | (0.00960) | (0.0127) | (0.0179) | (0.0103) | (0.0132) | (0.0124) | (0.0107) | (0.0130) |
| $GEO_{west}$ | -0.0144 | -0.00468 | -0.0313** | -0.0105 | -0.0127 | -0.0280** | -0.0189 | -0.00351 | -0.00791 |
| | (0.0116) | (0.0103) | (0.0138) | (0.0193) | (0.0114) | (0.0139) | (0.0116) | (0.00995) | (0.0119) |
| $\Delta CREDIT_{tot} * GEO_{centralnorth}$ | -0.0125 | | | 0.0210 | | | -0.00398 | | |
| | (0.0162) | | | (0.0735) | | | (0.00539) | | |
| $\Delta CREDIT_{tot} * GEO_{west}$ | -0.0119 | | | -0.0756 | | | 0.0751*** | | |
| | (0.0160) | | | (0.0732) | | | (0.0262) | | |
| $\Delta CREDIT_{NFC} * GEO_{centralnorth}$ | | -0.0678*** | | | -0.0511 | | | -0.0402* | |
| | | (0.0176) | | | (0.0316) | | | (0.0235) | |
| $\Delta CREDIT_{NFC} * GEO_{west}$ | | -0.0769*** | | | -0.0558** | | | -0.0421* | |
| | | (0.0199) | | | (0.0271) | | | (0.0253) | |
| $\Delta INV_{credit} * GEO_{centralnorth}$ | | | -0.00915 | | | -0.0125 | | | -0.00988 |
| | | | (0.0107) | | | (0.0304) | | | (0.0115) |
| $\Delta INV_{credit} * GEO_{west}$ | | | -0.00879 | | | -0.0319 | | | 0.00515 |
| | | | (0.00629) | | | (0.0259) | | | (0.00679) |
| Constant | 0.113*** | 0.110*** | 0.144*** | 0.106*** | 0.132*** | 0.175*** | | | |
| | (0.0326) | (0.0353) | (0.0273) | (0.0378) | (0.0384) | (0.0288) | | | |
| Observations | 981 | 1,040 | 891 | 402 | 424 | 351 | 579 | 616 | 540 |
| Number of Provinces | 31 | 31 | 31 | 29 | 31 | 30 | 31 | 31 | 31 |
| Adj. R-squared | 0.715 | 0.725 | 0.712 | 0.703 | 0.704 | 0.708 | 0.692 | 0.712 | 0.659 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

When adding the interaction terms, our first finding is that especially the coefficient of corporate credit growth (without interaction) is now dramatically increasing compared to the results from Table 8. For the dummy variables for the western and the central-northern regions we find smaller and less significant coefficients than before.

The interaction terms show the combined effect of credit growth and a province being in a specific region vis-à-vis credit provision in eastern provinces. Again, credit provision to western and central-northern provinces is in general less growth-enhancing than credit provision to eastern provinces. Significant results can be found in particular for the corporate credit variables. Table 18 in the Appendix shows that, also in absolute terms, lending to the corporate sector in eastern provinces was significantly growth enhancing in the last 35 years, especially before 2001. Credit provision to central-northern provinces seems to be less effective than to western regions in terms of GDP growth. After 2001, the difference in the effect of credit provision to western and central-northern provinces is slightly less pronounced but still significant. The log growth rates and moving averages in the Appendix even indicate a vanishing of significant differences between lending to central-northern or western provinces after 2001 compared to eastern provinces.

**2.) Disparities by size of financial system**

As we have outlined in the literature review, a substantial, more recent strand of the literature on the relationship between finance and growth emphasizes the importance of controlling for the size of the financial system. For this reason, we now also extend our analysis to include **(a)** a dummy

variable, $d10(CREDIT/GDP)$, that contains the province- and time-crossing observation points that belong to the top 10 percent of the total CREDIT/GDP variable (columns (1) to (3) and (7) to (9)), and **(b)** a restriction of our dataset ('if-condition') to the observations that contain only the bottom 90 percent of the total CREDIT/GDP observations (columns (4) - (6) and (10) to (12)). Accordingly, the estimation results for category (a) must be interpreted in relation to all other deciles, while those for category (b) are interpretable in absolute terms. In that way, we approximate a measure for the size of the financial system. The results of this analysis are given in Table 10.

Compared to the baseline, full sample estimation from Table 3 and 4, no major deviations can be observed in the results for the credit variables. However, we see that the dummy variable for the top 10% in total CREDIT/GDP is always positive and partially significant. This indicates that the observation units that have a relatively large financial system also have higher real GDP growth rates than observation units with a smaller financial system. However, what is interesting for us is not so much this isolated effect, but the extent to which the size of the financial system affects the impact of lending on GDP growth. For this reason, we introduce an interaction term consisting of the $d10(CREDIT/GDP)$ dummy variable and the three credit variables. For all three estimates, we obtain a negative growth effect of this interaction term. The effect is highly statistically significant for corporate credit growth in the FE estimation and credit financed investment in the RE estimation. We conclude that lending to the lower financial system deciles (i.e., 1st to 9th decile) might be more growth-enhancing than lending to provinces that already have a particularly large financial system at a given point in time. This is consistent with results found in the cross-country literature.

Table 10: Growth effects of dynamic credit indicators with dummy variable for credit to GDP share, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Dependent: $\Delta GDP_{real}$ | | | | $d(CREDIT/GDP) \leq 9$ | | | | | | $d(CREDIT/GDP) \leq 9$ | | |
| $log(INITIALGDP)$ | -0.120*** | -0.107*** | -0.107*** | -0.135*** | -0.119*** | -0.112*** | -0.00927 | -0.0133** | -0.0295*** | -0.00644 | -0.00816 | -0.0140* |
| | (0.0242) | (0.0233) | (0.0214) | (0.0247) | (0.0238) | (0.0208) | (0.00631) | (0.00628) | (0.00742) | (0.00765) | (0.00759) | (0.00846) |
| $SCHOOL$ | 0.106* | 0.0968 | 0.0851 | 0.0890 | 0.0731 | 0.0834 | 0.0378 | 0.0284 | 0.0424 | 0.0185 | 0.00578 | -0.0169 |
| | (0.0598) | (0.0612) | (0.0619) | (0.0717) | (0.0765) | (0.0701) | (0.0616) | (0.0628) | (0.0624) | (0.0637) | (0.0637) | (0.0698) |
| $log(GOV)$ | 0.118*** | 0.109*** | 0.114*** | 0.141*** | 0.128*** | 0.135*** | 0.0162* | 0.0227** | 0.0471*** | 0.0117 | 0.0144 | 0.0234* |
| | (0.0220) | (0.0201) | (0.0194) | (0.0205) | (0.0187) | (0.0172) | (0.00958) | (0.0102) | (0.0117) | (0.0110) | (0.0111) | (0.0122) |
| $log(OPENNESS)$ | -0.00771* | -0.00875** | -0.00985** | -0.00799* | -0.00934* | -0.0139** | -2.86e-05 | -0.000101 | -0.000361 | 0.00122 | 0.00109 | 0.00136 |
| | (0.00441) | (0.00423) | (0.00474) | (0.00468) | (0.00464) | (0.00543) | (0.00222) | (0.00228) | (0.00239) | (0.00225) | (0.00210) | (0.00202) |
| $\Delta CREDIT_{tot}$ | 7.70e-07** | | | 7.16e-07* | | | 1.73e-06*** | | | 1.95e-06*** | | |
| | (3.43e-07) | | | (3.96e-07) | | | (4.73e-07) | | | (4.95e-07) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0212** | | | 0.0200** | | | 0.0318*** | | | 0.0323*** | |
| | | (0.00848) | | | (0.00812) | | | (0.0113) | | | (0.0111) | |
| $\Delta INV_{credit}$ | | | 0.00563 | | | 0.00427 | | | 0.00938** | | | 0.0103** |
| | | | (0.00403) | | | (0.00404) | | | (0.00412) | | | (0.00462) |
| $d10(CREDIT/GDP)$ | 0.0133 | 0.0163** | 0.00976 | | | | 0.000419 | 0.00892* | 0.00359 | | | |
| | (0.0111) | (0.00712) | (0.00833) | | | | (0.00588) | (0.00482) | (0.00553) | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{tot}$ | -0.0134 | | | | | | 0.0259 | | | | | |
| | (0.0300) | | | | | | (0.0207) | | | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{NFC}$ | | -0.0292* | | | | | | -0.0265 | | | | |
| | | (0.0160) | | | | | | (0.0189) | | | | |
| $d10(CREDIT/GDP) * \Delta INV_{credit}$ | | | -0.00797 | | | | | | -0.00888* | | | |
| | | | (0.00475) | | | | | | (0.00469) | | | |
| Constant | 0.294*** | 0.260*** | 0.273*** | 0.304** | 0.262** | 0.209** | 0.126*** | 0.122*** | 0.145*** | 0.138*** | 0.136*** | 0.170*** |
| | (0.0998) | (0.0902) | (0.0991) | (0.113) | (0.106) | (0.0993) | (0.0342) | (0.0388) | (0.0292) | (0.0317) | (0.0350) | (0.0280) |
| Observations | 928 | 960 | 856 | 834 | 858 | 771 | 928 | 960 | 856 | 834 | 858 | 771 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.720 | 0.727 | 0.726 | 0.723 | 0.727 | 0.725 | 0.708 | 0.715 | 0.712 | 0.713 | 0.715 | 0.712 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In summary, it can be concluded from this first part of our empirical analysis that there is generally a positive relationship between finance (i.e. growth of lending) and GDP growth in China. However, this relationship exists mainly when looking at credit dynamics in the corporate sector; total credit ($\Delta log(CREDIT_{tot})$), on the other hand, has a less significant positive contribution to growth in China. This highlights the importance of a differentiated data set that goes beyond aggregate credit variables at the provincial level.

Moreover, we have so far been able to show that there are both temporal and geographic differences in the Chinese growth process and in the effect of credit on it. While China's eastern provinces showed much stronger GDP growth rates than the western and central-northern provinces, especially before 2001, the latter were able to catch up in the years thereafter. Also, the size of the financial system significantly influences the relationships within the finance-growth nexus, in the sense that credit to provinces with a high credit-to-GDP ratio might be negatively affecting GDP growth in China. In this context there is also a growing literature that observes credit bubbles in China and warns of possible risks associated with it (S. Chen & Kang, 2018). Inefficient lending or use of credit or overinvestment can lead to such bubbles, which can result in financial crises and economic collapses and/or inflation. While there were temporarily higher inflation rates in China in the 1980s and 1990s, however, Chinese economic policy has so far managed to control risks to the extent that the Chinese economy has continued to grow strongly without high inflation or bursting financial bubbles.

## 6.3 Empirical Results - Industrial Policy, Banks and Growth in China

The particular importance of the corporate sector in our previous analyses motivates us to take a closer look at the background to this. As we have shown in Chapter 3.2, the link between finance and growth in China might be of a different nature than in other economies due to the particularly strong influence of the state in the banking system. At the same time, we know that the Chinese government has for some time been pursuing a medium- to long-term industrial strategy in which individual industries are given special support through a large number of measures, including financial facilitation. Thus, one could hypothesize that the government (by means of state-owned banks) may have influenced China's GDP growth in the past through targeted lending to individual industries and corporations that are part of its industrial strategy.

To test this hypothesis, we first need to identify an indicator for 'industrial policy'. Due to the wide range and increasing interconnectedness of the targeted industries, as well as the limited detail of data from official Chinese statistics, we thereby have to resort to a temporal indicator, i.e. a time dummy variable. Unfortunately, an experimental approach (effect of measures in targeted industry before and after the start of measures vs. situation in the comparison group) is not possible for the

same reasons and because some of the time series in our data set on specific industries only start after the beginning of the industrial policy support. Thus, a before/after assessment of treatments is not possible. However, we know from Chapter 3 that China's targeted, i.e. vertical, industrial policy did not begin until the mid-2000s, and was first systematized with the Strategic Emerging Industries (SEI) Program in 2010. For this reason, we use 2010 as the starting point of industrial policy measures for our analysis.

We then start to repeat the finance and growth estimations, again including the usual control, credit and region variables, but now expanding them to include the $year_{>2010}$ dummy. Thus, our focus is now no longer on showing provincial convergence after 2001, but on testing the effectiveness of China's systematic industrial policy efforts after 2010.

Table 11: Growth effects of dynamic credit indicators with time dummy variable for industrial policy (SEI), estimated with Random Effects

| | RE | | | |
|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) |
| $log(INITIALGDP)$ | -0.0174** | -0.0174** | -0.0201*** | -0.0150** |
| | (0.00793) | (0.00793) | (0.00763) | (0.00761) |
| $SCHOOL$ | 0.0431 | 0.0413 | 0.0295 | 0.0209 |
| | (0.0552) | (0.0556) | (0.0547) | (0.0539) |
| $log(GOV)$ | 0.0292** | 0.0290** | 0.0341*** | 0.0272** |
| | (0.0114) | (0.0114) | (0.0112) | (0.0110) |
| $log(OPENNESS)$ | -0.00613* | -0.00613* | -0.00549 | -0.00476 |
| | (0.00335) | (0.00334) | (0.00334) | (0.00332) |
| $GEO_{west}$ | -0.0168 | -0.0169 | -0.0167 | -0.0141 |
| | (0.0112) | (0.0112) | (0.0110) | (0.0106) |
| $GEO_{centralnorth}$ | -0.0271*** | -0.0269*** | -0.0261** | -0.0241** |
| | (0.0104) | (0.0104) | (0.0102) | (0.0101) |
| $\Delta CREDIT_{tot}$ | 2.41e-06*** | 0.00419 | | |
| | (5.93e-07) | (0.00420) | | |
| $\Delta CREDIT_{NFC}$ | | | 0.0256*** | 0.0203** |
| | | | (0.00854) | (0.00943) |
| $year_{>2010}$ | | -0.180*** | | -0.190*** |
| | | (0.0326) | | (0.0326) |
| $year_{>2010} * \Delta CREDIT_{tot}$ | | -0.00419 | | |
| | | (0.00420) | | |
| $year_{>2010} * \Delta CREDIT_{NFC}$ | | | | 0.0452** |
| | | | | (0.0216) |
| Constant | 0.115*** | 0.114*** | 0.117*** | 0.120*** |
| | (0.0328) | (0.0327) | (0.0354) | (0.0343) |
| Observations | 981 | 981 | 1,040 | 1,040 |
| Number of Provinces | 31 | 31 | 31 | 31 |
| Adjusted R-squared | 0.715 | 0.715 | 0.724 | 0.725 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results in Table 11 indicate that GDP growth rates before 2010 were significantly higher than those after 2010, consistent with the results we obtained earlier when dividing the data set into the pre- and post-2001 periods. This can be attributed to the development process of China's provinces, leading to decreasing GDP growth rates after the year 2010, as the stronger growth process had already taken place before.

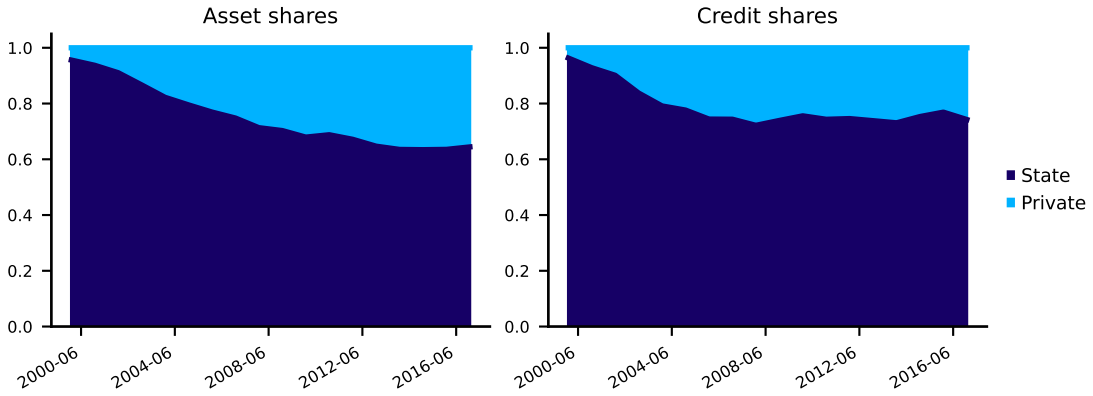
What is of particular interest to us, however, is whether the effect of credit on growth has changed significantly since the intensified efforts of industrial policy were rolled out, starting in 2010. Our data suggest that this was the case. Corporate credit growth after 2010 had a significantly more positive effect on the GDP growth rate than credit provision before 2010. At the same time we know that credit provision to non-financial corporations generally provided a significantly positive growth impulse in the past. Compared to the whole observation period, the effect size

of $\Delta log(CREDIT_{NFC})$ is significantly stronger when interacting with $year_{>2010}$ and also gains significance. These results are also robust if we include lags or logarithmic credit growth rates. No significant structural break is however discernible in total credit growth - if anything, total credit after 2010 even has a more negative effect than before. One potential explanation for this could be the increase in mortgage credit to households after the global financial crisis in 2008 that is included in the total credit indicator (L. Zhang & Bezemer, 2016). The significantly positive effect of credit growth to non-financial corporations controls at least to some extent for this non-productive credit, emphasizing the importance of using a more differentiated data set.

Thus, from these results, it can be hypothesized that credit has been used in a more growth-enhancing manner since 2010 than it was before 2010. This suggests that the more targeted lending, that the Chinese government has undertaken since the early 2010s based on its industrial strategy, could have been successful. In the literature, however, the success of China's industrial policy measures is often questioned, among other things, because there is a risk that credits will 'seep away', i.e. flow into firms that do not use the borrowed capital for growth-enhancing investments. For this reason, we will now take a closer look at who receives credit in China and what this means for the relationship between credit growth and GDP growth.

Figure 8 shows that state-owned enterprises (dark blue) continue to receive significantly more debt capital than private companies, accounting for around 75% of combined lending (right figure). At the same time, SOEs today 'only' account for about 65% of combined assets, with a slight downward trend (left figure). A distinction between state-owned and private companies could thus be of central importance when considering the use of credit for growth guided by industrial policy. Since these data are not available at the macro level, we have to rely on the industry panel data for this purpose, which reduces our observations significantly. In addition to the breakdown by state-owned and private companies, a separate consideration of joint venture or collective enterprises would also be of interest, but unfortunately we do not have access to sector-specific data for these firm types.

Figure 8: Shares of private and state enterprises in sum of assets (left) and sum of credit (right).




Source: China Industry Statistical Yearbooks.

If we now run our standard GDP growth estimation using approximated credit to the private and state industrial sectors, respectively, we detect no statistically significant credit growth effects for the state sector and a significant negative effect for credit to the private sector (Table 12). At the same time, we cannot observe any statistically significant structural break in the effect of credit growth on GDP growth after the year 2010. The negative private credit effect however vanishes and becomes insignificant. We therefore wonder whether effects might then be detected at an upstream stage, specifically concerning firms investment activities.

Table 12: Growth effects of industry credit growth with time dummy variable for industrial policy (SEI) by ownership, estimated with Random Effects

| | RE | |
|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) |
| $log(INITIALGDP)$ | -0.0280** | -0.0347** |
| | (0.0130) | (0.0141) |
| $SCHOOL$ | 0.125* | 0.135** |
| | (0.0639) | (0.0650) |
| $log(GOV)$ | 0.0421** | 0.0517*** |
| | (0.0178) | (0.0190) |
| $log(OPENNESS)$ | 0.000615 | 0.00226 |
| | (0.00572) | (0.00561) |
| $GEO_{west}$ | -0.000214 | -0.00117 |
| | (0.0126) | (0.0124) |
| $GEO_{centralnorth}$ | -0.0182 | -0.0177 |
| | (0.0146) | (0.0148) |
| $\Delta CREDIT_{priv}$ | -0.000366*** | -7.45e-05 |
| | (4.57e-05) | (0.000480) |
| $\Delta CREDIT_{state}$ | 0.00343 | 0.00161 |
| | (0.00280) | (0.00327) |
| $year_{>2010}$ | | -0.0621** |
| | | (0.0272) |
| $year_{>2010} * \Delta CREDIT_{priv}$ | | -0.000265 |
| | | (0.000489) |
| $year_{>2010} * \Delta CREDIT_{state}$ | | 0.00481 |
| | | (0.00496) |
| Constant | 0.0168 | 0.0138 |
| | (0.0529) | (0.0565) |
| Observations | 374 | 374 |
| Number of Provinces | 29 | 29 |
| Adj. R-squared | 0.685 | 0.684 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

We therefore split our analysis into two parts: 1.) Measuring the effect of credit growth to the state (resp. private) sector on total investment growth (Table 13), and 2.) analyzing the effect of credit-financed investment growth on GDP growth. In particular, we are interested in the effect difference after the start of the SEI program. Again, we resort to data from the aggregated firm balance sheet data set, now including total investment growth ($\Delta INV_{tot}$), receipt of state capital

($\Delta STATECAP_{ind}$) or foreign capital ($\Delta FORECAP_{ind}$), revenue growth ($\Delta REV_{ind}$) and credit growth by sector ($\Delta CREDIT_{priv}$ and $\Delta CREDIT_{state}$).

From Table 13, we see that the receipt of foreign equity in particular had a negative, albeit insignificant impact on the growth of investments. Government equity, on the other hand, has a significantly negative effect. While central-northern provinces do not have significantly higher or lower investment growth rates than eastern provinces, the western region of China invests significantly more than the eastern region. Without controlling for the SEI time dummy, there are no significant investment effects of credit to the private and the state industrial sector. When introducing an interaction term of the credit growth rates and the SEI time dummy, we also cannot find any structurally different effect of credit growth on investment growth for private and state-owned industrial firms after the start of the SEI.

While our previous estimations were largely in line with our robustness checks in the Appendix, we observe a significant deviation from them here. In our estimations with logarithmic credit growth rates (Table 40), we see that the growth of credit to the private sector now has a significantly negative effect on total investment growth across all points in time. This indicates, that in the first estimation, we might have overestimated the effect of private credit. Although we do not find these results with our standard growth rates, they could still hint at inefficiencies in the private sector, that we will discuss in more detail below. It thus seems that after 2010, credit provision to private firms could have been more investment-enhancing than before. Thus, our data hints that with the start of the SEI program, these inefficiencies might have improved, however these results are not robust.

Credit provision to the government, on the other hand, does not have a significant investment effect either in the overall period or after 2010. Table 26 shows that if we include lagged credit variables, we do find a significant positive effect for state credit. We have two possible explanations for the insignificant results: 1) since state-owned enterprises have always been supported by 'industrial policy' and had easier access to bank credit, no particular impulse can be detected after 2010, and/or 2) state-owned enterprises are more inefficient in using credit for investment. To complete our line of arguments, Table 3 and 4 show that credit-financed investment generally has a positive effect on real GDP growth that is also at least for the RE estimation significant.

Table 13: Investment effects of industry credit growth with time dummy variable for industrial policy (SEI) by ownership, estimated with Random Effects

| | RE | |
|---|---|---|
| Dependent: $\Delta INV_{tot}$ | (1) | (2) |
| $\Delta STATECAP_{ind}$ | -0.0213** | -0.0207** |
| | (0.0105) | (0.0103) |
| $\Delta FORECAP_{ind}$ | -0.00868 | -0.00831 |
| | (0.00717) | (0.00741) |
| $\Delta REV_{ind}$ | 0.304** | 0.291* |
| | (0.155) | (0.161) |
| $GEO_{centralnorth}$ | 0.0204 | 0.0219 |
| | (0.0174) | (0.0189) |
| $GEO_{west}$ | 0.0294** | 0.0270** |
| | (0.0117) | (0.0129) |
| $\Delta CREDIT_{priv}$ | 0.000620 | -0.00147 |
| | (0.000384) | (0.00161) |
| $\Delta CREDIT_{state}$ | 0.00791 | 0.00198 |
| | (0.00665) | (0.00529) |
| year >2010 | | -0.111** |
| | | (0.0444) |
| $year_{>2010} * \Delta CREDIT_{priv}$ | | 0.00216 |
| | | (0.00171) |
| $year_{>2010} * \Delta CREDIT_{state}$ | | 0.0193 |
| | | (0.0118) |
| Constant | 0.101*** | 0.104*** |
| | (0.0211) | (0.0220) |
| Observations | 365 | 365 |
| Number of Provinces | 29 | 29 |
| Adj. R-squared | 0.425 | 0.423 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In summary we can thus conclude the following: Credit provision to the non-financial corporate sector in general had a significant positive effect on real GDP growth, that increased considerably after 2010, in comparison to the time before 2010 (Table 11). We then extended our analysis with respect to ownership, to find that credit provision to the private industrial sector had a negative effect on GDP growth, and no significant effect on investment growth (Table 12 and 13). For SOEs, there is neither a significant effect of credit growth on GDP growth or investment growth. These findings seem to contradict our previous results from Table 11. This is not the case, however, because while we analyzed private and state firms in particular, our general $CREDIT_{NFC}$ variable also includes other types of firms, such as joint ventures, collectively owned firms, cooperatives, and foreign firms, amongst others. However, no individual data are available for these types of companies. This is particularly unfortunate since we assume that joint ventures in particular have and have had a significant impact on China's economic development. We thus assume that it was mainly non-private and non-state firms that used credit more efficiently. Private and state enterprises were less efficient in using credit.

While Table 13 shows a positive but not significant effect of credit to the private sector after the start of the SEI program, in our robustness checks (Table 40) we also find this effect to be significantly positive. This shows that at least for the private industrial sector there are hints for a structural improvement in the use of credit after the SEI program was initiated in 2010, that are, however, not robust. The interaction term of our time dummy and credit provision to the private sector show a positive effect on investment activity. For the SOEs we cannot observe any structural improvements after 2010. This is in line with the general literature on the efficiency of SOEs.

Overall, our estimation results therefore provide evidence that the credit-led component of China's

industrial policy since 2010 might have been successful, with the corporate sector generally undertaking more credit-financed investment and thus positively affecting real GDP growth. In contrast to state-owned firms, private firms in China have also seen improvements in the use of credit, although they still have some catching up to do in terms of the efficiency with which credit is used.

### 6.4 Industry Case Studies

Following our previous analysis of finance, industrial policy and growth at the general industry level, we will now supplement our findings by having a closer look at particularly interesting, individual industries as part of a case study to answer our fourth research question: If general industrial policy was successful, are there also positive effects observable for individual industries?

To begin with, we are able to repeat the above estimations of the impact of credit on investment, and investment on GDP growth based on our firm balance sheet data set for specific industry branches. Due to the industries' special importance for the global economy, as well as their ecological importance, we have chosen to focus on the energy sector (renewable energy, i.e., primarily solar and wind energy) on the one hand, and the automobile sector (new energy vehicles (NEV)) on the other, both industries being promoted under the SEI and subsequent strategic decisions.

The results of these estimations can be found in Tables 14 and 15. A breakdown into the period before and after 2010 is not possible due to the nature of the data, as these have only been recorded since 2012 for the automotive sector, and since the mid-2000s for the energy sector. Our findings therefore primarily refer to the phase after the start of targeted political support. Note that we now apply $\Delta CREDIT_{firm}$ as credit variable from our firm data set to ensure consistency.

The results show that lending to the automotive sector led to significantly more investment growth, while lending to the energy sector had no statistically significant investment growth effect (Table 14). Moreover, in the case of the automotive sector, having a larger share of government capital in owner's equity tends to lead to significantly lower investment growth, which is not the case for the energy sector. The firm credit variable shows a general positive, albeit statistically not significant, effect on total investment. Finally, Table 15 illustrates that the growth of investment in general and in the automotive sector had a positive impact on real GDP growth, albeit the effect is only significant for total investment. Table 28, 42, 61 and 62 from the robustness checks even shows significant positive effects for automobile investment. We find no significant growth impulse for investment in energy. These results fit to our previous findings: While in the automotive sector the majority of the firm landscape is made up of joint venture firms, the renewable energy sector contains significantly more private firms, as we will show below.

Table 14: Investment effects of industry credit growth by industrial sector, estimated with Random Effects

| | RE | | |
|---|---|---|---|
| Dependent: | (1) $\Delta INV_{tot}$ | (2) $\Delta INV_{auto}$ | (3) $\Delta INV_{energy}$ |
| $\Delta REV_{ind}$ | 0.302** | 0.834 | -10.72 |
| | (0.151) | (0.645) | (9.862) |
| $\Delta CREDIT_{firm}$ | 0.00436 | 0.557*** | -0.101 |
| | (0.00763) | (0.163) | (0.199) |
| $\Delta STATECAP_{ind}$ | -0.00370 | -0.267*** | 0.270 |
| | (0.0111) | (0.0901) | (0.456) |
| $\Delta FORECAP_{ind}$ | -0.00736 | -0.0314 | 0.227 |
| | (0.00917) | (0.103) | (0.371) |
| $GEO_{centralnorth}$ | 0.0228* | -0.0756 | 1.084 |
| | (0.0138) | (0.0565) | (1.126) |
| $GEO_{west}$ | 0.0344*** | -0.0651 | 2.485 |
| | (0.0117) | (0.132) | (2.202) |
| Constant | 0.0914*** | 0.154 | 0.0711 |
| | (0.0184) | (0.514) | (0.337) |
| Observations | 501 | 128 | 390 |
| Number of Provinces | 30 | 22 | 29 |
| Adj. R-squared | 0.432 | 0.540 | 0.044 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 15: Growth effects of investment by industrial sector, estimated with Random Effects

| | RE | | |
|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) |
| $log(INITIALGDP)$ | -0.0252*** | 1.09e-05 | -0.0379*** |
| | (0.00847) | (0.0301) | (0.0118) |
| $SCHOOL$ | 0.0502 | 0.186 | 0.0865 |
| | (0.0486) | (0.153) | (0.0590) |
| $log(GOV)$ | 0.0405*** | 0.0278 | 0.0523*** |
| | (0.0123) | (0.0404) | (0.0163) |
| $log(OPENNESS)$ | -0.00463 | -0.000954 | -0.00491 |
| | (0.00307) | (0.00553) | (0.00416) |
| $\Delta INV_{tot}$ | 0.118*** | | |
| | (0.0213) | | |
| $\Delta INV_{auto}$ | | 0.0119 | |
| | | (0.00728) | |
| $\Delta INV_{energy}$ | | | -0.000112** |
| | | | (4.64e-05) |
| $GEO_{centralnorth}$ | -0.0267*** | -0.0193 | -0.0243* |
| | (0.00966) | (0.0214) | (0.0132) |
| $GEO_{west}$ | -0.0207* | 0.0167 | -0.0128 |
| | (0.0112) | (0.0258) | (0.0139) |
| Constant | 0.113*** | 0.00965 | 0.117*** |
| | (0.0299) | (0.0867) | (0.0379) |
| Observations | 995 | 156 | 521 |
| Number of Provinces | 31 | 22 | 30 |
| Adj. R-squared | 0.719 | 0.756 | 0.744 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Thus, we will now finally have a look at the development and the performance of both industries to put the preceding observations in perspective, and to discuss to what extent China has achieved its primary goal of global competitiveness in advanced industries so far. As already mentioned, the availability of official Chinese statistics decreases significantly as the level of detail increases, so that we will have to rely on statistical-descriptive market descriptions in doing so.

### 6.4.1 Case I: Renewable Energy Sector

According to the Global Carbon Project (2022) China has been the largest emitter of Carbon dioxide worldwide since 2006. Most recently (2020), the country emitted more than twice as much as the second-placed country, the USA. At the same time, China is also the largest consumer of energy, accounting for 25% of global energy consumption in 2021 (Enerdata, 2022). Thus, securing long-term energy sources vis-à-vis increasing competition for energy resources with developed, but mainly by developing countries, high volatility in global energy markets and increasing resource constraints is a top priority for China. China also sees opportunities in the national development

of energy technologies and innovations to play a leading role in the global energy transformation (State Council of the People's Republic of China, 2013).

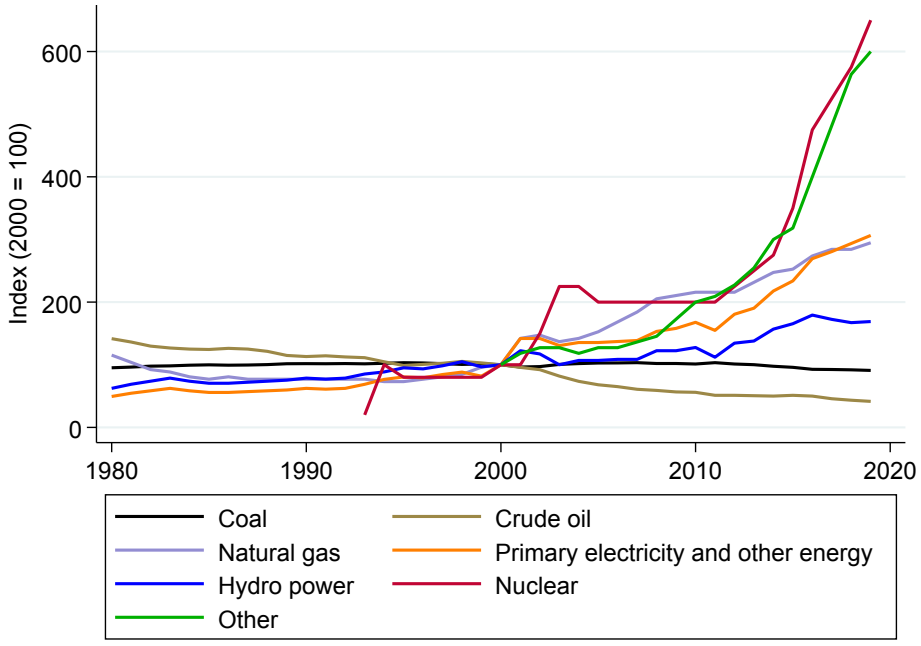
China's coordinated, industrial strategic efforts in renewable energy, fundamentally started from 2005, with the announcement of the 11th FYP and the passing of the Renewable Energy Law. Most of the industry policy measures in the renewable energy sector were implemented between 2005 and 2013. As specified in the Renewable Energy Law, the renewable energy sector thereby mainly includes the hydropower industry, wind power, solar power, biomass power, geothermal power and ocean power. The 11th FYP indicates to *'[c]arry out preferential finance and taxation and investment policies and mandatory market share policies, encourage the production and consumption of renewable energy resources and increase its proportion in the primary energy consumption'* (State Council of the People's Republic of China, 2006a). Furthermore, the government resorted to instruments as a guaranteed power grid connection and full purchase of energy through renewable energy generation and a fixed grid pricing policy (S. Zhang, Andrews-Speed, & Ji, 2014; S. Zhang, Andrews-Speed, Zhao, & He, 2013).

With the global financial crisis, the Chinese government faced major problems in the renewable energy market. Especially in the solar sector, the country was extremely dependent on exports, whereas the wind industry also found stronger domestic sales due to its cost advantages at that time (S. Zhang et al., 2014). In order to strengthen domestic demand, especially for solar energy, the Chinese government therefore adopted several programs in 2009, that subsidized solar system investment costs and photovoltaic systems on buildings (S. Zhang & He, 2013). The problem with these programs was that the amount of subsidies was linked solely to the level of investment, so that investment projects were subsidized regardless of their efficiency or quality (S. Zhang et al., 2014).

Another problem with the Chinese industrial policy measures in renewable energies was that they were initially not adjusted to changes in production and material prices, resulting in significant overproduction. This overproduction caused world market prices for PV systems to plummet, prompting the EU and US to respond with import tariffs on Chinese PV products to protect their own industries (G. Chen, 2015). In the beginning, subsidies were also only directed at the production of PV systems, but not at the construction and operation of these systems within China, so that this was financially unattractive for a long time and over 90% of the systems were exported (Andrews-Speed & Zhang, 2015). In addition, power grid operators were often overwhelmed by the later, rapid construction of PV systems, so that some PV systems could not be connected to the power grid after their completion (H. Wang et al., 2016). The targeted government support of 'national champions' furthermore created disincentives for companies to produce as large quantities

of PV systems as possible, as this protected them from potential competitors by the local or central government (G. Chen, 2015).

Figure 9: Indexed shares of energy sources in total energy production (Source: China Statistical Yearbooks)




Note: Other energy sources include wind power, solar power and geothermal power.

So, how successfull were the Chinese efforts in the development of the market for renewable energies? Figure 9 shows the evolution of different energy sources in China's total energy production since 1980 (indexed to 2000). It can be seen that the importance of crude oil and coal has been steadily declining since the turn of the millennium, whereas 'other' energy sources (wind, solar and geothermal energy) and nuclear energy have been gaining significantly in importance. Natural gas and hydro power have also gained in popularity. In absolute terms, however, the largest share of Chinese energy production today (as of 2019) still comes from coal (68.5%), followed by hydro power (9.8%) and crude oil (6.9%). Other energy sources account for 6.6%, natural gas is 5.6% and nuclear 2.6%. In 1980, coal and crude oil together accounted for 93.2% of total energy production (China Statistical Yearbooks data).

Besides, China is leading the global photovoltaic and wind energy markets today: In 2020 China accounted for 33.2% of annually installed PV capacity, and 33.1% of cumulative PV capacity. China is also the largest producer and consumer of photovoltaic cells (77.7% of 2020 global production in China) and modules (69.8%), as well as the largest producer of upstream products for the production of PV systems (such as PV wafers (96% of global production in 2020), or polysilicons

(76%). Of the top 5 manufacturers of solar cells, four are Chinese, as are the top 5 manufacturers of PV modules (including one Canadian company that does most of its manufacturing in China) (IEA, 2021).

Furthermore, China holds the leading position in the global wind energy sector. China's share of new global wind power capacity installations was 56% in 2020. Both the onshore and offshore wind markets are experiencing above-average global growth. Globally, China accounts for approximately 39% of all onshore and 28% of all offshore wind energy installations in 2020 (GWEC, 2021).

Thus, even though China faced enormous problems with the promotion of renewable energies, especially in its earlier stages, there is no way around the country today when it comes to photovoltaic or wind power technology. This is also due to the fact that China takes a rather pragmatic approach in pursuing its industrial policy and corrects measures quite quickly when they are at risk of failure. Nevertheless, the temporarily problematic performance of the energy sector could explain our findings from Tables 41 and 42.

#### 6.4.2 Case II: New Energy Vehicle Sector

Another industry in which China is emerging as a new player globally is the automotive sector, or more specifically, the market for automobiles with new, green powertrain technologies. Today, China has the largest automotive market in the world in terms of the number of new car registrations. In 2021, 36.6% of all new car registrations worldwide were completed in China, compared to 37.5% in 2020 and 33.1% in 2019 (OICA, 2022a). In addition, the country is now the largest producer of automobiles: In 2021, China produced about 32.5% of all vehicles worldwide (2020: 32.5%; 2019: 27.9%) (OICA, 2022b). The Chinese automobile industry is therefore of great strategic importance for the country, but also for the rest of the world.

In 1986 the automotive industry was identified as a strategically important key industry in China, whereas the primary goal was to substitute automobile imports from abroad. By the mid-1990s, the Chinese government had partly achieved this goal, but Chinese vehicles were still very expensive, technologically behind international standards and thus not competitive. Thus, in order to obtain urgently needed technological knowledge from abroad, it was decided to enter into large-scale joint venture partnerships with foreign companies - many of whom still exist today (Schüller, 2015). Selected firms were then first protected from foreign competition entering the market, for example through high tariffs and other barriers to entry (Chu, 2011; Shih, 2014). Starting in 2001, the first purely Chinese automobile manufacturers, such as Chery (state-owned), Geely or BYD (both privately owned) were opening business (Chu, 2011).

The automotive sector in the field of 'new energy vehicles' (NEV, i.e. energy-saving vehicles with new technologies, such as electric cars or hybrid cars) is today part of the strategic emerging industries (SEI) and the IDDS. Targets for the automotive sector were largely set in the sector-specific 12th Five-Year Plan and its accompanying 'Energy-Saving and New Energy Vehicle Industry Plan for 2012 to 2020', and adjusted in 2020 as part of the 'New Energy Vehicle Industrial Development Plan for 2021 to 2035'. Within these plans, the automobile industry was given direct government subsidies, tax exemptions, NEV quotas in public fleets and preferential credit provision, amongst others, and several subsidies for the purchase of NEV's were rolled out (ICCT, 2021; Yuan, Liu, & Zuo, 2015). In addition, non-financial incentives were provided on the demand side of the NEV market, as when many major Chinese cities introduced special regulations for the registration of electric vehicles: While in many cities, car registration is tied to lotteries and quotas, which lead to long waiting periods for a new car to be put into service, electric vehicles were excluded from all these limitations (S. Li et al., 2022; H.-j. Zhang, 2017). By the mid of the 2010s, subsidies for hybrid vehicles have been reduced to fully support the development of all-electric vehicles instead (P. Yu, Zhang, Yang, Lin, & Xu, 2019). Since 2015 there has therefore also been increased investment in the expansion of public charging infrastructure (H.-j. Zhang, 2017).

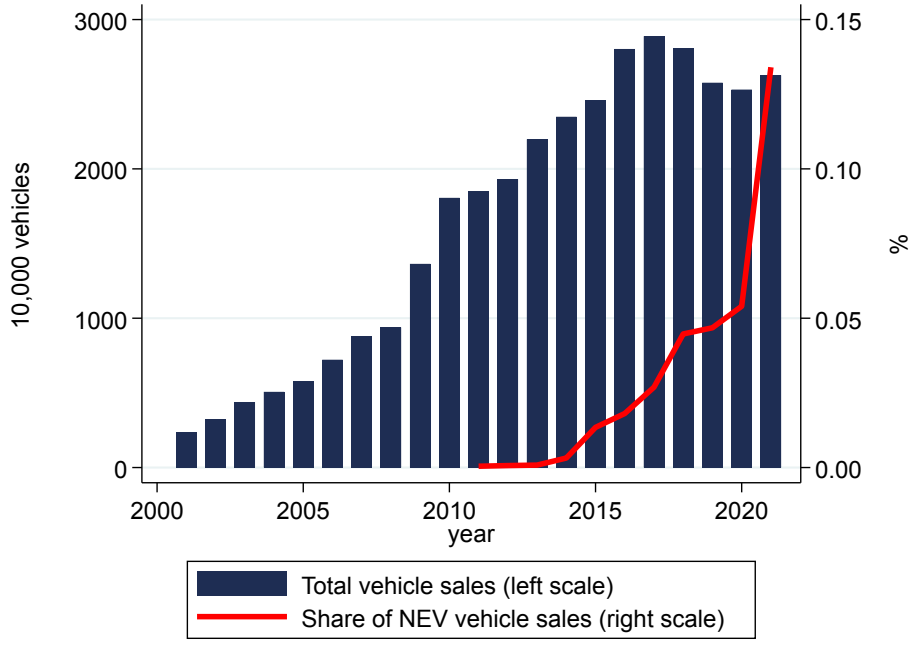



Figure 10: Annual vehicle sales and share of NEV in China (Source: CAAM)

From Figure 10 we can see that the share of NEVs sold, as a percentage of all vehicles sold in China, has increased significantly since 2011. According to a recent report of the International Energy Agency (iea), more e-vehicles were sold in China in 2021 (about 3.5 million) than in the entire

world in 2020. However, the particularly sharp increase in 2021 can be partly attributed to the fact that subsidies for the purchase of NEVs (that were initially extended due to the Corona crisis) will expire at the end of 2022 (IEA, 2022).

Sales of e-cars accounted for about 9% of the global automotive market in 2021, an increase of about 400% compared to 2019. The net increase in these sales can be attributed almost entirely to China, where the number of NEVs sold has nearly doubled since 2019. In China, NEV sales accounted for about 13.4% of all vehicle sales in 2021 (CAAM, 2022). China is also a leader in the manufacture of batteries, producing around two-thirds of all lithium-ion batteries and between 70 and 85% of the most important components for battery production. China now also has around 85% of the world's fast-charging stations, making it the world's number one country for the availability of public charging stations (IEA, 2022).

China currently offers the largest selection of NEV vehicles with around 300 models, compared to 184 in Europe and around 65 in the US. Most of the Chinese models are SUVs, followed by small and mid-sized cars. At 36.5% of all EVs, the share of small to mid-sized vehicles is higher than in Europe (31.5%) and the US (23.8%). This, but also lower production costs, also means that e-vehicles in China are significantly cheaper than in a global comparison. For example, the price of EVs in China in 2021 was only around 10% higher than for traditional vehicles, whereas these were around 45-50% more expensive in Europe and the USA (IEA, 2022). The three largest producers worldwide as of today (2022) are Tesla (USA), Volkswagen (Germany) and BYD (China), producing about one third of the global EV volume together. BYD was not even in the global top 6 in 2020 (IEA, 2022).

In summary, it seems that China's industrial policy strategy could show considerable success, also in the market for new energy vehicles. In particular, Chinese firms seem to be able to compete with large global players, like Volkswagen or Tesla and were also able to establish a substantial domestic demand for Chinese vehicles.

# 7 Discussion

From the preceding chapters, a rather positive overall impression of the success of Chinese industrial policy measures emerges. This relates on the one hand to the generally more positive impact of credit growth on GDP growth after the start of SEI measures in the corporate sector. On the other hand, one could argue that regional industrial policy has partly contributed to the catching-up process of the non-eastern provinces since the early 2000s that we have found in our empirical analysis on the finance and growth nexus in Chapter 6.2 and that is also found in the literature (Schütz, Li, & Palan, 2017; H.-z. Wang & Bai, 2008).

Despite this generally rather positive picture, there are, however, structural and industry-specific features which we would now like to analyze in more detail as part of the discussion.

To begin with, part of our empirical results relate to the role of ownership structures in the corporate sector. We have found hints, especially in our robustness estimations, that there might be signs for a structural difference in the use of credit by purely private Chinese firms and SOEs, especially after the start of China's deeper industrial policy efforts in 2010. Although there is generally no or even a slightly negative correlation between credit growth and investment growth for both types of firms, private firms might use credit more efficiently after 2010 than before 2010. This does not necessarily mean that an increase in credit received after 2010 leads to a disproportionate increase in investment for private firms in absolute terms (= efficient credit use), but that relative improvements do occur. In contrast, no improvement in efficiency can be observed for state-owned firms. The general inefficiencies of SOEs but also of purely private Chinese firms have already been addressed in the literature from various angles (e.g. Dougherty, Herd, and He (2007); S. Li, Lin, and Selover (2014); L.-Y. Zhang (2004)) and can thus be confirmed in the context of this study from the side of the use of credit. In addition to inefficiencies in the use of credit, it would also be conceivable, especially in the case of private companies, that more credit would not lead to an increase in investment on the same scale, for example due to bureaucratic or similar hurdles.

We attributed the discrepancy from the significantly growth-enhancing credit use by the corporate sector in general, and the sometimes negative or non-significant results when looking at purely private or purely state-owned firms in isolation, to the existence of other types of firms for which we do not have any individual data. We have already suggested that joint venture firms may be particularly relevant in this context, which is also shown in the literature (e.g. Jiang, Keller, Qiu, and Ridley (2018); Y. Lu, Tao, and Zhu (2017)). Furthermore, there is a range of literature that suggests that the existence of joint-ventures positively influences the success of private firms in China through spillover effects (Jiang et al., 2018; Van Reenen & Yueh, 2012). Overall, it could thus be argued that credit after the start of SEI measures is being used more efficiently and in a growth-enhancing way, primarily by joint-venture firms (or other non-private and non-state firms), and that these positive effects are also slowly spreading to Chinese private firms. Jiang et al. (2018) also show that firms that receive government subsidies - implicitly, firms with well-developed political connections - are also more likely to be selected as joint venture partners and thus benefit from foreign expertise. Particularly with regard to state subsidies, this can also be seen as an indirect positive effect of industrial policy in China.

The case studies from the previous chapter also provide evidence that this might be true. We

showed that efficient lending (in terms of enhancing investment and growth) was observed in the automotive sector in particular, which is strongly dominated by joint venture enterprises (Y. Chen, Lawell, & Wang, 2020; Y. Liu & Kokko, 2013; Schüller, 2015). In the renewable energy sector, on the other hand, there are many domestic private enterprises and less international cooperations Chiu (2017). From an empirical point of view, we could not detect any significant effect of credit on investment in the renewable energy sector. However, we have shown in the case studies that there have been large inefficiencies in this market in the past. This observation is also in line with the literature that finds strong inefficiencies and overinvestment (e.g. Bu and Tu (2017); Shen and Luo (2015)).

The reason why we still consider China's industrial policy to be positive overall lies in the fact that the Chinese government has in the end achieved its designated goal of global dominance both in the NEV market and in the market for renewable energies. China is now considered one of the world's leading economies in both markets, although the Chinese approach to the development of the two sectors has been fundamentally different. Due to the lack of foreign expertise in the renewable energy sector, achieving market dominance there in particular was associated with extremely high costs. As a result, it is not uncommon for studies to come to a rather negative assessment of industrial policy success in this area (e.g. Bu and Tu (2017); Shen and Luo (2015)). We have not performed a cost-benefit analysis of the industrial policy measures in the context of this paper. This is partly because an objective assessment of all costs is insufficiently possible due to the availability of data, and partly because an assessment at this stage is probably too early - especially since the overall benefits of the industrial policy measures cannot even be seen at present. At the same time, it must be discussed whether the activity of the state per se does not have to go far beyond a pure cost-benefit consideration. The remainder of this chapter will therefore briefly describe the role of the Chinese state as an entrepreneurial state in the sense of Schumpeter's growth theory.

Schumpeter's growth theory was described at the outset, and China was described as a hybrid between a central planner and a private banking system. The banker described by Schumpeter thus changes from a private institution to a state institution, and the state becomes an active player on its own right. This concept of the **'entrepreneurial state'** was elaborated by Mazzucato (2014), but can already be traced back to Schumpeter (Burlamaqui, 2020). The correspondence between the Schumpeterian growth model and the entrepreneurial state in China was described by Burlamaqui (2020, p.14) as follows: *'[F]rom a Schumpeterian (rekindled) perspective, the Chinese entrepreneurial state encompasses the functions of ephor, entrepreneur-in-chief and policy coordinator.'* Burlamaqui (2015, p.730) argues that the Chinese economic model shows all the elements contained in Schumpeter's vision of successful state involvement in economic activity, *'[t]he centrality of credit for innovation*

*and development (instead of 'savings'), the key role of the State in steering and governing the development process (instead of 'free markets'), the strategic role of investment-development banks to provide the necessary funding, and the functionality of financial restraint to avoid the buildup of 'financial casinos'*. This model of the entrepreneurial state in the Schumpeterian sense could be the key to the Chinese growth miracle as Herr (2010, p.86) argues: *'The secret of Chinese success seems to rest on a productive combination of government interaction and market forces. China has managed to create a sustainable Schumpeterian-Keynesian credit-investment-income-creation process which has led to economic prosperity. This process was domestically driven by political credit expansion and allocation, and by a dynamic private sector including foreign enterprises.'* Our empirical analysis based on our newly created data set provides additional confirmation of this account of the Chinese growth model.

# 8 Conclusion

In this paper we analyzed the role of China's banking system in implementing industrial policy, by the example of the 'Strategic Emerging Industries' program. We collected data from the Chinese statistical provincial yearbooks to construct a **new panel of financial and economic indicators** for 31 provinces over the period from 1985 to 2019 to empirically assess the **role of credit** in China's general economic development process (Chapter 6.2), and as transmission instrument of industrial policy to foster this development (Chapter 6.3). At the beginning of our empirical analysis, we defined a set of research questions based on the Schumpeterian growth model, that we hoped to answer:

**1.) Is there a relationship between credit and growth in China? And, if so, was credit provision to the non-financial corporate sector in particular even more conducive to growth than credit overall?**

Our empirical analysis based on panel estimations suggests an overall positive relationship between credit growth and real GDP growth, especially when credit is extended to the corporate sector. The growth effects of total credit, an indicator including a higher proportion of unproductively used credit, are less statistically significant. Our data also show that the generally positive effect of credit growth on GDP growth diminishes in provinces with already high credit shares in GDP and that there are regional and temporal differences in the finance-growth nexus. This highlights the different development processes within China. While eastern provinces had high growth rates in the pre-WTO accession period, western provinces in particular have been catching up since.

**2.) Can the positive effect of credit on growth be attributed to industrial policy and are positive effects also observed for individual industries?**

In a first step, we found that credit provision to non-financial corporations after 2010, i.e., the start

of the SEI program (which marks the first systematized vertical industrial policy strategy in China) was significantly more growth-enhancing than credit provision before 2010. Thus, credit after 2010 appears to have been used in a more efficient way. However, as the literature often questions the effectiveness of industrial policy measures due to the risk of credit flowing to unproductive (mostly state-owned) firms, we then distinguished between the provision of credit to state-owned or private firms. Even though we found no statistically significant difference in the effectiveness of credit to generate real GDP growth after the SEI program has started, we found effects at an upstream stage: Our estimations indicate that credit provision to private industrial enterprises could have led to higher investment growth after 2010 than before. This is not the case for state-owned industrial enterprises. Overall, however, credit growth and investment growth are negatively correlated for both private and state-owned industrial firms, while for credit-financed investment we find positive effects on real GDP growth. Due to the overall positive growth effect of credit, we thus conclude that other types of firms, that we cannot analyze individually due to the lack of data (for example joint-venture enterprises), have been particularly efficient in using credit for investment and growth, and that Chinese private firms seem to start catching up.
We then extended our analysis to have a closer look at the automobile industry and the renewable energy sector. We found that since the start of the SEI strategy, lending to firms has increased investment in the automotive sector (which is largely dominated by joint-venture firms), and that the latter has also had a positive effect on overall economic growth. We do not find these effects for lending to businesses in the renewable energy sector, which is in line with existing literature that finds inefficiencies and overinvestment in this sector.

To the best of our knowledge, we are the first to present an econometric analysis of the impact of China's targeted lending on economic development, as well as an analysis of the role of lending on the success of China's industrial policy strategy. On the one hand, we contribute to the more general finance and growth literature on China, by applying a new data set, which spans nearly four decades and differentiates credit into total credit and more targeted credit for firms or investment. On the other hand, while there are several works that empirically analyze industrial policy and specifically industrial policy in China, few of these works examine the role of credit as a tool to implement industrial policy objectives. These papers confirm the important role of credit as an industrial policy tool, but often limit their analysis to credit conditions, showing that target industries and especially SOEs in target industries receive more credit and that industrial policy measures alleviate firms' financing constraints.

Our paper has several **limitations** that could be addressed in future research. First, it is important to emphasize that we did not analyze causal mechanisms of industrial policy or lending on growth. This is largely due to the indicator availability and structure of our data set. Since some time series

start only at or after the beginning of the SEI program, a before/after comparison of treatments, for example, was not possible for us. Furthermore, we did not cover some topics, that are closely related to Schumpeter's theories, as for instance 'secondary wave' effects of finance and growth, as well as the analysis of business cycles. Finally, it would also be interesting to see, how China's development differs from that of other developing countries that have relied on less direct state intervention.

We are aware that the **transferability** of our results, for example to industrial policy measures in Europe, is rather limited due to the special political circumstances in China and the resulting longer-term planning, as well as the stricter implementation capability. Nevertheless, our results highlight the potential of developing medium- to long-term strategies for the advancement of particularly strategically important industries - a project, that will be particularly important to be able to compete with China in the future.

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# 9 Appendix

## 9.1 Data Description and Sources

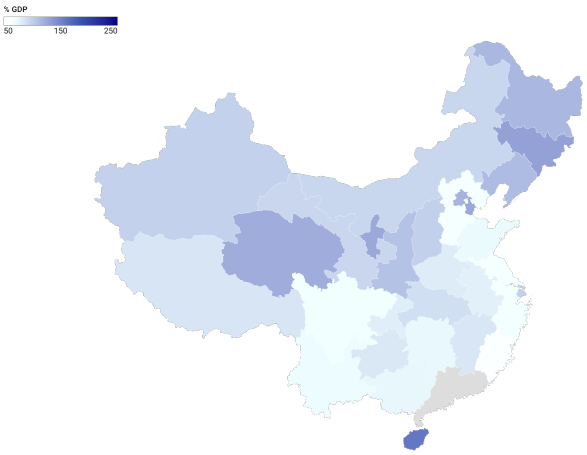
Table 16: Data description and sources (macro panel).

| Variables and sources | | | |
|---|---|---|---|
| Symbol | Variable | Definition | Data source |
| Dependent variable | | | |
| $\Delta GDP_{real}$ | Real GDP growth | Annual growth rate of real GDP in percent | China Provincial Statistical Yearbooks, var. years |
| Explanatory variables | | | |
| $\Delta CREDIT_{tot}$ | Total credit growth | Annual growth rate of total credit (100 mio yuan) | China Provincial Statistical Yearbooks, var. years |
| $\Delta CREDIT_{NFC}$ | Commercial credit growth | Combined annual growth rates of various non-financial corporation / industry credit data series, interpolated, in percent | China Provincial Statistical Yearbooks, var. years |
| $\Delta INV_{credit}$ | Growth of credit financed investment | Annual growth rates of investment in Fixed Assets with the source of funds being domestic credit (10.000 Yuan) | China Provincial Statistical Yearbooks, var. years |
| Control variables | | | |
| log(INITIAL GDP) | Level of initial GDP | Natural logarithm of GDP from previous period (t-1) | China Provincial Statistical Yearbooks, var. years |
| SCHOOL | Secondary school enrollment rate | Share of students in secondary schooling by total students in primary and secondary schooling (percent) | China Provincial Statistical Yearbooks, var. years |
| log(GOV) | Government expenditure | Natural logarithm of General Public Budget Expenditure (100 Mio Yuan) | China Provincial Statistical Yearbooks, var. years |
| log(OPENNESS) | Trade | Natural logarithm of Openness, calculated as sum of imports and exports divided by GDP | China Provincial Statistical Yearbooks, var. years |

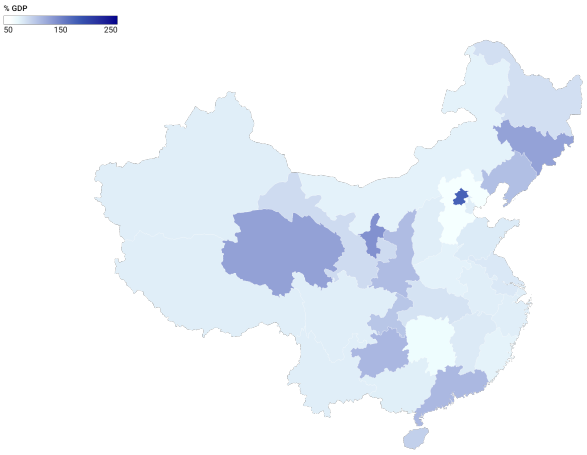
Table 17: Data description and sources (industry panel).

| Variables and sources | | | |
|---|---|---|---|
| Symbol | Variable | Definition | Data source |
| Dependent variable | | | |
| $\Delta INV_{tot}$ | Growth of investment in fixed assets | Annual growth rate of investment in fixed assets for total industry | China Industry Statistical Yearbooks, var. years |
| $\Delta INV_{auto}$ | Growth of investment in fixed assets by automobile industry | Annual growth rate of investment in fixed assets for automobile industry | China Industry Statistical Yearbooks, var. years |
| $\Delta INV_{energy}$ | Growth of investment in fixed assets by energy industry | Annual growth rate of investment in fixed assets for energy industry | China Industry Statistical Yearbooks, var. years |
| Explanatory variables | | | |
| $\Delta CREDIT_{firm}$ | Growth of credit to total industry (aggregate firm data) | Difference in liabilities and owner's equity for total industry | China Industry Statistical Yearbooks, var. years |
| $\Delta CREDIT_{priv}$ | Growth of credit to private firms (aggregate firm data) | Difference in liabilities and owner's equity for private industrial enterprises | China Industry Statistical Yearbooks, var. years |
| $\Delta CREDIT_{state}$ | Growth of credit to state-owned firms (aggregate firm data) | Difference in liabilities and owner's equity for state-holding industrial enterprises | China Industry Statistical Yearbooks, var. years |
| Control variables | | | |
| $\Delta REV_{ind}$ | Aggregate firm revenues | Growth of main business revenues from total industry | China Industry Statistical Yearbooks, var. years |
| $\Delta STATECAP_{ind}$ | Receipt of state capital | Paid in state capital as part of owner's equity for total industry | China Industry Statistical Yearbooks, var. years |
| $\Delta FORECAP_{ind}$ | Receipt of foreign capital | Paid in foreign capital as part of owner's equity for total industry | China Industry Statistical Yearbooks, var. years |

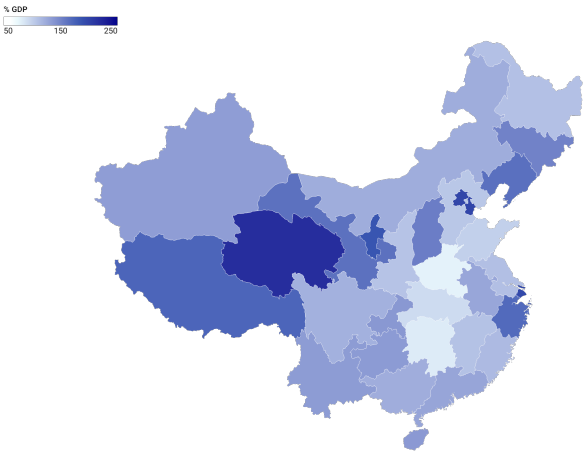
Figure 11: Median total credit to GDP by decade.




(a) 1990-1999




(b) 2000-2009




(c) 2010-2019

Source: China Provincial Statistical Yearbooks.

## 9.2 Robustness Checks

Table 18: Growth effects of dynamic credit indicators with dummy variable for regions, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Dependent: $\Delta GDP_{real}$ | | | | | year <2001 | | | year >= 2001 | |
| $log(INITIALGDP)$ | -0.0217*** | -0.0235*** | -0.0472*** | -0.0155 | -0.0101 | -0.0282** | -0.0382*** | -0.0395*** | -0.0399*** |
| | (0.00767) | (0.00695) | (0.00975) | (0.0140) | (0.0135) | (0.0115) | (0.00845) | (0.00771) | (0.00836) |
| $SCHOOL$ | 0.0239 | 0.00617 | 0.0502 | 0.00340 | -0.0407 | -0.0437 | 0.0511 | 0.0495 | 0.0591 |
| | (0.0606) | (0.0578) | (0.0571) | (0.0678) | (0.0647) | (0.0673) | (0.0563) | (0.0515) | (0.0540) |
| $log(GOV)$ | 0.0333*** | 0.0376*** | 0.0711*** | 0.0289 | 0.0225 | 0.0455*** | 0.0567*** | 0.0593*** | 0.0595*** |
| | (0.0116) | (0.0110) | (0.0141) | (0.0187) | (0.0174) | (0.0168) | (0.0136) | (0.0126) | (0.0136) |
| $log(OPENNESS)$ | -0.00644* | -0.00549* | -0.00803** | -0.00228 | -0.000367 | -0.00278 | -0.00531 | -0.00419 | -0.00428 |
| | (0.00349) | (0.00324) | (0.00361) | (0.00412) | (0.00419) | (0.00466) | (0.00404) | (0.00371) | (0.00400) |
| $\Delta CREDIT_{tot}$ | 2.03e-06*** | | | 0.00296 | | | 1.30e-06*** | | |
| | (4.97e-07) | | | (0.00295) | | | (3.28e-07) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0168* | | | 0.00867 | | | 0.0178*** | |
| | | (0.00881) | | | (0.0201) | | | (0.00666) | |
| $\Delta INV_{credit}$ | | | 0.00118 | | | 0.00113 | | | 0.00353 |
| | | | (0.00358) | | | (0.00824) | | | (0.00334) |
| $GEO_{east}$ | 0.0219* | 0.0128 | 0.0304** | 0.0173 | 0.0187* | 0.0306** | 0.0172 | 0.0106 | 0.0151 |
| | (0.0114) | (0.00986) | (0.0121) | (0.0180) | (0.0103) | (0.0128) | (0.0121) | (0.00994) | (0.0120) |
| $\Delta CREDIT_{tot} * GEO_{east}$ | 0.0127 | | | 0.0667 | | | 0.00285 | | |
| | (0.0161) | | | (0.0707) | | | (0.00482) | | |
| $\Delta CREDIT_{NFC} * GEO_{east}$ | | 0.0709*** | | | 0.0525** | | | 0.0392* | |
| | | (0.0164) | | | (0.0255) | | | (0.0227) | |
| $\Delta INV_{credit} * GEO_{east}$ | | | 0.00907 | | | 0.0258 | | | -0.00309 |
| | | | (0.00594) | | | (0.0255) | | | (0.00647) |
| Constant | 0.104*** | 0.108*** | 0.116*** | 0.103*** | 0.124*** | 0.149*** | -0.120* | -0.0906 | |
| | (0.0381) | (0.0400) | (0.0281) | (0.0384) | (0.0401) | (0.0341) | (0.0616) | (0.0568) | |
| Observations | 981 | 1,040 | 891 | 402 | 424 | 351 | 579 | 616 | 540 |
| Number of Provinces | 31 | 31 | 31 | 29 | 31 | 30 | 31 | 31 | 31 |
| Adj. R-squared | 0.715 | 0.725 | 0.713 | 0.700 | 0.704 | 0.708 | 0.690 | 0.712 | 0.657 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

### 9.2.1 Lagged variables

Table 19: Growth effects of dynamic credit indicators and lagged credit indicators with dummy variable for regions, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $log(INITIALGDP)$ | -0.0217*** | -0.0214*** | -0.0266*** | -0.0235*** | -0.0295*** | -0.0241*** | -0.0472*** | -0.0304*** | -0.0295*** |
| | (0.00767) | (0.00801) | (0.00858) | (0.00695) | (0.00778) | (0.00750) | (0.00975) | (0.00799) | (0.00799) |
| $SCHOOL$ | 0.0239 | 0.0190 | 0.0418 | 0.00617 | 0.0170 | 0.0187 | 0.0502 | 0.0114 | 0.00593 |
| | (0.0606) | (0.0580) | (0.0555) | (0.0578) | (0.0529) | (0.0582) | (0.0571) | (0.0608) | (0.0607) |
| $log(GOV)$ | 0.0333*** | 0.0327*** | 0.0399*** | 0.0376*** | 0.0459*** | 0.0373*** | 0.0711*** | 0.0464*** | 0.0452*** |
| | (0.0116) | (0.0120) | (0.0126) | (0.0110) | (0.0118) | (0.0118) | (0.0141) | (0.0122) | (0.0117) |
| $log(OPENNESS)$ | -0.00644* | -0.00636* | -0.00758** | -0.00549* | -0.00708** | -0.00547 | -0.00803** | -0.00630* | -0.00675* |
| | (0.00349) | (0.00354) | (0.00364) | (0.00324) | (0.00341) | (0.00337) | (0.00361) | (0.00358) | (0.00372) |
| $\Delta CREDIT_{tot}$ | 2.03e-06*** | | | | | | | | |
| | (4.97e-07) | | | | | | | | |
| $\Delta CREDIT_{tot(l1)}$ | | 3.21e-06*** | | | | | | | |
| | | (5.68e-07) | | | | | | | |
| $\Delta CREDIT_{tot(l2)}$ | | | 2.10e-06*** | | | | | | |
| | | | (5.54e-07) | | | | | | |
| $\Delta CREDIT_{NFC}$ | | | | 0.0168* | | | | | |
| | | | | (0.00881) | | | | | |
| $\Delta CREDIT_{NFC(l1)}$ | | | | | 0.0199* | | | | |
| | | | | | (0.0103) | | | | |
| $\Delta CREDIT_{NFC(l2)}$ | | | | | | 0.00127 | | | |
| | | | | | | (0.0169) | | | |
| $\Delta INV_{credit}$ | | | | | | | 0.00118 | | |
| | | | | | | | (0.00358) | | |
| $\Delta INV_{credit(l1)}$ | | | | | | | | 0.00121 | |
| | | | | | | | | (0.00346) | |
| $\Delta INV_{credit(l2)}$ | | | | | | | | | -0.00302 |
| | | | | | | | | | (0.00318) |
| $GEO_{east}$ | 0.0219* | 0.0196* | 0.0248** | 0.0128 | 0.0220* | 0.0149 | 0.0304** | 0.0262** | 0.0293*** |
| | (0.0114) | (0.0111) | (0.0118) | (0.00986) | (0.0115) | (0.0121) | (0.0121) | (0.0112) | (0.0112) |
| $\Delta CREDIT_{tot} * GEO_{east}$ | 0.0127 | | | | | | | | |
| | (0.0161) | | | | | | | | |
| $\Delta CREDIT_{tot(l1)} * GEO_{east}$ | | 0.0286*** | | | | | | | |
| | | (0.0101) | | | | | | | |
| $\Delta CREDIT_{tot(l2)} * GEO_{east}$ | | | 0.0200** | | | | | | |
| | | | (0.00818) | | | | | | |
| $\Delta CREDIT_{NFC} * GEO_{east}$ | | | | 0.0709*** | | | | | |
| | | | | (0.0164) | | | | | |
| $\Delta CREDIT_{NFC(l1)} * GEO_{east}$ | | | | | 0.0323 | | | | |
| | | | | | (0.0198) | | | | |
| $\Delta CREDIT_{NFC(l2)} * GEO_{east}$ | | | | | | 0.0534 | | | |
| | | | | | | (0.0343) | | | |
| $\Delta INV_{credit} * GEO_{east}$ | | | | | | | 0.00907 | | |
| | | | | | | | (0.00594) | | |
| $\Delta INV_{credit(l1)} * GEO_{east}$ | | | | | | | | 0.00514 | |
| | | | | | | | | (0.00619) | |
| $\Delta INV_{credit(l2)} * GEO_{east}$ | | | | | | | | | 0.000150 |
| | | | | | | | | | (0.0102) |
| Constant | 0.104*** | 0.106*** | 0.0955** | 0.108*** | 0.0955*** | 0.116*** | 0.116*** | 0.136*** | 0.136*** |
| | (0.0381) | (0.0378) | (0.0381) | (0.0400) | (0.0328) | (0.0365) | (0.0281) | (0.0297) | (0.0303) |
| Observations | 981 | 957 | 931 | 1,040 | 1,016 | 1,009 | 891 | 877 | 863 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.715 | 0.709 | 0.702 | 0.725 | 0.739 | 0.731 | 0.712 | 0.701 | 0.696 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 20: Growth effects of dynamic credit indicators and lagged credit indicators with dummy variable for regions before 2001, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $log(INITIALGDP)$ | -0.0155 | -0.0164 | -0.0152 | -0.0101 | -0.0116 | -0.00779 | -0.0282** | -0.0226* | -0.0219* |
| | (0.0140) | (0.0141) | (0.0137) | (0.0135) | (0.0139) | (0.0141) | (0.0115) | (0.0120) | (0.0117) |
| $SCHOOL$ | 0.00340 | 0.00655 | 0.00317 | -0.0407 | -0.0670 | -0.0407 | -0.0437 | -0.0597 | -0.0709 |
| | (0.0678) | (0.0692) | (0.0679) | (0.0647) | (0.0653) | (0.0681) | (0.0673) | (0.0666) | (0.0638) |
| $log(GOV)$ | 0.0289 | 0.0296 | 0.0276 | 0.0225 | 0.0245 | 0.0175 | 0.0455*** | 0.0381** | 0.0378** |
| | (0.0187) | (0.0188) | (0.0182) | (0.0174) | (0.0184) | (0.0187) | (0.0168) | (0.0163) | (0.0157) |
| $log(OPENNESS)$ | -0.00228 | -0.00279 | -0.00251 | -0.000367 | -0.00166 | 0.00151 | -0.00278 | -0.00160 | -0.00131 |
| | (0.00412) | (0.00410) | (0.00401) | (0.00419) | (0.00436) | (0.00434) | (0.00466) | (0.00421) | (0.00409) |
| $\Delta CREDIT_{tot}$ | 0.00296 | | | | | | | | |
| | (0.00295) | | | | | | | | |
| $\Delta CREDIT_{tot(l1)}$ | | 5.47e-05 | | | | | | | |
| | | (0.00196) | | | | | | | |
| $\Delta CREDIT_{tot(l2)}$ | | | 0.00209 | | | | | | |
| | | | (0.00357) | | | | | | |
| $\Delta CREDIT_{NFC}$ | | | | 0.00867 | | | | | |
| | | | | (0.0201) | | | | | |
| $\Delta CREDIT_{NFC(l1)}$ | | | | | 0.0189 | | | | |
| | | | | | (0.0175) | | | | |
| $\Delta CREDIT_{NFC(l2)}$ | | | | | | 0.0492*** | | | |
| | | | | | | (0.0167) | | | |
| $\Delta INV_{credit}$ | | | | | | | 0.00113 | | |
| | | | | | | | (0.00824) | | |
| $\Delta INV_{credit(l1)}$ | | | | | | | | -0.000265 | |
| | | | | | | | | (0.00819) | |
| $\Delta INV_{credit(l2)}$ | | | | | | | | | -0.0152 |
| | | | | | | | | | (0.0126) |
| $GEO_{east}$ | 0.0173 | 0.0163 | 0.0227 | 0.0187* | 0.0270** | 0.0343** | 0.0306** | 0.0324*** | 0.0385*** |
| | (0.0180) | (0.0141) | (0.0147) | (0.0103) | (0.0136) | (0.0144) | (0.0128) | (0.0114) | (0.0111) |
| $\Delta CREDIT_{tot} * GEO_{east}$ | 0.0667 | | | | | | | | |
| | (0.0707) | | | | | | | | |
| $\Delta CREDIT_{tot(l1)} * GEO_{east}$ | | 0.0833* | | | | | | | |
| | | (0.0485) | | | | | | | |
| $\Delta CREDIT_{tot(l2)} * GEO_{east}$ | | | 0.0476 | | | | | | |
| | | | (0.0554) | | | | | | |
| $\Delta CREDIT_{NFC} * GEO_{east}$ | | | | 0.0525** | | | | | |
| | | | | (0.0255) | | | | | |
| $\Delta CREDIT_{NFC(l1)} * GEO_{east}$ | | | | | 0.0195 | | | | |
| | | | | | (0.0419) | | | | |
| $\Delta CREDIT_{NFC(l2)} * GEO_{east}$ | | | | | | -0.0476 | | | |
| | | | | | | (0.0556) | | | |
| $\Delta INV_{credit} * GEO_{east}$ | | | | | | | 0.0258 | | |
| | | | | | | | (0.0255) | | |
| $\Delta INV_{credit(l1)} * GEO_{east}$ | | | | | | | | 0.0123 | |
| | | | | | | | | (0.0276) | |
| $\Delta INV_{credit(l2)} * GEO_{east}$ | | | | | | | | | -0.0125 |
| | | | | | | | | | (0.0260) |
| Constant | 0.103*** | 0.104*** | 0.108*** | 0.124*** | 0.120*** | 0.137*** | 0.149*** | 0.162*** | 0.165*** |
| | (0.0384) | (0.0386) | (0.0383) | (0.0401) | (0.0343) | (0.0358) | (0.0341) | (0.0311) | (0.0313) |
| Observations | 402 | 408 | 413 | 424 | 400 | 393 | 351 | 365 | 381 |
| Number of Provinces | 29 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 30 |
| Adj. R-squared | 0.700 | 0.700 | 0.698 | 0.704 | 0.718 | 0.710 | 0.708 | 0.700 | 0.702 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 21: Growth effects of dynamic credit indicators and lagged credit indicators with dummy variable for regions after 2001, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $log(INITIALGDP)$ | -0.0382*** | -0.0401*** | -0.0404*** | -0.0395*** | -0.0390*** | -0.0404*** | -0.0399*** | -0.0403*** | -0.0422*** |
| | (0.00845) | (0.00881) | (0.00913) | (0.00771) | (0.00798) | (0.00794) | (0.00836) | (0.00872) | (0.00952) |
| $SCHOOL$ | 0.0511 | 0.0394 | 0.0543 | 0.0495 | 0.0562 | 0.0561 | 0.0591 | 0.0675 | 0.0724 |
| | (0.0563) | (0.0554) | (0.0538) | (0.0515) | (0.0500) | (0.0524) | (0.0540) | (0.0551) | (0.0571) |
| $log(GOV)$ | 0.0567*** | 0.0599*** | 0.0594*** | 0.0593*** | 0.0580*** | 0.0605*** | 0.0595*** | 0.0594*** | 0.0621*** |
| | (0.0136) | (0.0141) | (0.0144) | (0.0126) | (0.0125) | (0.0132) | (0.0136) | (0.0140) | (0.0150) |
| $log(OPENNESS)$ | -0.00531 | -0.00452 | -0.00589 | -0.00419 | -0.00427 | -0.00400 | -0.00428 | -0.00510 | -0.00623 |
| | (0.00404) | (0.00427) | (0.00445) | (0.00371) | (0.00382) | (0.00374) | (0.00400) | (0.00423) | (0.00459) |
| $\Delta CREDIT_{tot}$ | 1.30e-06*** | | | | | | | | |
| | (3.28e-07) | | | | | | | | |
| $\Delta CREDIT_{tot(l1)}$ | | 2.48e-06*** | | | | | | | |
| | | (4.26e-07) | | | | | | | |
| $\Delta CREDIT_{tot(l2)}$ | | | 1.40e-06*** | | | | | | |
| | | | (4.90e-07) | | | | | | |
| $\Delta CREDIT_{NFC}$ | | | | 0.0178*** | | | | | |
| | | | | (0.00666) | | | | | |
| $\Delta CREDIT_{NFC(l1)}$ | | | | | 0.0237** | | | | |
| | | | | | (0.0120) | | | | |
| $\Delta CREDIT_{NFC(l2)}$ | | | | | | -0.00621 | | | |
| | | | | | | (0.0146) | | | |
| $\Delta INV_{credit}$ | | | | | | | 0.00353 | | |
| | | | | | | | (0.00334) | | |
| $\Delta INV_{credit(l1)}$ | | | | | | | | 0.00178 | |
| | | | | | | | | (0.00260) | |
| $\Delta INV_{credit(l2)}$ | | | | | | | | | -0.000565 |
| | | | | | | | | | (0.00433) |
| $GEO_{east}$ | 0.0172 | 0.0131 | 0.0167 | 0.0106 | 0.0167 | 0.0110 | 0.0151 | 0.0170 | 0.0188 |
| | (0.0121) | (0.0124) | (0.0133) | (0.00994) | (0.0109) | (0.0114) | (0.0120) | (0.0126) | (0.0133) |
| $\Delta CREDIT_{tot} * GEO_{east}$ | 0.00285 | | | | | | | | |
| | (0.00482) | | | | | | | | |
| $\Delta CREDIT_{tot(l1)} * GEO_{east}$ | | 0.0204*** | | | | | | | |
| | | (0.00208) | | | | | | | |
| $\Delta CREDIT_{tot(l2)} * GEO_{east}$ | | | 0.0150*** | | | | | | |
| | | | (0.00192) | | | | | | |
| $\Delta CREDIT_{NFC} * GEO_{east}$ | | | | 0.0392* | | | | | |
| | | | | (0.0227) | | | | | |
| $\Delta CREDIT_{NFC(l1)} * GEO_{east}$ | | | | | -0.0126 | | | | |
| | | | | | (0.0247) | | | | |
| $\Delta CREDIT_{NFC(l2)} * GEO_{east}$ | | | | | | 0.0373 | | | |
| | | | | | | (0.0345) | | | |
| $\Delta INV_{credit} * GEO_{east}$ | | | | | | | -0.00309 | | |
| | | | | | | | (0.00647) | | |
| $\Delta INV_{credit(l1)} * GEO_{east}$ | | | | | | | | -0.00145 | |
| | | | | | | | | (0.00427) | |
| $\Delta INV_{credit(l2)} * GEO_{east}$ | | | | | | | | | 0.00410 |
| | | | | | | | | | (0.00566) |
| Constant | -0.120* | | -0.0719 | -0.0906 | -0.0885 | -0.0916 | | | -0.0770 |
| | (0.0616) | | (0.0638) | (0.0568) | (0.0549) | (0.0592) | | | (0.0646) |
| Observations | 579 | 549 | 518 | 616 | 616 | 616 | 540 | 512 | 482 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.690 | 0.678 | 0.663 | 0.712 | 0.715 | 0.711 | 0.657 | 0.645 | 0.645 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 22: Growth effects of dynamic credit indicators and lagged credit indicators with dummy variable for credit to GDP share, estimated with Fixed Effects

| | FE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $log(INITIALGDP)$ | -0.120*** | -0.125*** | -0.131*** | -0.107*** | -0.0983*** | -0.104*** | -0.107*** | -0.116*** | -0.125*** |
| | (0.0242) | (0.0241) | (0.0248) | (0.0233) | (0.0209) | (0.0224) | (0.0214) | (0.0216) | (0.0194) |
| $SCHOOL$ | 0.106* | 0.105* | 0.0975 | 0.0968 | 0.0777 | 0.101 | 0.0851 | 0.0856 | 0.0831 |
| | (0.0598) | (0.0606) | (0.0577) | (0.0612) | (0.0618) | (0.0627) | (0.0619) | (0.0627) | (0.0638) |
| $log(GOV)$ | 0.118*** | 0.119*** | 0.120*** | 0.109*** | 0.103*** | 0.107*** | 0.114*** | 0.116*** | 0.119*** |
| | (0.0220) | (0.0224) | (0.0231) | (0.0201) | (0.0204) | (0.0199) | (0.0194) | (0.0198) | (0.0187) |
| $log(OPENNESS)$ | -0.00771* | -0.00787* | -0.00945* | -0.00875** | -0.0110* | -0.00806* | -0.00985** | -0.00947* | -0.0122** |
| | (0.00441) | (0.00462) | (0.00486) | (0.00423) | (0.00539) | (0.00410) | (0.00474) | (0.00545) | (0.00497) |
| $\Delta CREDIT_{tot}$ | 7.70e-07** | | | | | | | | |
| | (3.43e-07) | | | | | | | | |
| $\Delta CREDIT_{tot(l1)}$ | | 1.62e-06*** | | | | | | | |
| | | (4.51e-07) | | | | | | | |
| $\Delta CREDIT_{tot(l2)}$ | | | 5.46e-07 | | | | | | |
| | | | (4.25e-07) | | | | | | |
| $\Delta CREDIT_{NFC}$ | | | | 0.0212** | | | | | |
| | | | | (0.00848) | | | | | |
| $\Delta CREDIT_{NFC(l1)}$ | | | | | 0.00678 | | | | |
| | | | | | (0.00781) | | | | |
| $\Delta CREDIT_{NFC(l2)}$ | | | | | | -0.00893 | | | |
| | | | | | | (0.0134) | | | |
| $\Delta INV_{credit}$ | | | | | | | 0.00563 | | |
| | | | | | | | (0.00403) | | |
| $\Delta INV_{credit(l1)}$ | | | | | | | | -0.00148 | |
| | | | | | | | | (0.00467) | |
| $\Delta INV_{credit(l2)}$ | | | | | | | | | -0.00948 |
| | | | | | | | | | (0.00633) |
| $d10(CREDIT/GDP)$ | 0.0133 | 0.0148 | 0.0116 | 0.0163** | 0.00502 | 0.00720 | 0.00976 | 0.00443 | 0.00541 |
| | (0.0111) | (0.0112) | (0.00892) | (0.00712) | (0.00907) | (0.00786) | (0.00833) | (0.00953) | (0.00947) |
| $d10(CREDIT/GDP) * \Delta CREDIT_{tot}$ | -0.0134 | | | | | | | | |
| | (0.0300) | | | | | | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{tot(l1)}$ | | -0.0206 | | | | | | | |
| | | (0.0391) | | | | | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{tot(l2)}$ | | | -0.0241 | | | | | | |
| | | | (0.0171) | | | | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{NFC}$ | | | | -0.0292* | | | | | |
| | | | | (0.0160) | | | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{NFC(l1)}$ | | | | | 0.0365** | | | | |
| | | | | | (0.0168) | | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{NFC(l2)}$ | | | | | | 0.0309 | | | |
| | | | | | | (0.0263) | | | |
| $d10(CREDIT/GDP) * \Delta INV_{credit}$ | | | | | | | -0.00797 | | |
| | | | | | | | (0.00475) | | |
| $d10(CREDIT/GDP) * \Delta INV_{credit(l1)}$ | | | | | | | | 0.00550 | |
| | | | | | | | | (0.00507) | |
| $d10(CREDIT/GDP) * \Delta INV_{credit(l2)}$ | | | | | | | | | 0.0145* |
| | | | | | | | | | (0.00789) |
| Constant | 0.294*** | 0.320*** | 0.346*** | 0.260*** | 0.237** | 0.258*** | 0.273*** | 0.316*** | 0.345*** |
| | (0.0998) | (0.0998) | (0.105) | (0.0902) | (0.0871) | (0.0897) | (0.0991) | (0.104) | (0.0979) |
| Observations | 928 | 912 | 892 | 960 | 940 | 935 | 856 | 842 | 829 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.720 | 0.717 | 0.715 | 0.727 | 0.740 | 0.731 | 0.726 | 0.716 | 0.712 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 23: Growth effects of dynamic credit indicators and lagged credit indicators with dummy variable for credit to GDP share, estimated with Random Effects

| | RE | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $log(INITIALGDP)$ | -0.00927 | -0.0267*** | -0.0176*** | -0.0133** | -0.0156** | -0.00983 | -0.0295*** | -0.0359*** | -0.0174** |
| | (0.00631) | (0.00747) | (0.00672) | (0.00628) | (0.00624) | (0.00676) | (0.00742) | (0.00851) | (0.00676) |
| $SCHOOL$ | 0.0378 | 0.0809 | 0.0628 | 0.0284 | 0.0222 | 0.0144 | 0.0424 | 0.0611 | 0.0181 |
| | (0.0616) | (0.0587) | (0.0581) | (0.0628) | (0.0601) | (0.0637) | (0.0624) | (0.0613) | (0.0636) |
| $log(GOV)$ | 0.0162* | 0.0420*** | 0.0279*** | 0.0227** | 0.0266*** | 0.0170 | 0.0471*** | 0.0559*** | 0.0283*** |
| | (0.00958) | (0.0121) | (0.0107) | (0.0102) | (0.0101) | (0.0105) | (0.0117) | (0.0131) | (0.0107) |
| $log(OPENNESS)$ | -2.86e-05 | -0.000455 | -2.53e-05 | -0.000101 | -0.000503 | 0.000419 | -0.000361 | -0.000458 | 0.000932 |
| | (0.00222) | (0.00274) | (0.00243) | (0.00228) | (0.00230) | (0.00214) | (0.00239) | (0.00277) | (0.00244) |
| $\Delta CREDIT_{tot}$ | 1.73e-06*** | | | | | | | | |
| | (4.73e-07) | | | | | | | | |
| $\Delta CREDIT_{tot(l1)}$ | | 2.76e-06*** | | | | | | | |
| | | (4.97e-07) | | | | | | | |
| $\Delta CREDIT_{tot(l2)}$ | | | 1.75e-06*** | | | | | | |
| | | | (5.26e-07) | | | | | | |
| $\Delta CREDIT_{NFC}$ | | | | 0.0318*** | | | | | |
| | | | | (0.0113) | | | | | |
| $\Delta CREDIT_{NFC(l1)}$ | | | | | 0.0135 | | | | |
| | | | | | (0.00886) | | | | |
| $\Delta CREDIT_{NFC(l2)}$ | | | | | | -0.000486 | | | |
| | | | | | | (0.0172) | | | |
| $\Delta INV_{credit}$ | | | | | | | 0.00938** | | |
| | | | | | | | (0.00412) | | |
| $\Delta INV_{credit(l1)}$ | | | | | | | | 0.000768 | |
| | | | | | | | | (0.00464) | |
| $\Delta INV_{credit(l2)}$ | | | | | | | | | -0.00771 |
| | | | | | | | | | (0.00623) |
| $d10(CREDIT/GDP)$ | 0.000419 | 0.00299 | -0.000202 | 0.00892* | -0.00118 | -0.000125 | 0.00359 | -0.00231 | -0.00377 |
| | (0.00588) | (0.00795) | (0.00515) | (0.00482) | (0.00507) | (0.00566) | (0.00553) | (0.00722) | (0.00615) |
| $d10(CREDIT/GDP) * \Delta CREDIT_{tot}$ | 0.0259 | | | | | | | | |
| | (0.0207) | | | | | | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{tot(l1)}$ | | 0.00600 | | | | | | | |
| | | (0.0343) | | | | | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{tot(l2)}$ | | | 0.00222 | | | | | | |
| | | | (0.0180) | | | | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{NFC}$ | | | | -0.0265 | | | | | |
| | | | | (0.0189) | | | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{NFC(l1)}$ | | | | | 0.0455*** | | | | |
| | | | | | (0.0163) | | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{NFC(l2)}$ | | | | | | 0.0420 | | | |
| | | | | | | (0.0294) | | | |
| $d10(CREDIT/GDP) * \Delta INV_{credit}$ | | | | | | | -0.00888* | | |
| | | | | | | | (0.00469) | | |
| $d10(CREDIT/GDP) * \Delta INV_{credit(l1)}$ | | | | | | | | 0.00479 | |
| | | | | | | | | (0.00512) | |
| $d10(CREDIT/GDP) * \Delta INV_{credit(l2)}$ | | | | | | | | | 0.0151* |
| | | | | | | | | | (0.00782) |
| Constant | 0.126*** | 0.110*** | 0.121*** | 0.122*** | 0.121*** | 0.141*** | 0.145*** | 0.146*** | 0.167*** |
| | (0.0342) | (0.0388) | (0.0357) | (0.0388) | (0.0323) | (0.0324) | (0.0292) | (0.0314) | (0.0283) |
| Observations | 928 | 912 | 892 | 960 | 940 | 935 | 856 | 842 | 829 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.708 | 0.704 | 0.700 | 0.715 | 0.729 | 0.721 | 0.712 | 0.701 | 0.696 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 24: Growth effects of dynamic credit indicators and lagged credit indicators with time dummy variable for industrial policy (SEI), estimated with Random Effects

| | RE | | | | | |
|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) |
| $log(INITIALGDP)$ | -0.0174** | -0.0172** | -0.0219** | -0.0150** | -0.0212*** | -0.0149* |
| | (0.00793) | (0.00843) | (0.00916) | (0.00761) | (0.00821) | (0.00805) |
| $SCHOOL$ | 0.0413 | 0.0441 | 0.0577 | 0.0209 | 0.0175 | 0.0242 |
| | (0.0556) | (0.0546) | (0.0530) | (0.0539) | (0.0518) | (0.0548) |
| $log(GOV)$ | 0.0290** | 0.0287** | 0.0350*** | 0.0272** | 0.0357*** | 0.0261** |
| | (0.0114) | (0.0120) | (0.0128) | (0.0110) | (0.0118) | (0.0117) |
| $log(OPENNESS)$ | -0.00613* | -0.00609* | -0.00712** | -0.00476 | -0.00613* | -0.00447 |
| | (0.00334) | (0.00340) | (0.00352) | (0.00332) | (0.00340) | (0.00340) |
| $GEO_{west}$ | -0.0169 | -0.0172 | -0.0210* | -0.0141 | -0.0186 | -0.0131 |
| | (0.0112) | (0.0115) | (0.0124) | (0.0106) | (0.0114) | (0.0109) |
| $GEO_{centralnorth}$ | -0.0269*** | -0.0280*** | -0.0305*** | -0.0241** | -0.0268** | -0.0235** |
| | (0.0104) | (0.0107) | (0.0111) | (0.0101) | (0.0106) | (0.0104) |
| $\Delta CREDIT_{tot}$ | 0.00419 | | | | | |
| | (0.00420) | | | | | |
| $\Delta CREDIT_{tot(l1)}$ | | 5.03e-06*** | | | | |
| | | (8.00e-07) | | | | |
| $\Delta CREDIT_{tot(l2)}$ | | | 1.54e-06** | | | |
| | | | (6.81e-07) | | | |
| $\Delta CREDIT_{NFC}$ | | | | 0.0203** | | |
| | | | | (0.00943) | | |
| $\Delta CREDIT_{NFC(l1)}$ | | | | | 0.0183* | |
| | | | | | (0.00994) | |
| $\Delta CREDIT_{NFC(l2)}$ | | | | | | 0.00222 |
| | | | | | | (0.0208) |
| $year_{>2010}$ | -0.180*** | -0.150*** | -0.139*** | -0.190*** | -0.196*** | -0.186*** |
| | (0.0326) | (0.0334) | (0.0353) | (0.0326) | (0.0316) | (0.0315) |
| $year_{>2010} * \Delta CREDIT_{tot}$ | -0.00419 | | | | | |
| | (0.00420) | | | | | |
| $year_{>2010} * \Delta CREDIT_{tot(l1)}$ | | -3.00e-06*** | | | | |
| | | (6.07e-07) | | | | |
| $year_{>2010} * \Delta CREDIT_{tot(l2)}$ | | | 1.87e-06*** | | | |
| | | | (5.12e-07) | | | |
| $year_{>2010} * \Delta CREDIT_{NFC}$ | | | | 0.0452** | | |
| | | | | (0.0216) | | |
| $year_{>2010} * \Delta CREDIT_{NFC(l1)}$ | | | | | 0.0243* | |
| | | | | | (0.0131) | |
| $year_{>2010} * \Delta CREDIT_{NFC(l2)}$ | | | | | | 0.0233 |
| | | | | | | (0.0273) |
| Constant | 0.114*** | 0.116*** | 0.112*** | 0.120*** | 0.116*** | 0.128*** |
| | (0.0327) | (0.0326) | (0.0337) | (0.0343) | (0.0293) | (0.0302) |
| Observations | 981 | 957 | 931 | 1,040 | 1,016 | 1,009 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.715 | 0.707 | 0.701 | 0.725 | 0.740 | 0.732 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 25: Growth effects of industry credit growth and lagged industry credit growth with time dummy variable for industrial policy (SEI) by ownership, estimated with Random Effects

| | RE | | | | | |
|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) |
| $log(INITIALGDP)$ | -0.0280** | -0.0287** | -0.0174 | -0.0347** | -0.0319** | -0.0261* |
| | (0.0130) | (0.0140) | (0.0132) | (0.0141) | (0.0153) | (0.0142) |
| $SCHOOL$ | 0.125* | 0.0818 | 0.0541 | 0.135** | 0.0843 | 0.0602 |
| | (0.0639) | (0.0645) | (0.0668) | (0.0650) | (0.0672) | (0.0683) |
| $log(GOV)$ | 0.0421** | 0.0449** | 0.0288 | 0.0517*** | 0.0505** | 0.0406** |
| | (0.0178) | (0.0195) | (0.0188) | (0.0190) | (0.0213) | (0.0202) |
| $log(OPENNESS)$ | 0.000615 | 0.000418 | -0.00186 | 0.00226 | 0.00218 | 0.000790 |
| | (0.00572) | (0.00524) | (0.00589) | (0.00561) | (0.00517) | (0.00587) |
| $GEO_{west}$ | -0.000214 | 0.00106 | 0.00398 | -0.00117 | 0.00119 | 0.00390 |
| | (0.0126) | (0.0116) | (0.0119) | (0.0124) | (0.0119) | (0.0121) |
| $GEO_{centralnorth}$ | -0.0182 | -0.0165 | -0.0128 | -0.0177 | -0.0156 | -0.0116 |
| | (0.0146) | (0.0132) | (0.0133) | (0.0148) | (0.0132) | (0.0136) |
| $\Delta CREDIT_{priv}$ | -0.000366*** | | | -7.45e-05 | | |
| | (4.57e-05) | | | (0.000480) | | |
| $\Delta CREDIT_{state}$ | 0.00343 | | | 0.00161 | | |
| | (0.00280) | | | (0.00327) | | |
| $\Delta CREDIT_{priv(l1)}$ | | -0.000109*** | | | -0.000150 | |
| | | (3.53e-05) | | | (0.000529) | |
| $\Delta CREDIT_{state(l1)}$ | | 0.00118 | | | -0.00295* | |
| | | (0.00298) | | | (0.00165) | |
| $\Delta CREDIT_{priv(l2)}$ | | | -4.00e-05 | | | -0.000995 |
| | | | (5.63e-05) | | | (0.000608) |
| $\Delta CREDIT_{state(l2)}$ | | | 0.00348* | | | 0.00178 |
| | | | (0.00198) | | | (0.00162) |
| $year_{>2010}$ | | | | -0.0621** | -0.127*** | -0.134*** |
| | | | | (0.0272) | (0.0289) | (0.0279) |
| $year_{>2010} * \Delta CREDIT_{priv}$ | | | | -0.000265 | | |
| | | | | (0.000489) | | |
| $year_{>2010} * \Delta CREDIT_{state}$ | | | | 0.00481 | | |
| | | | | (0.00496) | | |
| $year_{>2010} * \Delta CREDIT_{priv(l1)}$ | | | | | 6.26e-05 | |
| | | | | | (0.000544) | |
| $year_{>2010} * \Delta CREDIT_{state(l1)}$ | | | | | 0.0103*** | |
| | | | | | (0.00382) | |
| $year_{>2010} * \Delta CREDIT_{priv(l2)}$ | | | | | | 0.000985 |
| | | | | | | (0.000613) |
| $year_{>2010} * \Delta CREDIT_{state(l2)}$ | | | | | | 0.00338 |
| | | | | | | (0.00331) |
| Constant | 0.0168 | 0.0553 | 0.0563 | 0.0138 | 0.0516 | 0.0620 |
| | (0.0529) | (0.0518) | (0.0592) | (0.0565) | (0.0554) | (0.0610) |
| Observations | 374 | 373 | 372 | 374 | 373 | 372 |
| Number of Provinces | 29 | 29 | 29 | 29 | 29 | 29 |
| Adj. R-squared | 0.685 | 0.692 | 0.743 | 0.684 | 0.695 | 0.743 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 26: Investment effects of industry credit growth and lagged industry credit growth with time dummy variable for industrial policy (SEI) by ownership, estimated with Random Effects

| | RE | | | | | |
|---|---|---|---|---|---|---|
| Dependent: $\Delta INV_{tot}$ | (1) | (2) | (3) | (4) | (5) | (6) |
| $\Delta STATECAP_{ind}$ | -0.0213** | -0.0177* | -0.0169 | -0.0207** | -0.0177* | -0.0177* |
| | (0.0105) | (0.00980) | (0.0104) | (0.0103) | (0.00968) | (0.0102) |
| $\Delta FORECAP_{ind}$ | -0.00868 | -0.00899 | 0.0111 | -0.00831 | -0.00841 | 0.0100 |
| | (0.00717) | (0.00596) | (0.0116) | (0.00741) | (0.00648) | (0.0127) |
| $\Delta REV_{ind}$ | 0.304** | 0.178 | 0.150 | 0.291* | 0.175 | 0.151 |
| | (0.155) | (0.131) | (0.131) | (0.161) | (0.130) | (0.132) |
| $GEO_{centralnorth}$ | 0.0204 | 0.0330* | 0.0320* | 0.0219 | 0.0298 | 0.0303 |
| | (0.0174) | (0.0189) | (0.0192) | (0.0189) | (0.0190) | (0.0194) |
| $GEO_{west}$ | 0.0294** | 0.0352*** | 0.0338*** | 0.0270** | 0.0326*** | 0.0330*** |
| | (0.0117) | (0.0113) | (0.0116) | (0.0129) | (0.0119) | (0.0121) |
| $\Delta CREDIT_{priv}$ | 0.000620 | | | -0.00147 | | |
| | (0.000384) | | | (0.00161) | | |
| $\Delta CREDIT_{state}$ | 0.00791 | | | 0.00198 | | |
| | (0.00665) | | | (0.00529) | | |
| $\Delta CREDIT_{priv(l1)}$ | | -0.00138 | | | -0.00350* | |
| | | (0.000910) | | | (0.00184) | |
| $\Delta CREDIT_{state(l1)}$ | | 0.000697 | | | -0.00869 | |
| | | (0.00978) | | | (0.00622) | |
| $\Delta CREDIT_{priv(l2)}$ | | | 0.00143 | | | -0.000512 |
| | | | (0.000996) | | | (0.00259) |
| $\Delta CREDIT_{state(l2)}$ | | | -0.00144 | | | -0.00520 |
| | | | (0.0123) | | | (0.0113) |
| $year_{>2010}$ | | | | -0.111** | -0.148*** | -0.216*** |
| | | | | (0.0444) | (0.0503) | (0.0666) |
| $year_{>2010} * \Delta CREDIT_{priv}$ | | | | 0.00216 | | |
| | | | | (0.00171) | | |
| $year_{>2010} * \Delta CREDIT_{state}$ | | | | 0.0193 | | |
| | | | | (0.0118) | | |
| $year_{>2010} * \Delta CREDIT_{priv(l1)}$ | | | | | 0.00270 | |
| | | | | | (0.00194) | |
| $year_{>2010} * \Delta CREDIT_{state(l1)}$ | | | | | 0.0243*** | |
| | | | | | (0.00782) | |
| $year_{>2010} * \Delta CREDIT_{priv(l2)}$ | | | | | | 0.00248 |
| | | | | | | (0.00302) |
| $year_{>2010} * \Delta CREDIT_{state(l2)}$ | | | | | | 0.0111 |
| | | | | | | (0.0169) |
| Constant | 0.101*** | 0.137*** | 0.219*** | 0.104*** | 0.143*** | 0.223*** |
| | (0.0211) | (0.0250) | (0.0429) | (0.0220) | (0.0259) | (0.0442) |
| Observations | 365 | 347 | 330 | 365 | 347 | 330 |
| Number of province1 | 29 | 29 | 28 | 29 | 29 | 28 |
| Adj. R-squared | 0.425 | 0.435 | 0.446 | 0.423 | 0.439 | 0.445 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 27: Investment effects of industry credit growth and lagged industry credit growth by industrial sector, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Dependent: | $\Delta INV_{tot}$ | $\Delta INV_{tot}$ | $\Delta INV_{tot}$ | $\Delta INV_{auto}$ | $\Delta INV_{auto}$ | $\Delta INV_{auto}$ | $\Delta INV_{energy}$ | $\Delta INV_{energy}$ | $\Delta INV_{energy}$ |
| $\Delta REV_{ind}$ | 0.302** | 0.270* | 0.269* | 0.834 | 0.0867 | 0.0254 | -10.72 | -10.81 | -10.73 |
| | (0.151) | (0.156) | (0.160) | (0.645) | (0.427) | (0.411) | (9.862) | (10.10) | (10.12) |
| $\Delta CREDIT_{firm}$ | 0.00436 | | | 0.557*** | | | -0.101 | | |
| | (0.00763) | | | (0.163) | | | (0.199) | | |
| $\Delta CREDIT_{firm(l1)}$ | | 0.000654 | | | -0.159** | | | 0.140 | |
| | | (0.00886) | | | (0.0641) | | | (0.262) | |
| $\Delta CREDIT_{firm(l2)}$ | | | -0.00460 | | | 0.0567 | | | -0.104 |
| | | | (0.0121) | | | (0.0524) | | | (0.218) |
| $\Delta STATECAP_{ind}$ | -0.00370 | -0.0165* | -0.0167* | -0.267*** | -0.175* | -0.153* | 0.270 | 0.358 | 0.304 |
| | (0.0111) | (0.00886) | (0.00897) | (0.0901) | (0.0968) | (0.0865) | (0.456) | (0.605) | (0.577) |
| $\Delta FORECAP_{ind}$ | -0.00736 | -0.0120* | -0.0119* | -0.0314 | -0.0165 | -0.0611 | 0.227 | 0.196 | 0.218 |
| | (0.00917) | (0.00624) | (0.00646) | (0.103) | (0.0881) | (0.0903) | (0.371) | (0.420) | (0.414) |
| $GEO_{centralnorth}$ | 0.0228* | 0.0198 | 0.0178 | -0.0756 | -0.0499 | -0.0489 | 1.084 | 1.120 | 1.157 |
| | (0.0138) | (0.0128) | (0.0134) | (0.0565) | (0.0440) | (0.0502) | (1.126) | (1.165) | (1.212) |
| $GEO_{west}$ | 0.0344*** | 0.0310*** | 0.0290*** | -0.0651 | -0.00542 | 0.0397 | 2.485 | 2.599 | 2.658 |
| | (0.0117) | (0.0104) | (0.0109) | (0.132) | (0.108) | (0.103) | (2.202) | (2.381) | (2.475) |
| Constant | 0.0914*** | 0.0977*** | 0.115*** | 0.154 | 0.0773 | 2.483*** | 0.0711 | 0.0706 | 0.562 |
| | (0.0184) | (0.0180) | (0.0254) | (0.514) | (0.469) | (0.142) | (0.337) | (0.378) | (0.539) |
| Observations | 501 | 480 | 452 | 128 | 123 | 121 | 390 | 372 | 362 |
| Number of Provinces | 30 | 30 | 29 | 22 | 21 | 21 | 29 | 29 | 28 |
| Adj. R-squared | 0.432 | 0.426 | 0.424 | 0.540 | 0.710 | 0.694 | 0.044 | 0.055 | 0.064 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 28: Growth effects of investment and lagged investment by industrial sector, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $log(INITIALGDP)$ | -0.0252*** | -0.0256*** | -0.0237*** | 1.09e-05 | -0.0256*** | -0.0237*** | -0.0379*** | -0.0256*** | -0.0237*** |
| | (0.00847) | (0.00833) | (0.00834) | (0.0301) | (0.00833) | (0.00834) | (0.0118) | (0.00833) | (0.00834) |
| $SCHOOL$ | 0.0502 | 0.0348 | 0.0353 | 0.186 | 0.0348 | 0.0353 | 0.0865 | 0.0348 | 0.0353 |
| | (0.0486) | (0.0483) | (0.0505) | (0.153) | (0.0483) | (0.0505) | (0.0590) | (0.0483) | (0.0505) |
| $log(GOV)$ | 0.0405*** | 0.0404*** | 0.0370*** | 0.0278 | 0.0404*** | 0.0370*** | 0.0523*** | 0.0404*** | 0.0370*** |
| | (0.0123) | (0.0119) | (0.0119) | (0.0404) | (0.0119) | (0.0119) | (0.0163) | (0.0119) | (0.0119) |
| $log(OPENNESS)$ | -0.00463 | -0.00533* | -0.00508 | -0.000954 | -0.00533* | -0.00508 | -0.00491 | -0.00533* | -0.00508 |
| | (0.00307) | (0.00316) | (0.00317) | (0.00553) | (0.00316) | (0.00317) | (0.00416) | (0.00316) | (0.00317) |
| $\Delta INV_{tot}$ | 0.118*** | | | | | | | | |
| | (0.0213) | | | | | | | | |
| $\Delta INV_{tot(l1)}$ | | 0.0909*** | | | | | | | |
| | | (0.0139) | | | | | | | |
| $\Delta INV_{tot(l2)}$ | | | 0.0618*** | | | | | | |
| | | | (0.0115) | | | | | | |
| $\Delta INV_{auto}$ | | | | 0.0119 | | | | | |
| | | | | (0.00728) | | | | | |
| $\Delta INV_{auto(l1)}$ | | | | | 0.0909*** | | | | |
| | | | | | (0.0139) | | | | |
| $\Delta INV_{auto(l2)}$ | | | | | | 0.0618*** | | | |
| | | | | | | (0.0115) | | | |
| $\Delta INV_{energy}$ | | | | | | | -0.000112** | | |
| | | | | | | | (4.64e-05) | | |
| $\Delta INV_{energy(l1)}$ | | | | | | | | 0.0909*** | |
| | | | | | | | | (0.0139) | |
| $\Delta INV_{energy(l2)}$ | | | | | | | | | 0.0618*** |
| | | | | | | | | | (0.0115) |
| $GEO_{centralnorth}$ | -0.0267*** | -0.0282*** | -0.0270*** | -0.0193 | -0.0282*** | -0.0270*** | -0.0243* | -0.0282*** | -0.0270*** |
| | (0.00966) | (0.0102) | (0.0102) | (0.0214) | (0.0102) | (0.0102) | (0.0132) | (0.0102) | (0.0102) |
| $GEO_{west}$ | -0.0207* | -0.0216* | -0.0188* | 0.0167 | -0.0216* | -0.0188* | -0.0128 | -0.0216* | -0.0188* |
| | (0.0112) | (0.0113) | (0.0111) | (0.0258) | (0.0113) | (0.0111) | (0.0139) | (0.0113) | (0.0111) |
| Constant | 0.113*** | 0.116*** | 0.159*** | 0.00965 | 0.116*** | 0.159*** | 0.117*** | 0.116*** | 0.159*** |
| | (0.0299) | (0.0265) | (0.0245) | (0.0867) | (0.0265) | (0.0245) | (0.0379) | (0.0265) | (0.0245) |
| Observations | 995 | 998 | 997 | 156 | 998 | 997 | 521 | 998 | 997 |
| Number of Provinces | 31 | 31 | 31 | 22 | 31 | 31 | 30 | 31 | 31 |
| Adj. R-squared | 0.719 | 0.726 | 0.735 | 0.756 | 0.726 | 0.735 | 0.744 | 0.726 | 0.735 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

### 9.2.2 Log growth rates

Table 29: Growth effects of dynamic credit indicators and lagged credit indicators, estimated with Fixed Effects

| | FE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $log(INITIALGDP)$ | -0.117*** | -0.124*** | -0.132*** | -0.101*** | -0.0973*** | -0.0985*** | -0.109*** | -0.118*** | -0.127*** |
| | (0.0239) | (0.0238) | (0.0236) | (0.0232) | (0.0195) | (0.0231) | (0.0214) | (0.0211) | (0.0187) |
| $SCHOOL$ | 0.0890 | 0.0861 | 0.0797 | 0.0808 | 0.0728 | 0.0894 | 0.0751 | 0.0734 | 0.0700 |
| | (0.0566) | (0.0567) | (0.0561) | (0.0579) | (0.0554) | (0.0583) | (0.0609) | (0.0610) | (0.0617) |
| $log(GOV)$ | 0.118*** | 0.120*** | 0.122*** | 0.108*** | 0.104*** | 0.106*** | 0.114*** | 0.118*** | 0.122*** |
| | (0.0219) | (0.0222) | (0.0218) | (0.0204) | (0.0188) | (0.0204) | (0.0194) | (0.0195) | (0.0182) |
| $log(OPENNESS)$ | -0.00907** | -0.00927** | -0.0106** | -0.00832* | -0.00990* | -0.00722* | -0.00967** | -0.00970* | -0.0121** |
| | (0.00408) | (0.00434) | (0.00459) | (0.00412) | (0.00503) | (0.00375) | (0.00469) | (0.00525) | (0.00501) |
| $\Delta log(CREDIT_{tot})$ | 0.0221 | | | | | | | | |
| | (0.0182) | | | | | | | | |
| $\Delta log(CREDIT_{tot(l1)})$ | | 0.0125 | | | | | | | |
| | | (0.0129) | | | | | | | |
| $\Delta log(CREDIT_{tot(l2)})$ | | | -0.00876 | | | | | | |
| | | | (0.0240) | | | | | | |
| $\Delta log(CREDIT_{NFC})$ | | | | 0.0890* | | | | | |
| | | | | (0.0464) | | | | | |
| $\Delta log(CREDIT_{NFC(l1)})$ | | | | | 0.105* | | | | |
| | | | | | (0.0547) | | | | |
| $\Delta log(CREDIT_{NFC(l2)})$ | | | | | | 0.0539 | | | |
| | | | | | | (0.0916) | | | |
| $\Delta log(INV_{credit})$ | | | | | | | 0.0403 | | |
| | | | | | | | (0.0247) | | |
| $\Delta log(INV_{credit(l1)})$ | | | | | | | | -0.0545 | |
| | | | | | | | | (0.0547) | |
| $\Delta log(INV_{credit(l2)})$ | | | | | | | | | -0.121** |
| | | | | | | | | | (0.0464) |
| Constant | 0.279*** | 0.311*** | 0.340*** | 0.244** | 0.234** | 0.243** | 0.288*** | 0.326*** | 0.351*** |
| | (0.0966) | (0.0966) | (0.101) | (0.0890) | (0.0880) | (0.0908) | (0.0972) | (0.100) | (0.0969) |
| Observations | 981 | 957 | 931 | 1,040 | 1,016 | 1,009 | 891 | 877 | 863 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.727 | 0.719 | 0.714 | 0.736 | 0.749 | 0.742 | 0.726 | 0.716 | 0.713 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 30: Growth effects of dynamic credit indicators and lagged credit indicators, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $log(INITIALGDP)$ | -0.0108* | -0.0139** | -0.0218*** | -0.0115** | -0.0147*** | -0.0115* | -0.0290*** | -0.0206*** | -0.0160*** |
| | (0.00557) | (0.00556) | (0.00586) | (0.00555) | (0.00539) | (0.00601) | (0.00665) | (0.00615) | (0.00597) |
| $SCHOOL$ | 0.00782 | 0.0205 | 0.0469 | -0.0141 | -0.0141 | -0.0105 | 0.0235 | -0.00444 | -0.0249 |
| | (0.0614) | (0.0607) | (0.0584) | (0.0638) | (0.0609) | (0.0635) | (0.0639) | (0.0652) | (0.0653) |
| $log(GOV)$ | 0.0191** | 0.0235*** | 0.0350*** | 0.0214** | 0.0263*** | 0.0203** | 0.0465*** | 0.0336*** | 0.0272*** |
| | (0.00870) | (0.00905) | (0.00977) | (0.00913) | (0.00911) | (0.00982) | (0.0108) | (0.0102) | (0.00961) |
| $log(OPENNESS)$ | 0.000517 | 0.000604 | 9.54e-05 | 0.000880 | 0.000247 | 0.000912 | 0.000309 | 0.00119 | 0.00175 |
| | (0.00218) | (0.00226) | (0.00254) | (0.00214) | (0.00227) | (0.00216) | (0.00243) | (0.00242) | (0.00241) |
| $\Delta log(CREDIT_{tot})$ | 0.0406 | | | | | | | | |
| | (0.0293) | | | | | | | | |
| $\Delta log(CREDIT_{tot(l1)})$ | | 0.0249 | | | | | | | |
| | | (0.0157) | | | | | | | |
| $\Delta log(CREDIT_{tot(l2)})$ | | | -0.00484 | | | | | | |
| | | | (0.0331) | | | | | | |
| $\Delta log(CREDIT_{NFC})$ | | | | 0.167*** | | | | | |
| | | | | (0.0532) | | | | | |
| $\Delta log(CREDIT_{NFC(l1)})$ | | | | | 0.169*** | | | | |
| | | | | | (0.0500) | | | | |
| $\Delta log(CREDIT_{NFC(l2)})$ | | | | | | 0.123 | | | |
| | | | | | | (0.0826) | | | |
| $\Delta log(INV_{credit})$ | | | | | | | 0.0620 | | |
| | | | | | | | (0.0424) | | |
| $\Delta log(INV_{credit(l1)})$ | | | | | | | | -0.0384 | |
| | | | | | | | | (0.0756) | |
| $\Delta log(INV_{credit(l2)})$ | | | | | | | | | -0.129** |
| | | | | | | | | | (0.0641) |
| Constant | 0.135*** | 0.134*** | 0.125*** | 0.137*** | 0.129*** | 0.148*** | 0.155*** | 0.173*** | 0.179*** |
| | (0.0332) | (0.0339) | (0.0350) | (0.0350) | (0.0301) | (0.0335) | (0.0285) | (0.0287) | (0.0286) |
| Observations | 981 | 957 | 931 | 1,040 | 1,016 | 1,009 | 891 | 877 | 863 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.716 | 0.707 | 0.701 | 0.724 | 0.740 | 0.732 | 0.713 | 0.701 | 0.698 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 31: Growth effects of dynamic credit indicators in $GEO_{east}$, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent:$\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| log(INITIAL GDP) | -0.133*** | -0.115*** | -0.161*** | -0.136*** | -0.115*** | -0.162*** | -0.0417 | -0.0346 | -0.0462 | -0.0422 | -0.0345 | -0.0465 |
| | (0.0384) | (0.0345) | (0.0304) | (0.0376) | (0.0344) | (0.0293) | (0.0287) | (0.0263) | (0.0299) | (0.0280) | (0.0261) | (0.0299) |
| SCHOOL | 0.0877 | 0.0972** | 0.113** | 0.0852 | 0.0970** | 0.113** | 0.0161 | -0.0111 | 0.0261 | 0.0140 | -0.0111 | 0.0262 |
| | (0.0529) | (0.0413) | (0.0410) | (0.0536) | (0.0410) | (0.0408) | (0.0529) | (0.0521) | (0.0498) | (0.0528) | (0.0520) | (0.0499) |
| log(GOV) | 0.124*** | 0.103*** | 0.122*** | 0.124*** | 0.103*** | 0.122*** | 0.0586 | 0.0516 | 0.0659* | 0.0595* | 0.0515 | 0.0663* |
| | (0.0321) | (0.0316) | (0.0371) | (0.0315) | (0.0314) | (0.0370) | (0.0363) | (0.0329) | (0.0384) | (0.0354) | (0.0327) | (0.0384) |
| log(OPENNESS) | -0.00709 | -0.00539 | -0.00735 | -0.00633 | -0.00528 | -0.00702 | -0.00509 | -0.00285 | -0.00474 | -0.00504 | -0.00281 | -0.00474 |
| | (0.00796) | (0.00931) | (0.00985) | (0.00808) | (0.00923) | (0.00960) | (0.00614) | (0.00575) | (0.00683) | (0.00602) | (0.00573) | (0.00677) |
| $\Delta log(CREDIT_{tot})$ | 0.242 | | | 0.255 | | | 0.355 | | | 0.367 | | |
| | (0.292) | | | (0.302) | | | (0.368) | | | (0.379) | | |
| $\Delta log(CREDIT_{NFC})$ | | 0.181 | | | 0.182 | | | 0.458*** | | | 0.458*** | |
| | | (0.136) | | | (0.136) | | | (0.131) | | | (0.130) | |
| $\Delta log(INV_{credit})$ | | | -0.0257 | | | -0.0239 | | | -0.0174 | | | -0.0155 |
| | | | (0.0199) | | | (0.0203) | | | (0.0330) | | | (0.0337) |
| $year_{>2001}$ | | | | -0.00460* | -0.000825 | -0.00213 | | | | -0.00453 | -0.00152 | -0.00209 |
| | | | | (0.00208) | (0.00198) | (0.00343) | | | | (0.00283) | (0.00267) | (0.00415) |
| Constant | 0.410* | 0.396 | 0.569** | 0.432* | 0.398* | 0.578** | 0.161*** | 0.159*** | 0.167*** | 0.163*** | 0.160*** | 0.169*** |
| | (0.213) | (0.217) | (0.201) | (0.210) | (0.215) | (0.189) | (0.0271) | (0.0191) | (0.0254) | (0.0279) | (0.0192) | (0.0276) |
| Observations | 315 | 334 | 291 | 315 | 334 | 291 | 315 | 334 | 291 | 315 | 334 | 291 |
| Number of Provinces | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Adj. R-squared | 0.817 | 0.824 | 0.822 | 0.818 | 0.824 | 0.822 | 0.790 | 0.800 | 0.795 | 0.790 | 0.799 | 0.794 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 32: Growth effects of dynamic credit indicators in $GEO_{centralnorth}$, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| log(INITIAL GDP) | -0.0889 | -0.0654 | -0.0770 | -0.0865 | -0.0636 | -0.0756 | -0.0378 | -0.0206 | -0.0287 | -0.0375 | -0.0205 | -0.0290 |
| | (0.0552) | (0.0445) | (0.0504) | (0.0556) | (0.0452) | (0.0502) | (0.0304) | (0.0251) | (0.0306) | (0.0306) | (0.0255) | (0.0308) |
| SCHOOL | -0.0891 | -0.0884 | -0.0719 | -0.0860 | -0.0830 | -0.0682 | -0.280 | -0.259* | -0.256 | -0.278 | -0.256 | -0.255 |
| | (0.201) | (0.190) | (0.208) | (0.204) | (0.193) | (0.211) | (0.177) | (0.157) | (0.179) | (0.177) | (0.158) | (0.180) |
| log(GOV) | 0.131** | 0.111** | 0.126** | 0.130** | 0.110** | 0.125** | 0.0580 | 0.0341 | 0.0493 | 0.0579 | 0.0346 | 0.0499 |
| | (0.0443) | (0.0425) | (0.0411) | (0.0460) | (0.0446) | (0.0423) | (0.0394) | (0.0342) | (0.0389) | (0.0399) | (0.0349) | (0.0394) |
| log(OPENNESS) | -0.00860 | -0.0143 | -0.00932 | -0.00832 | -0.0138 | -0.00886 | -0.0186*** | -0.0151*** | -0.0174*** | -0.0185*** | -0.0150*** | -0.0172*** |
| | (0.00755) | (0.00781) | (0.00740) | (0.00818) | (0.00830) | (0.00817) | (0.00369) | (0.00325) | (0.00367) | (0.00375) | (0.00338) | (0.00385) |
| $\Delta log(CREDIT_{tot})$ | 0.0186 | | | 0.0211 | | | 0.0323 | | | 0.0348* | | |
| | (0.0167) | | | (0.0157) | | | (0.0213) | | | (0.0201) | | |
| $\Delta log(CREDIT_{NFC})$ | | 0.176 | | | 0.181 | | | 0.228* | | | 0.232* | |
| | | (0.128) | | | (0.126) | | | (0.137) | | | (0.138) | |
| $\Delta log(INV_{credit})$ | | | 0.213 | | | 0.212 | | | 0.281 | | | 0.279 |
| | | | (0.301) | | | (0.292) | | | (0.294) | | | (0.284) |
| $year_{>2001}$ | | | | 0.00641 | 0.00678 | 0.00606 | | | | 0.00680 | 0.00670 | 0.00625 |
| | | | | (0.00603) | (0.00543) | (0.00548) | | | | (0.00630) | (0.00585) | (0.00575) |
| Constant | 0.117 | 0.0673 | 0.108 | 0.104 | 0.0523 | 0.0983 | 0.134 | 0.155** | 0.151* | 0.127 | 0.147* | 0.146* |
| | (0.222) | (0.170) | (0.212) | (0.225) | (0.175) | (0.213) | (0.0822) | (0.0771) | (0.0872) | (0.0810) | (0.0772) | (0.0868) |
| Observations | 291 | 305 | 273 | 291 | 305 | 273 | 291 | 305 | 273 | 291 | 305 | 273 |
| Number of Provinces | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| Adj. R-squared | 0.787 | 0.780 | 0.774 | 0.789 | 0.781 | 0.775 | 0.754 | 0.747 | 0.735 | 0.755 | 0.747 | 0.735 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 33: Growth effects of dynamic credit indicators in $GEO_{west}$, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| log(INITIAL GDP) | -0.128** | -0.111** | -0.0877*** | -0.128** | -0.111** | -0.0877*** | -0.0120 | -0.0145 | -0.0206** | -0.0120 | -0.0145 | -0.0210** |
| | (0.0465) | (0.0423) | (0.0212) | (0.0466) | (0.0422) | (0.0216) | (0.0105) | (0.0111) | (0.00935) | (0.0106) | (0.0111) | (0.00939) |
| SCHOOL | 0.118 | 0.141 | 0.0981 | 0.118 | 0.141 | 0.0993 | 0.0590 | 0.0729 | 0.0525 | 0.0591 | 0.0726 | 0.0535 |
| | (0.134) | (0.135) | (0.176) | (0.134) | (0.135) | (0.176) | (0.0628) | (0.0715) | (0.0998) | (0.0629) | (0.0716) | (0.100) |
| log(GOV) | 0.0743* | 0.0747* | 0.0622* | 0.0743* | 0.0746* | 0.0624* | 0.0221 | 0.0253 | 0.0308* | 0.0220 | 0.0252 | 0.0312* |
| | (0.0360) | (0.0372) | (0.0290) | (0.0361) | (0.0373) | (0.0290) | (0.0172) | (0.0181) | (0.0159) | (0.0173) | (0.0181) | (0.0159) |
| log(OPENNESS) | -0.00667 | -0.00735 | -0.00828 | -0.00669 | -0.00741 | -0.00830 | 0.00304 | 0.000961 | 0.00311 | 0.00295 | 0.000891 | 0.00312 |
| | (0.00811) | (0.00724) | (0.00896) | (0.00812) | (0.00724) | (0.00905) | (0.00554) | (0.00414) | (0.00505) | (0.00562) | (0.00416) | (0.00506) |
| $\Delta log(CREDIT_{tot})$ | 0.0320 | | | 0.0319 | | | 0.0324 | | | 0.0322 | | |
| | (0.0444) | | | (0.0448) | | | (0.0489) | | | (0.0502) | | |
| $\Delta log(CREDIT_{NFC})$ | | 0.0642 | | | 0.0672 | | | 0.0764 | | | 0.0796 | |
| | | (0.0440) | | | (0.0435) | | | (0.0497) | | | (0.0496) | |
| $\Delta log(INV_{credit})$ | | | 0.0473 | | | 0.0451 | | | 0.0910** | | | 0.0884** |
| | | | (0.0503) | | | (0.0496) | | | (0.0460) | | | (0.0450) |
| $year_{>2001}$ | | | | 0.000441 | 0.00203 | -0.00296 | | | | 0.00136 | 0.00223 | -0.00327 |
| | | | | (0.00494) | (0.00453) | (0.00436) | | | | (0.00524) | (0.00470) | (0.00443) |
| Constant | 0.424** | 0.328** | 0.329** | 0.423** | 0.325** | 0.330** | 0.108 | 0.0900 | 0.176*** | 0.106 | 0.0881 | 0.178*** |
| | (0.148) | (0.148) | (0.134) | (0.147) | (0.147) | (0.136) | (0.0700) | (0.0747) | (0.0397) | (0.0716) | (0.0759) | (0.0391) |
| Observations | 375 | 401 | 327 | 375 | 401 | 327 | 375 | 401 | 327 | 375 | 401 | 327 |
| Number of Provinces | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Adj. R-squared | 0.690 | 0.715 | 0.718 | 0.690 | 0.715 | 0.719 | 0.649 | 0.678 | 0.673 | 0.648 | 0.677 | 0.672 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 34: Growth effects of dynamic credit indicators with dummy variable for regions, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Dependent: $\Delta GDP_{real}$ | | | | | $year < 2001$ | | | $year >= 2001$ | |
| $log(INITIALGDP)$ | -0.0170** | -0.0184** | -0.0433*** | -0.0125 | -0.00687 | -0.0280** | -0.0310*** | -0.0346*** | -0.0364*** |
| | (0.00797) | (0.00754) | (0.0101) | (0.0147) | (0.0133) | (0.0124) | (0.00895) | (0.00843) | (0.00912) |
| $SCHOOL$ | 0.0429 | 0.0253 | 0.0534 | 0.00507 | -0.0279 | -0.0418 | 0.0580 | 0.0598 | 0.0624 |
| | (0.0551) | (0.0560) | (0.0574) | (0.0699) | (0.0642) | (0.0699) | (0.0531) | (0.0491) | (0.0520) |
| $log(GOV)$ | 0.0288** | 0.0322*** | 0.0661*** | 0.0270 | 0.0205 | 0.0455*** | 0.0484*** | 0.0536*** | 0.0563*** |
| | (0.0114) | (0.0112) | (0.0141) | (0.0187) | (0.0167) | (0.0177) | (0.0138) | (0.0129) | (0.0140) |
| $log(OPENNESS)$ | -0.00610* | -0.00523 | -0.00773** | -0.00144 | 0.000340 | -0.00257 | -0.00501 | -0.00425 | -0.00408 |
| | (0.00334) | (0.00339) | (0.00365) | (0.00445) | (0.00415) | (0.00480) | (0.00383) | (0.00369) | (0.00383) |
| $\Delta log(CREDIT_{tot})$ | 0.0397 | | | 0.110 | | | 0.0175* | | |
| | (0.0260) | | | (0.0831) | | | (0.00950) | | |
| $\Delta log(CREDIT_{NFC})$ | | 0.161*** | | | 0.141** | | | 0.207*** | |
| | | (0.0486) | | | (0.0617) | | | (0.0622) | |
| $\Delta log(INV_{credit})$ | | | 0.0567* | | | 0.0566 | | | 0.0503 |
| | | | (0.0335) | | | (0.0480) | | | (0.0769) |
| $GEO_{centralnorth}$ | -0.0268*** | -0.0253** | -0.0328*** | -0.0314*** | -0.0293*** | -0.0371*** | -0.0203 | -0.0180 | -0.0172 |
| | (0.0103) | (0.0103) | (0.0124) | (0.0101) | (0.00973) | (0.0125) | (0.0124) | (0.0118) | (0.0127) |
| $GEO_{west}$ | -0.0167 | -0.0159 | -0.0285** | -0.0261* | -0.0221* | -0.0357** | -0.00859 | -0.00910 | -0.00847 |
| | (0.0112) | (0.0110) | (0.0133) | (0.0140) | (0.0127) | (0.0148) | (0.0115) | (0.0111) | (0.0119) |
| Constant | 0.112*** | 0.115*** | 0.144*** | 0.123*** | 0.136*** | 0.184*** | -0.107** | -0.0815 | -0.0536 |
| | (0.0327) | (0.0336) | (0.0250) | (0.0376) | (0.0364) | (0.0292) | (0.0540) | (0.0498) | (0.0650) |
| Observations | 981 | 1,040 | 891 | 402 | 424 | 351 | 579 | 616 | 540 |
| Number of Provinces | 31 | 31 | 31 | 29 | 31 | 30 | 31 | 31 | 31 |
| Adj. R-squared | 0.716 | 0.724 | 0.713 | 0.701 | 0.705 | 0.708 | 0.691 | 0.713 | 0.658 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 35: Growth effects of dynamic credit indicators with dummy variable for regions, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Dependent:$\Delta GDP_{real}$ | | | | | $year < 2001$ | | | $year >= 2001$ | |
| $log(INITIALGDP)$ | -0.0168** | -0.0194** | -0.0505*** | -0.0150 | -0.00827 | -0.0280** | -0.0236** | -0.0315*** | -0.0311*** |
| | (0.00805) | (0.00759) | (0.0113) | (0.0144) | (0.0135) | (0.0123) | (0.00995) | (0.00793) | (0.00863) |
| $SCHOOL$ | 0.0300 | 0.0200 | 0.0617 | 0.0326 | -0.0190 | -0.0396 | 0.0603 | 0.0477 | 0.0582 |
| | (0.0561) | (0.0528) | (0.0572) | (0.0656) | (0.0635) | (0.0700) | (0.0561) | (0.0523) | (0.0547) |
| $log(GOV)$ | 0.0293** | 0.0348*** | 0.0757*** | 0.0311* | 0.0231 | 0.0454** | 0.0399*** | 0.0495*** | 0.0486*** |
| | (0.0114) | (0.0114) | (0.0153) | (0.0186) | (0.0168) | (0.0176) | (0.0145) | (0.0126) | (0.0136) |
| $log(OPENNESS)$ | -0.00567* | -0.00493 | -0.00849** | -0.00237 | -0.000358 | -0.00271 | -0.00507 | -0.00415 | -0.00449 |
| | (0.00321) | (0.00309) | (0.00366) | (0.00406) | (0.00412) | (0.00479) | (0.00376) | (0.00350) | (0.00374) |
| $\Delta log(CREDIT_{tot})$ | 0.535 | | | 0.767* | | | 0.155 | | |
| | (0.418) | | | (0.425) | | | (0.189) | | |
| $\Delta log(CREDIT_{NFC})$ | | 0.757*** | | | 0.541*** | | | 0.546** | |
| | | (0.159) | | | (0.164) | | | (0.235) | |
| $\Delta log(INV_{credit})$ | | | 0.0763 | | | 0.0673 | | | 0.0532 |
| | | | (0.0554) | | | (0.0673) | | | (0.175) |
| $GEO_{centralnorth}$ | -0.0155 | -0.0147 | -0.0346*** | -0.0243 | -0.0202** | -0.0384*** | -0.0164 | -0.0128 | -0.0153 |
| | (0.0142) | (0.00995) | (0.0131) | (0.0149) | (0.0101) | (0.0131) | (0.0131) | (0.0106) | (0.0131) |
| $GEO_{west}$ | -0.00405 | -0.00244 | -0.0320** | -0.00406 | -0.00991 | -0.0347** | -0.0149 | -0.00278 | -0.00750 |
| | (0.0144) | (0.0104) | (0.0139) | (0.0173) | (0.0117) | (0.0147) | (0.0122) | (0.00986) | (0.0119) |
| $\Delta log(CREDIT_{tot}) * GEO_{centralnorth}$ | -0.502 | | | -0.256 | | | -0.143 | | |
| | (0.417) | | | (0.409) | | | (0.189) | | |
| $\Delta log(CREDIT_{tot}) * GEO_{west}$ | -0.545 | | | -0.761* | | | 0.521* | | |
| | (0.409) | | | (0.420) | | | (0.277) | | |
| $\Delta log(CREDIT_{NFC}) * GEO_{centralnorth}$ | | -0.557*** | | | -0.401* | | | -0.326 | |
| | | (0.167) | | | (0.223) | | | (0.256) | |
| $\Delta log(CREDIT_{NFC}) * GEO_{west}$ | | -0.700*** | | | -0.480*** | | | -0.365 | |
| | | (0.148) | | | (0.158) | | | (0.249) | |
| $\Delta log(INV_{credit}) * GEO_{centralnorth}$ | | | -0.0648 | | | 0.0883 | | | -0.178 |
| | | | (0.183) | | | (0.318) | | | (0.244) |
| $\Delta log(INV_{credit}) * GEO_{west}$ | | | -0.0714 | | | -0.0791 | | | 0.0585 |
| | | | (0.0947) | | | (0.149) | | | (0.204) |
| Constant | 0.0997*** | 0.0996*** | 0.144*** | 0.0875** | 0.118*** | 0.182*** | | -0.0770 | |
| | (0.0347) | (0.0363) | (0.0263) | (0.0394) | (0.0407) | (0.0286) | | (0.0491) | |
| Observations | 981 | 1,040 | 891 | 402 | 424 | 351 | 579 | 616 | 540 |
| Number of Provinces | 31 | 31 | 31 | 29 | 31 | 30 | 31 | 31 | 31 |
| Adj. R-squared | 0.717 | 0.726 | 0.712 | 0.704 | 0.705 | 0.707 | 0.692 | 0.712 | 0.659 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 36: Growth effects of dynamic credit indicators with dummy variable for regions, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Dependent: $\Delta GDP_{real}$ | | | | | year<2001 | | | year>=2001 | |
| $log(INITIALGDP)$ | -0.0212*** | -0.0221*** | -0.0456*** | -0.0163 | -0.0106 | -0.0287** | -0.0377*** | -0.0392*** | -0.0397*** |
| | (0.00776) | (0.00696) | (0.00940) | (0.0143) | (0.0138) | (0.0121) | (0.00845) | (0.00767) | (0.00823) |
| $SCHOOL$ | 0.0155 | -0.000332 | 0.0513 | 0.0153 | -0.0352 | -0.0426 | 0.0472 | 0.0485 | 0.0577 |
| | (0.0605) | (0.0577) | (0.0581) | (0.0677) | (0.0654) | (0.0690) | (0.0578) | (0.0520) | (0.0550) |
| $log(GOV)$ | 0.0336*** | 0.0367*** | 0.0685*** | 0.0315 | 0.0246 | 0.0460*** | 0.0561*** | 0.0590*** | 0.0592*** |
| | (0.0116) | (0.0112) | (0.0137) | (0.0192) | (0.0179) | (0.0175) | (0.0135) | (0.0125) | (0.0135) |
| $log(OPENNESS)$ | -0.00608* | -0.00511 | -0.00806** | -0.00254 | -0.000534 | -0.00271 | -0.00525 | -0.00413 | -0.00445 |
| | (0.00340) | (0.00324) | (0.00367) | (0.00409) | (0.00419) | (0.00477) | (0.00402) | (0.00373) | (0.00396) |
| $\Delta log(CREDIT_{tot})$ | 0.0257 | | | 0.0784 | | | 0.0142** | | |
| | (0.0188) | | | (0.0749) | | | (0.00724) | | |
| $\Delta log(CREDIT_{NFC})$ | | 0.101** | | | 0.0789 | | | 0.188*** | |
| | | (0.0475) | | | (0.0504) | | | (0.0655) | |
| $\Delta log(INV_{credit})$ | | | 0.0114 | | | 0.0232 | | | 0.0500 |
| | | | (0.0707) | | | (0.120) | | | (0.0838) |
| $GEO_{east}$ | 0.0127 | 0.00986 | 0.0315** | 0.0128 | 0.0165* | 0.0365*** | 0.0156 | 0.0109 | 0.0149 |
| | (0.0144) | (0.00998) | (0.0123) | (0.0157) | (0.0100) | (0.0128) | (0.0126) | (0.0101) | (0.0121) |
| $\Delta log(CREDIT_{tot}) * GEO_{east}$ | 0.506 | | | 0.646 | | | 0.108 | | |
| | (0.408) | | | (0.420) | | | (0.169) | | |
| $\Delta log(CREDIT_{NFC}) * GEO_{east}$ | | 0.654*** | | | 0.447*** | | | 0.312 | |
| | | (0.154) | | | (0.159) | | | (0.247) | |
| $\Delta log(INV_{credit}) * GEO_{east}$ | | | 0.0660 | | | 0.0414 | | | -0.00261 |
| | | | (0.0933) | | | (0.151) | | | (0.197) |
| Constant | 0.0986*** | 0.103*** | 0.117*** | 0.0886** | 0.114*** | 0.149*** | -0.118* | | -0.0581 |
| | (0.0372) | (0.0394) | (0.0283) | (0.0393) | (0.0405) | (0.0342) | (0.0615) | | (0.0691) |
| Observations | 981 | 1,040 | 891 | 402 | 424 | 351 | 579 | 616 | 540 |
| Number of Provinces | 31 | 31 | 31 | 29 | 31 | 30 | 31 | 31 | 31 |
| Adj. R-squared | 0.717 | 0.726 | 0.713 | 0.701 | 0.705 | 0.707 | 0.690 | 0.713 | 0.657 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 37: Growth effects of dynamic credit indicators with dummy variable for credit to GDP share, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Dependent: $\Delta GDP_{real}$ | | | | $d(CREDIT/GDP) \leq 9$ | | | | | | $d(CREDIT/GDP) \leq 9$ | | |
| log(INITIAL GDP) | -0.121*** | -0.108*** | -0.108*** | -0.135*** | -0.119*** | -0.113*** | -0.0149** | -0.0110* | -0.0153** | -0.00600 | -0.00727 | -0.0142* |
| | (0.0245) | (0.0233) | (0.0216) | (0.0246) | (0.0237) | (0.0209) | (0.00660) | (0.00619) | (0.00709) | (0.00773) | (0.00765) | (0.00851) |
| SCHOOL | 0.111* | 0.0949 | 0.0878 | 0.0874 | 0.0688 | 0.0865 | 0.0509 | 0.0229 | -0.0148 | 0.0184 | 0.00757 | -0.0170 |
| | (0.0580) | (0.0609) | (0.0624) | (0.0722) | (0.0774) | (0.0711) | (0.0617) | (0.0640) | (0.0671) | (0.0634) | (0.0638) | (0.0706) |
| log(GOV) | 0.120*** | 0.111*** | 0.114*** | 0.140*** | 0.129*** | 0.135*** | 0.0242** | 0.0204** | 0.0254** | 0.0114 | 0.0143 | 0.0233* |
| | (0.0220) | (0.0203) | (0.0194) | (0.0202) | (0.0186) | (0.0171) | (0.0103) | (0.00996) | (0.0109) | (0.0110) | (0.0111) | (0.0123) |
| log(OPENNESS) | -0.00694 | -0.00869** | -0.0101** | -0.00807* | -0.00940* | -0.0140** | -0.000226 | -1.34e-05 | 0.00102 | 0.00119 | 0.00107 | 0.00146 |
| | (0.00415) | (0.00414) | (0.00482) | (0.00464) | (0.00467) | (0.00547) | (0.00243) | (0.00224) | (0.00201) | (0.00224) | (0.00210) | (0.00204) |
| $\Delta log(CREDIT_{tot})$ | 0.0277 | | | 0.0265 | | | 0.0440 | | | 0.0476 | | |
| | (0.0238) | | | (0.0222) | | | (0.0334) | | | (0.0345) | | |
| $\Delta log(CREDIT_{NFC})$ | | 0.173*** | | | 0.164** | | | 0.240*** | | | 0.239*** | |
| | | (0.0623) | | | (0.0604) | | | (0.0678) | | | (0.0646) | |
| $\Delta log(INV_{credit})$ | | | 0.0564 | | | 0.0483 | | | 0.0744 | | | 0.0688 |
| | | | (0.0362) | | | (0.0317) | | | (0.0598) | | | (0.0554) |
| $d10(CREDIT/GDP)$ | 0.0213** | 0.0167** | 0.00961 | | | | 0.0113** | 0.00976** | 0.00260 | | | |
| | (0.00852) | (0.00668) | (0.00836) | | | | (0.00484) | (0.00455) | (0.00449) | | | |
| $d10(CREDIT/GDP) * \Delta log(CREDIT_{tot})$ | -0.510*** | | | | | | -0.345*** | | | | | |
| | (0.140) | | | | | | (0.0922) | | | | | |
| $d10(CREDIT/GDP) * \Delta log(CREDIT_{NFC})$ | | -0.256*** | | | | | | -0.258*** | | | | |
| | | (0.0837) | | | | | | (0.0896) | | | | |
| $d10(CREDIT/GDP) * \Delta log(INV_{credit})$ | | | -0.154 | | | | | | -0.0494 | | | |
| | | | (0.102) | | | | | | (0.133) | | | |
| Constant | 0.295*** | 0.255*** | 0.275*** | 0.300** | 0.258** | 0.210** | 0.120*** | 0.118*** | 0.169*** | 0.134*** | 0.128*** | 0.173*** |
| | (0.101) | (0.0899) | (0.0999) | (0.114) | (0.105) | (0.0996) | (0.0348) | (0.0373) | (0.0270) | (0.0312) | (0.0339) | (0.0274) |
| Observations | 928 | 960 | 856 | 834 | 858 | 771 | 928 | 960 | 856 | 834 | 858 | 771 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.722 | 0.727 | 0.726 | 0.723 | 0.727 | 0.725 | 0.710 | 0.715 | 0.712 | 0.713 | 0.715 | 0.712 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 38: Growth effects of dynamic credit indicators with time dummy variable for industrial policy (SEI), estimated with Random Effects

| | RE | | | |
|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) |
| $log(INITIALGDP)$ | -0.0170** | -0.0169** | -0.0184** | -0.0146* |
| | (0.00797) | (0.00798) | (0.00754) | (0.00757) |
| $SCHOOL$ | 0.0429 | 0.0436 | 0.0253 | 0.0209 |
| | (0.0551) | (0.0550) | (0.0560) | (0.0543) |
| $log(GOV)$ | 0.0288** | 0.0288** | 0.0322*** | 0.0273** |
| | (0.0114) | (0.0114) | (0.0112) | (0.0110) |
| $log(OPENNESS)$ | -0.00610* | -0.00612* | -0.00523 | -0.00463 |
| | (0.00334) | (0.00334) | (0.00339) | (0.00339) |
| $GEO_{west}$ | -0.0167 | -0.0167 | -0.0159 | -0.0140 |
| | (0.0112) | (0.0112) | (0.0110) | (0.0109) |
| $GEO_{centralnorth}$ | -0.0268*** | -0.0266*** | -0.0253** | -0.0238** |
| | (0.0103) | (0.0103) | (0.0103) | (0.0102) |
| $\Delta log(CREDIT_{tot})$ | 0.0397 | 0.0996 | | |
| | (0.0260) | (0.0761) | | |
| $\Delta log(CREDIT_{NFC})$ | | | 0.161*** | 0.121** |
| | | | (0.0486) | (0.0554) |
| $year_{>2010}$ | | -0.179*** | | -0.191*** |
| | | (0.0325) | | (0.0322) |
| $year_{>2010} * \Delta log(CREDIT_{tot})$ | | -0.0770 | | |
| | | (0.0761) | | |
| $year_{>2010} * \Delta log(CREDIT_{NFC})$ | | | | 0.487*** |
| | | | | (0.151) |
| Constant | 0.112*** | 0.108*** | 0.115*** | 0.117*** |
| | (0.0327) | (0.0322) | (0.0336) | (0.0331) |
| Observations | 981 | 981 | 1,040 | 1,040 |
| Number of Provinces | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.716 | 0.716 | 0.724 | 0.725 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 39: Growth effects of industry credit growth with time dummy variable for industrial policy (SEI) by ownership, estimated with Random Effects

| | RE | |
|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) |
| $log(INITIALGDP)$ | -0.0230* | -0.0257* |
| | (0.0130) | (0.0144) |
| $SCHOOL$ | 0.115* | 0.126** |
| | (0.0640) | (0.0634) |
| $log(GOV)$ | 0.0349** | 0.0395** |
| | (0.0176) | (0.0194) |
| $log(OPENNESS)$ | -1.97e-05 | 0.000901 |
| | (0.00588) | (0.00576) |
| $GEO_{west}$ | 0.00108 | 0.000750 |
| | (0.0130) | (0.0129) |
| $GEO_{centralnorth}$ | -0.0181 | -0.0176 |
| | (0.0148) | (0.0147) |
| $\Delta log(CREDIT_{priv})$ | -0.00707*** | -0.00125 |
| | (0.00125) | (0.00734) |
| $\Delta log(CREDIT_{state})$ | 0.0267 | 0.00445 |
| | (0.0242) | (0.0322) |
| $year_{>2010}$ | | -0.0478* |
| | | (0.0275) |
| $year_{>2010} * \Delta log(CREDIT_{priv})$ | | -0.00585 |
| | | (0.00757) |
| $year_{>2010} * \Delta log(CREDIT_{state})$ | | 0.0640 |
| | | (0.0538) |
| Constant | 0.0213 | 0.0136 |
| | (0.0517) | (0.0535) |
| Observations | 374 | 374 |
| Number of Provinces | 29 | 29 |
| Adj. R-squared | 0.682 | 0.683 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 40: Investment effects of industry credit growth with time dummy variable for industrial policy (SEI) by ownership, estimated with Random Effects

| | RE | |
|---|---|---|
| Dependent: $\Delta log(INV_{tot})$ | (1) | (2) |
| $\Delta log(STATECAP_{ind})$ | -0.00912* | -0.0103* |
| | (0.00544) | (0.00544) |
| $\Delta log(FORECAP_{ind})$ | 0.000985*** | 0.000862*** |
| | (0.000312) | (0.000327) |
| $\Delta log(REV_{ind})$ | 0.136 | 0.136 |
| | (0.0965) | (0.0982) |
| $GEO_{centralnorth}$ | 0.000525 | 0.000370 |
| | (0.000981) | (0.000974) |
| $GEO_{west}$ | 0.00146** | 0.00140** |
| | (0.000734) | (0.000695) |
| $\Delta log(CREDIT_{priv})$ | 0.000347 | -0.00184* |
| | (0.000663) | (0.000956) |
| $\Delta log(CREDIT_{state})$ | 0.00310 | -0.000602 |
| | (0.00419) | (0.00380) |
| $year_{>2010}$ | | -0.00704** |
| | | (0.00279) |
| $year_{>2010} * \Delta log(CREDIT_{priv})$ | | 0.00271** |
| | | (0.00124) |
| $year_{>2010} * \Delta log(CREDIT_{state})$ | | 0.00941 |
| | | (0.00820) |
| Constant | 0.00598*** | 0.00627*** |
| | (0.00132) | (0.00139) |
| Observations | 365 | 365 |
| Number of Provinces | 29 | 29 |
| Adj. R-squared | 0.388 | 0.389 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 41: Investment effects of industry credit growth by industrial sector, estimated with Random Effects

| | RE | | |
|---|---|---|---|
| Dependent: | (1) $\Delta log(INV_{tot})$ | (2) $\Delta log(INV_{auto})$ | (3) $\Delta log(INV_{energy})$ |
| $\Delta log(REV_{ind})$ | 0.139 | 0.440 | -0.163 |
| | (0.0964) | (0.388) | (0.310) |
| $\Delta log(CREDIT_{firm})$ | 0.00239 | 0.155*** | -0.0142 |
| | (0.00351) | (0.0552) | (0.0223) |
| $\Delta log(STATECAP_{ind})$ | -0.00194 | -0.136*** | -0.00762 |
| | (0.00337) | (0.0456) | (0.0231) |
| $\Delta log(FORECAP_{ind})$ | 0.00120*** | 0.0231 | 0.0365* |
| | (0.000331) | (0.0621) | (0.0190) |
| $GEO_{centralnorth}$ | 0.000775 | -0.00638* | -8.30e-05 |
| | (0.000860) | (0.00351) | (0.00246) |
| $GEO_{west}$ | 0.00167** | -0.00827 | 0.00227 |
| | (0.000719) | (0.00731) | (0.00370) |
| Constant | 0.00540*** | -0.0195 | -0.0101 |
| | (0.00120) | (0.0596) | (0.00768) |
| Observations | 501 | 128 | 390 |
| Number of Provinces | 30 | 22 | 29 |
| Adj. R-squared | 0.407 | 0.373 | 0.012 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 42: Growth effects of investment by industrial sector, estimated with Random Effects

| | RE | | |
|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) |
| $log(INITIALGDP)$ | -0.0227*** | -0.000514 | -0.0365*** |
| | (0.00838) | (0.0300) | (0.0116) |
| $SCHOOL$ | 0.0518 | 0.172 | 0.0863 |
| | (0.0505) | (0.153) | (0.0601) |
| $log(GOV)$ | 0.0384*** | 0.0281 | 0.0503*** |
| | (0.0121) | (0.0405) | (0.0161) |
| $log(OPENNESS)$ | -0.00470 | -0.00108 | -0.0049 |
| | (0.00312) | (0.00549) | (0.0041) |
| $\Delta\ log(INV_{tot})$ | 2.025*** | | |
| | (0.430) | | |
| $\Delta\ log(INV_{auto})$ | | 0.174* | |
| | | (0.0945) | |
| $\Delta\ log(INV_{energy})$ | | | 0.0115 |
| | | | (0.0231) |
| $GEO_{centralnorth}$ | -0.0262*** | -0.0185 | -0.0240* |
| | (0.00960) | (0.0212) | (0.0130) |
| $GEO_{west}$ | -0.0201* | 0.0182 | -0.0122 |
| | (0.0110) | (0.0255) | (0.0136 |
| Constant | 0.104*** | 0.0173 | 0.1166*** |
| | (0.0297) | (0.0883) | (0.0368) |
| Observations | 995 | 156 | 521 |
| Number of Provinces | 31 | 22 | 30 |
| Adj. R-squared | 0.717 | 0.756 | 0.744 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

### 9.2.3 3- and 5-year averages

Table 43: Growth effects of dynamic credit indicators and lagged credit indicators, 3-year moving averages, estimated with Fixed Effects

| | FE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $log(INITIALGDP)$ | -0.0933*** | -0.0834*** | -0.0800*** | -0.0801*** | -0.0785*** | -0.0772*** | -0.1000*** | -0.0931*** | -0.0861*** |
| | (0.0220) | (0.0221) | (0.0230) | (0.0213) | (0.0214) | (0.0218) | (0.0223) | (0.0249) | (0.0258) |
| $SCHOOL$ | 0.0798 | 0.0807 | 0.0901 | 0.0638 | 0.0680 | 0.0789 | 0.0702 | 0.0642 | 0.0674 |
| | (0.0593) | (0.0607) | (0.0616) | (0.0589) | (0.0591) | (0.0603) | (0.0647) | (0.0651) | (0.0658) |
| $log(GOV)$ | 0.109*** | 0.101*** | 0.0972*** | 0.0970*** | 0.0930*** | 0.0915*** | 0.109*** | 0.0981*** | 0.0880*** |
| | (0.0241) | (0.0232) | (0.0241) | (0.0209) | (0.0209) | (0.0220) | (0.0194) | (0.0202) | (0.0210) |
| $log(OPENNESS)$ | -0.00880 | -0.00818 | -0.00769 | -0.00816 | -0.00839 | -0.00859 | -0.00757 | -0.00545 | -0.00463 |
| | (0.00526) | (0.00535) | (0.00517) | (0.00483) | (0.00520) | (0.00518) | (0.00596) | (0.00606) | (0.00557) |
| $\Delta CREDIT_{tot}$ | 3.42e-06*** | | | | | | | | |
| | (1.01e-06) | | | | | | | | |
| $\Delta CREDIT_{tot(l1)}$ | | 2.18e-06** | | | | | | | |
| | | (9.72e-07) | | | | | | | |
| $\Delta CREDIT_{tot(l2)}$ | | | 6.64e-07 | | | | | | |
| | | | (9.47e-07) | | | | | | |
| $\Delta CREDIT_{NFC}$ | | | | 0.0215* | | | | | |
| | | | | (0.0116) | | | | | |
| $\Delta CREDIT_{NFC(l1)}$ | | | | | 0.0184 | | | | |
| | | | | | (0.0131) | | | | |
| $\Delta CREDIT_{NFC(l2)}$ | | | | | | 0.00956 | | | |
| | | | | | | (0.0133) | | | |
| $\Delta INV_{credit}$ | | | | | | | 0.00840 | | |
| | | | | | | | (0.00553) | | |
| $\Delta INV_{credit(l1)}$ | | | | | | | | 0.0192*** | |
| | | | | | | | | (0.00641) | |
| $\Delta INV_{credit(l2)}$ | | | | | | | | | 0.0243*** |
| | | | | | | | | | (0.00580) |
| Constant | 0.193** | 0.177* | 0.221** | 0.170* | 0.180* | 0.231** | 0.248** | 0.258* | 0.303** |
| | (0.0835) | (0.0879) | (0.0906) | (0.0871) | (0.0930) | (0.0955) | (0.110) | (0.127) | (0.133) |
| Observations | 915 | 909 | 896 | 978 | 954 | 925 | 818 | 817 | 813 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.797 | 0.803 | 0.809 | 0.805 | 0.811 | 0.815 | 0.807 | 0.824 | 0.835 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 44: Growth effects of dynamic credit indicators and lagged credit indicators, 5-year moving averages, estimated with Fixed Effects

| | FE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $log(INITIALGDP)$ | -0.0951*** | -0.0850*** | -0.0785*** | -0.0756*** | -0.0753*** | -0.0736*** | -0.100*** | -0.0901*** | -0.0770*** |
| | (0.0217) | (0.0233) | (0.0246) | (0.0210) | (0.0219) | (0.0222) | (0.0224) | (0.0246) | (0.0252) |
| $SCHOOL$ | 0.0841 | 0.0961 | 0.108 | 0.0663 | 0.0791 | 0.0905 | 0.0745 | 0.0655 | 0.0621 |
| | (0.0627) | (0.0645) | (0.0648) | (0.0632) | (0.0629) | (0.0629) | (0.0691) | (0.0685) | (0.0669) |
| $log(GOV)$ | 0.112*** | 0.105*** | 0.101*** | 0.0955*** | 0.0947*** | 0.0971*** | 0.110*** | 0.0987*** | 0.0871*** |
| | (0.0260) | (0.0256) | (0.0265) | (0.0215) | (0.0219) | (0.0230) | (0.0201) | (0.0205) | (0.0217) |
| $log(OPENNESS)$ | -0.00899 | -0.00901 | -0.00925 | -0.00948 | -0.00870 | -0.00852 | -0.0101 | -0.00709 | -0.00500 |
| | (0.00602) | (0.00618) | (0.00592) | (0.00559) | (0.00575) | (0.00561) | (0.00632) | (0.00666) | (0.00656) |
| $\Delta CREDIT_{tot}$ | 3.11e-06** | | | | | | | | |
| | (1.24e-06) | | | | | | | | |
| $\Delta CREDIT_{tot(l1)}$ | | 2.56e-06** | | | | | | | |
| | | (1.19e-06) | | | | | | | |
| $\Delta CREDIT_{tot(l2)}$ | | | 2.49e-06** | | | | | | |
| | | | (1.18e-06) | | | | | | |
| $\Delta CREDIT_{NFC}$ | | | | 0.0313* | | | | | |
| | | | | (0.0158) | | | | | |
| $\Delta CREDIT_{NFC(l1)}$ | | | | | 0.0205 | | | | |
| | | | | | (0.0161) | | | | |
| $\Delta CREDIT_{NFC(l2)}$ | | | | | | 0.00467 | | | |
| | | | | | | (0.0164) | | | |
| $\Delta INV_{credit}$ | | | | | | | 0.0210** | | |
| | | | | | | | (0.00950) | | |
| $\Delta INV_{credit(l1)}$ | | | | | | | | 0.0305*** | |
| | | | | | | | | (0.00899) | |
| $\Delta INV_{credit(l2)}$ | | | | | | | | | 0.0346*** |
| | | | | | | | | | (0.00810) |
| Constant | 0.224*** | 0.184** | 0.166* | 0.180* | 0.177* | 0.165 | 0.260** | 0.249* | 0.234* |
| | (0.0811) | (0.0898) | (0.0948) | (0.0910) | (0.0975) | (0.0980) | (0.116) | (0.130) | (0.128) |
| Observations | 850 | 844 | 831 | 916 | 892 | 863 | 750 | 749 | 745 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.821 | 0.824 | 0.834 | 0.833 | 0.835 | 0.841 | 0.838 | 0.849 | 0.858 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 45: Growth effects of dynamic credit indicators and lagged credit indicators, 3-year moving averages, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $log(INITIALGDP)$ | -0.0185*** | -0.0192*** | -0.0231*** | -0.0227*** | -0.0243*** | -0.0239*** | -0.0373*** | -0.0394*** | -0.0401*** |
| | (0.00632) | (0.00634) | (0.00697) | (0.00656) | (0.00703) | (0.00735) | (0.00821) | (0.00915) | (0.01000) |
| $SCHOOL$ | 0.0357 | 0.0364 | 0.0545 | 0.0254 | 0.0320 | 0.0402 | 0.0482 | 0.0508 | 0.0584 |
| | (0.0598) | (0.0611) | (0.0610) | (0.0577) | (0.0571) | (0.0581) | (0.0633) | (0.0624) | (0.0615) |
| $log(GOV)$ | 0.0302*** | 0.0309*** | 0.0364*** | 0.0381*** | 0.0401*** | 0.0389*** | 0.0594*** | 0.0619*** | 0.0619*** |
| | (0.0104) | (0.0103) | (0.0113) | (0.0112) | (0.0116) | (0.0120) | (0.0133) | (0.0150) | (0.0164) |
| $log(OPENNESS)$ | -0.000284 | -0.000592 | -0.00108 | -0.000425 | -0.000689 | -0.000813 | -0.000340 | -0.000255 | -0.000510 |
| | (0.00255) | (0.00253) | (0.00265) | (0.00259) | (0.00268) | (0.00264) | (0.00282) | (0.00292) | (0.00298) |
| $\Delta CREDIT_{tot}$ | 5.64e-06*** | | | | | | | | |
| | (1.19e-06) | | | | | | | | |
| $\Delta CREDIT_{tot(l1)}$ | | 4.12e-06*** | | | | | | | |
| | | (1.15e-06) | | | | | | | |
| $\Delta CREDIT_{tot(l2)}$ | | | 2.21e-06** | | | | | | |
| | | | (1.08e-06) | | | | | | |
| $\Delta CREDIT_{NFC}$ | | | | 0.0356*** | | | | | |
| | | | | (0.0133) | | | | | |
| $\Delta CREDIT_{NFC(l1)}$ | | | | | 0.0308** | | | | |
| | | | | | (0.0131) | | | | |
| $\Delta CREDIT_{NFC(l2)}$ | | | | | | 0.0223* | | | |
| | | | | | | (0.0128) | | | |
| $\Delta INV_{credit}$ | | | | | | | 0.0149** | | |
| | | | | | | | (0.00636) | | |
| $\Delta INV_{credit(l1)}$ | | | | | | | | 0.0240*** | |
| | | | | | | | | (0.00743) | |
| $\Delta INV_{credit(l2)}$ | | | | | | | | | 0.0270*** |
| | | | | | | | | | (0.00654) |
| Constant | 0.124*** | 0.125*** | 0.168*** | 0.112*** | 0.115*** | 0.168*** | 0.120*** | 0.116*** | 0.156*** |
| | (0.0312) | (0.0297) | (0.0315) | (0.0336) | (0.0321) | (0.0314) | (0.0292) | (0.0323) | (0.0340) |
| Observations | 915 | 909 | 896 | 978 | 954 | 925 | 818 | 817 | 813 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.793 | 0.780 | 0.807 | 0.801 | 0.808 | 0.812 | 0.802 | 0.820 | 0.832 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 46: Growth effects of dynamic credit indicators and lagged credit indicators, 5-year moving averages, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $log(INITIALGDP)$ | -0.0232*** | -0.0222*** | -0.0265*** | -0.0279*** | -0.0289*** | -0.0307*** | -0.0435*** | -0.0436*** | -0.0420*** |
| | (0.00719) | (0.00717) | (0.00800) | (0.00784) | (0.00817) | (0.00859) | (0.00971) | (0.0104) | (0.0112) |
| $SCHOOL$ | 0.0584 | 0.0652 | 0.0870 | 0.0452 | 0.0568 | 0.0709 | 0.0670 | 0.0590 | 0.0572 |
| | (0.0611) | (0.0626) | (0.0622) | (0.0593) | (0.0593) | (0.0595) | (0.0672) | (0.0655) | (0.0631) |
| $log(GOV)$ | 0.0372*** | 0.0352*** | 0.0420*** | 0.0464*** | 0.0472*** | 0.0495*** | 0.0690*** | 0.0689*** | 0.0661*** |
| | (0.0120) | (0.0118) | (0.0131) | (0.0133) | (0.0136) | (0.0142) | (0.0158) | (0.0168) | (0.0181) |
| $log(OPENNESS)$ | -0.000878 | -0.00108 | -0.00178 | -0.00156 | -0.00147 | -0.00158 | -0.00165 | -0.00129 | -0.00122 |
| | (0.00280) | (0.00275) | (0.00286) | (0.00276) | (0.00289) | (0.00291) | (0.00295) | (0.00319) | (0.00337) |
| $\Delta CREDIT_{tot}$ | 5.60e-06*** | | | | | | | | |
| | (1.32e-06) | | | | | | | | |
| $\Delta CREDIT_{tot(l1)}$ | | 4.71e-06*** | | | | | | | |
| | | (1.31e-06) | | | | | | | |
| $\Delta CREDIT_{tot(l2)}$ | | | 4.09e-06*** | | | | | | |
| | | | (1.25e-06) | | | | | | |
| $\Delta CREDIT_{NFC}$ | | | | 0.0469*** | | | | | |
| | | | | (0.0165) | | | | | |
| $\Delta CREDIT_{NFC(l1)}$ | | | | | 0.0363** | | | | |
| | | | | | (0.0148) | | | | |
| $\Delta CREDIT_{NFC(l2)}$ | | | | | | 0.0215 | | | |
| | | | | | | (0.0141) | | | |
| $\Delta INV_{credit}$ | | | | | | | 0.0288*** | | |
| | | | | | | | (0.00869) | | |
| $\Delta INV_{credit(l1)}$ | | | | | | | | 0.0370*** | |
| | | | | | | | | (0.00826) | |
| $\Delta INV_{credit(l2)}$ | | | | | | | | | 0.0391*** |
| | | | | | | | | | (0.00736) |
| Constant | 0.148*** | 0.137*** | 0.132*** | 0.131*** | 0.127*** | 0.131*** | 0.127*** | 0.119*** | 0.127*** |
| | (0.0312) | (0.0307) | (0.0333) | (0.0321) | (0.0327) | (0.0339) | (0.0309) | (0.0338) | (0.0339) |
| Observations | 850 | 844 | 831 | 916 | 892 | 863 | 750 | 749 | 745 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.820 | 0.825 | 0.836 | 0.832 | 0.835 | 0.841 | 0.837 | 0.848 | 0.859 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 47: Growth effects of dynamic credit indicators in $GEO_{east}$, 3-year moving averages, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| $log(INITIALGDP)$ | -0.126*** | -0.101*** | -0.157*** | -0.127*** | -0.100*** | -0.159*** | -0.0336 | -0.0282 | -0.0391 | -0.0339 | -0.0282 | -0.0398 |
| | (0.0324) | (0.0299) | (0.0294) | (0.0320) | (0.0298) | (0.0287) | (0.0278) | (0.0210) | (0.0267) | (0.0277) | (0.0211) | (0.0263) |
| $SCHOOL$ | 0.0737 | 0.0803 | 0.121** | 0.0724 | 0.0817 | 0.120** | -0.00969 | -0.0656 | 0.0418 | -0.0105 | -0.0653 | 0.0406 |
| | (0.0446) | (0.0544) | (0.0424) | (0.0445) | (0.0542) | (0.0416) | (0.0575) | (0.0514) | (0.0526) | (0.0569) | (0.0514) | (0.0518) |
| $log(GOV)$ | 0.122*** | 0.0961*** | 0.122*** | 0.122*** | 0.0960** | 0.122*** | 0.0472 | 0.0434 | 0.0582 | 0.0477 | 0.0433 | 0.0594* |
| | (0.0349) | (0.0294) | (0.0313) | (0.0349) | (0.0296) | (0.0314) | (0.0359) | (0.0270) | (0.0354) | (0.0357) | (0.0271) | (0.0347) |
| $log(OPENNESS)$ | -0.00376 | -0.00317 | -0.0124 | -0.00362 | -0.00326 | -0.0121 | -0.00355 | -0.000988 | -0.00479 | -0.00357 | -0.00100 | -0.00485 |
| | (0.0113) | (0.0130) | (0.0101) | (0.0113) | (0.0130) | (0.01000) | (0.00594) | (0.00467) | (0.00687) | (0.00589) | (0.00469) | (0.00676) |
| $\Delta CREDIT_{tot}$ | 0.0235 | | | 0.0236 | | | 0.0355 | | | 0.0355 | | |
| | (0.0192) | | | (0.0192) | | | (0.0288) | | | (0.0289) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0472 | | | 0.0477 | | | 0.135*** | | | 0.136*** | |
| | | (0.0375) | | | (0.0376) | | | (0.0319) | | | (0.0318) | |
| $\Delta INV_{credit}$ | | | -0.000914 | | | -0.00102 | | | 0.0147 | | | 0.0147 |
| | | | (0.00703) | | | (0.00692) | | | (0.0111) | | | (0.0110) |
| $year_{>2001}$ | | | | -0.00146 | 0.00171 | -0.00282 | | | | -0.00182 | 0.00116 | -0.00397* |
| | | | | (0.00169) | (0.00145) | (0.00164) | | | | (0.00153) | (0.00214) | (0.00215) |
| Constant | 0.395* | 0.341 | 0.536** | 0.401* | 0.336 | 0.548** | 0.168*** | 0.154*** | 0.152*** | 0.169*** | 0.153*** | 0.154*** |
| | (0.191) | (0.216) | (0.190) | (0.189) | (0.214) | (0.186) | (0.0220) | (0.0174) | (0.0256) | (0.0221) | (0.0175) | (0.0262) |
| Observations | 295 | 314 | 264 | 295 | 314 | 264 | 295 | 314 | 264 | 295 | 314 | 264 |
| Number of Provinces | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Adj. R-squared | 0.873 | 0.875 | 0.889 | 0.873 | 0.875 | 0.890 | 0.855 | 0.858 | 0.875 | 0.855 | 0.858 | 0.875 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 48: Growth effects of dynamic credit indicators in $GEO_{east}$, 5-year moving averages, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| $log(INITIALGDP)$ | -0.120*** | -0.0875*** | -0.160*** | -0.121*** | -0.0867*** | -0.161*** | -0.0228 | -0.0228 | -0.0334 | -0.0228 | -0.0227 | -0.0341 |
| | (0.0292) | (0.0247) | (0.0259) | (0.0285) | (0.0243) | (0.0255) | (0.0257) | (0.0179) | (0.0243) | (0.0256) | (0.0180) | (0.0237) |
| $SCHOOL$ | 0.0831 | 0.0848 | 0.133** | 0.0827 | 0.0861 | 0.132** | -0.00388 | -0.0718 | 0.0778 | -0.00389 | -0.0715 | 0.0762 |
| | (0.0463) | (0.0704) | (0.0447) | (0.0456) | (0.0711) | (0.0443) | (0.0622) | (0.0560) | (0.0571) | (0.0618) | (0.0560) | (0.0566) |
| $log(GOV)$ | 0.113** | 0.0872*** | 0.122*** | 0.113** | 0.0870*** | 0.122*** | 0.0327 | 0.0374 | 0.0509 | 0.0327 | 0.0373 | 0.0521 |
| | (0.0366) | (0.0246) | (0.0246) | (0.0367) | (0.0248) | (0.0246) | (0.0338) | (0.0237) | (0.0326) | (0.0336) | (0.0239) | (0.0317) |
| $log(OPENNESS)$ | -0.00218 | -0.00502 | -0.0191* | -0.00214 | -0.00524 | -0.0190* | -0.00257 | -0.000581 | -0.00464 | -0.00257 | -0.000595 | -0.00477 |
| | (0.0125) | (0.0146) | (0.00962) | (0.0124) | (0.0147) | (0.00944) | (0.00559) | (0.00404) | (0.00666) | (0.00559) | (0.00407) | (0.00653) |
| $\Delta CREDIT_{tot}$ | 0.0368 | | | 0.0368 | | | 0.0591 | | | 0.0591 | | |
| | (0.0281) | | | (0.0283) | | | (0.0408) | | | (0.0412) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0785 | | | 0.0795 | | | 0.178*** | | | 0.178*** | |
| | | (0.0519) | | | (0.0521) | | | (0.0424) | | | (0.0426) | |
| $\Delta INV_{credit}$ | | | 0.000966 | | | 0.000622 | | | 0.0284* | | | 0.0279* |
| | | | (0.00974) | | | (0.00967) | | | (0.0148) | | | (0.0149) |
| $year_{>2001}$ | | | | -0.000376 | 0.00164 | -0.00148 | | | | -2.94e-05 | 0.00130 | -0.00380 |
| | | | | (0.00249) | (0.00173) | (0.00194) | | | | (0.00276) | (0.00250) | (0.00297) |
| Constant | 0.419** | 0.314 | 0.571*** | 0.421** | 0.307 | 0.579*** | 0.175*** | 0.160*** | 0.156*** | 0.175*** | 0.159*** | 0.159*** |
| | (0.182) | (0.211) | (0.129) | (0.175) | (0.209) | (0.124) | (0.0272) | (0.0217) | (0.0399) | (0.0274) | (0.0216) | (0.0397) |
| Observations | 275 | 294 | 240 | 275 | 294 | 240 | 275 | 294 | 240 | 275 | 294 | 240 |
| Number of Provinces | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Adj. R-squared | 0.897 | 0.900 | 0.928 | 0.897 | 0.901 | 0.928 | 0.885 | 0.888 | 0.921 | 0.884 | 0.888 | 0.920 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 49: Growth effects of dynamic credit indicators in $GEO_{centralnorth}$, 3-year moving averages, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| $log(INITIALGDP)$ | -0.0169 | 0.00143 | -0.0143 | -0.0165 | 0.00170 | -0.0137 | -0.00107 | 0.0153 | -0.000923 | -0.000726 | 0.0155 | -0.000702 |
| | (0.0542) | (0.0438) | (0.0519) | (0.0539) | (0.0438) | (0.0523) | (0.0332) | (0.0244) | (0.0317) | (0.0332) | (0.0245) | (0.0318) |
| $SCHOOL$ | -0.0363 | -0.0433 | 0.00135 | -0.0366 | -0.0432 | 0.00132 | -0.241 | -0.227 | -0.208 | -0.241 | -0.226 | -0.207 |
| | (0.189) | (0.178) | (0.181) | (0.190) | (0.178) | (0.182) | (0.154) | (0.139) | (0.154) | (0.154) | (0.139) | (0.154) |
| $log(GOV)$ | 0.0653 | 0.0460 | 0.0733* | 0.0648 | 0.0458 | 0.0728 | 0.00523 | -0.0171 | 0.00801 | 0.00477 | -0.0172 | 0.00781 |
| | (0.0420) | (0.0396) | (0.0391) | (0.0417) | (0.0396) | (0.0393) | (0.0429) | (0.0325) | (0.0417) | (0.0430) | (0.0326) | (0.0418) |
| $log(OPENNESS)$ | -0.000499 | -0.00774 | -0.00162 | -0.000477 | -0.00775 | -0.00160 | -0.0148*** | -0.0116*** | -0.0139*** | -0.0148*** | -0.0116*** | -0.0138*** |
| | (0.00839) | (0.00845) | (0.00873) | (0.00845) | (0.00853) | (0.00877) | (0.00419) | (0.00369) | (0.00408) | (0.00420) | (0.00372) | (0.00419) |
| $\Delta CREDIT_{tot}$ | 4.51e-06 | | | 4.60e-06 | | | 8.25e-06*** | | | 8.36e-06*** | | |
| | (2.81e-06) | | | (2.97e-06) | | | (2.01e-06) | | | (2.15e-06) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0163 | | | 0.0166 | | | 0.0251 | | | 0.0255 | |
| | | (0.0146) | | | (0.0148) | | | (0.0177) | | | (0.0178) | |
| $\Delta INV_{credit}$ | | | 0.0142 | | | 0.0144 | | | 0.0232 | | | 0.0233 |
| | | | (0.0314) | | | (0.0313) | | | (0.0311) | | | (0.0310) |
| $year_{>2001}$ | | | | 0.000691 | 0.000714 | 0.000786 | | | | 0.00149 | 0.00108 | 0.00178 |
| | | | | (0.00216) | (0.00244) | (0.00260) | | | | (0.00238) | (0.00238) | (0.00248) |
| Constant | -0.0209 | -0.0688 | -0.0672 | -0.0210 | -0.0698 | -0.0690 | 0.134* | 0.140** | 0.130* | 0.133* | 0.139** | 0.130* |
| | (0.218) | (0.180) | (0.204) | (0.218) | (0.181) | (0.206) | (0.0769) | (0.0696) | (0.0736) | (0.0766) | (0.0691) | (0.0729) |
| Observations | 273 | 287 | 253 | 273 | 287 | 253 | 273 | 287 | 253 | 273 | 287 | 253 |
| Number of Provinces | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| Adj. R-squared | 0.874 | 0.875 | 0.860 | 0.874 | 0.875 | 0.860 | 0.857 | 0.860 | 0.838 | 0.856 | 0.859 | 0.837 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 50: Growth effects of dynamic credit indicators in $GEO_{centralnorth}$, 5-year moving averages, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| $log(INITIALGDP)$ | -0.00264 | 0.0302 | -0.0126 | -0.00289 | 0.0302 | -0.0131 | 0.0116 | 0.0299 | 0.00786 | 0.0117 | 0.0299 | 0.00791 |
| | (0.0594) | (0.0455) | (0.0602) | (0.0596) | (0.0455) | (0.0608) | (0.0379) | (0.0241) | (0.0372) | (0.0382) | (0.0242) | (0.0374) |
| $SCHOOL$ | -0.0257 | -0.0170 | 0.0355 | -0.0255 | -0.0170 | 0.0359 | -0.227 | -0.205 | -0.176 | -0.227 | -0.205 | -0.176 |
| | (0.197) | (0.166) | (0.180) | (0.197) | (0.166) | (0.180) | (0.155) | (0.128) | (0.150) | (0.155) | (0.129) | (0.150) |
| $log(GOV)$ | 0.0490 | 0.0152 | 0.0812 | 0.0493 | 0.0152 | 0.0818 | -0.0150 | -0.0394 | -0.00642 | -0.0151 | -0.0394 | -0.00645 |
| | (0.0511) | (0.0414) | (0.0542) | (0.0508) | (0.0414) | (0.0546) | (0.0506) | (0.0328) | (0.0512) | (0.0510) | (0.0329) | (0.0513) |
| $log(OPENNESS)$ | -0.000608 | -0.00857 | -0.00550 | -0.000580 | -0.00858 | -0.00555 | -0.0145*** | -0.0107*** | -0.0134*** | -0.0145*** | -0.0107*** | -0.0134*** |
| | (0.0103) | (0.00867) | (0.0115) | (0.0104) | (0.00871) | (0.0114) | (0.00444) | (0.00402) | (0.00451) | (0.00449) | (0.00401) | (0.00454) |
| $\Delta CREDIT_{tot}$ | 4.83e-06 | | | 4.81e-06 | | | 8.76e-06*** | | | 8.77e-06*** | | |
| | (3.50e-06) | | | (3.46e-06) | | | (2.14e-06) | | | (2.15e-06) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0368* | | | 0.0368* | | | 0.0478** | | | 0.0479** | |
| | | (0.0184) | | | (0.0185) | | | (0.0216) | | | (0.0218) | |
| $\Delta INV_{credit}$ | | | 0.0273 | | | 0.0274 | | | 0.0350 | | | 0.0349 |
| | | | (0.0333) | | | (0.0333) | | | (0.0304) | | | (0.0305) |
| $year_{>2001}$ | | | | -0.000411 | 7.41e-05 | -0.000830 | | | | 0.000313 | 0.000345 | 0.000488 |
| | | | | (0.00197) | (0.00168) | (0.00197) | | | | (0.00186) | (0.00149) | (0.00156) |
| Constant | -0.0118 | -0.109 | -0.124 | -0.0112 | -0.109 | -0.123 | 0.172** | 0.164** | 0.149** | 0.171** | 0.163** | 0.149** |
| | (0.238) | (0.187) | (0.214) | (0.239) | (0.187) | (0.215) | (0.0752) | (0.0653) | (0.0742) | (0.0751) | (0.0647) | (0.0737) |
| Observations | 255 | 269 | 235 | 255 | 269 | 235 | 255 | 269 | 235 | 255 | 269 | 235 |
| Number of Provinces | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| Adj. R-squared | 0.914 | 0.921 | 0.898 | 0.914 | 0.921 | 0.898 | 0.905 | 0.913 | 0.883 | 0.904 | 0.913 | 0.882 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 51: Growth effects of dynamic credit indicators in $GEO_{west}$, 3-year moving averages, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| $log(INITIALGDP)$ | -0.0807* | -0.0674* | -0.0650** | -0.0801* | -0.0670* | -0.0647** | -0.00462 | -0.00700 | -0.0171* | -0.00439 | -0.00831 | -0.0172* |
| | (0.0390) | (0.0314) | (0.0218) | (0.0382) | (0.0311) | (0.0220) | (0.0120) | (0.0109) | (0.00898) | (0.0120) | (0.0114) | (0.00895) |
| $SCHOOL$ | 0.0802 | 0.0906 | 0.0812 | 0.0807 | 0.0907 | 0.0825 | 0.0146 | 0.0212 | 0.0506 | 0.0140 | 0.0281 | 0.0511 |
| | (0.148) | (0.145) | (0.192) | (0.149) | (0.146) | (0.192) | (0.0748) | (0.0729) | (0.101) | (0.0745) | (0.0771) | (0.101) |
| $log(GOV)$ | 0.0565 | 0.0558 | 0.0589* | 0.0564 | 0.0557 | 0.0588* | 0.0105 | 0.0140 | 0.0247 | 0.0101 | 0.0160 | 0.0247 |
| | (0.0379) | (0.0356) | (0.0308) | (0.0378) | (0.0356) | (0.0309) | (0.0183) | (0.0169) | (0.0153) | (0.0182) | (0.0176) | (0.0153) |
| $log(OPENNESS)$ | -0.00739 | -0.00712 | -0.00218 | -0.00737 | -0.00713 | -0.00232 | 0.00248 | 0.000631 | 0.00580 | 0.00242 | 0.000273 | 0.00575 |
| | (0.00910) | (0.00704) | (0.0116) | (0.00911) | (0.00703) | (0.0118) | (0.00591) | (0.00459) | (0.00635) | (0.00590) | (0.00468) | (0.00640) |
| $\Delta CREDIT_{tot}$ | 0.00890* | | | 0.00869 | | | 0.00682 | | | 0.00638 | | |
| | (0.00449) | | | (0.00495) | | | (0.00507) | | | (0.00546) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0155 | | | 0.0153 | | | 0.0171 | | | 0.0171 | |
| | | (0.0220) | | | (0.0217) | | | (0.0235) | | | (0.0227) | |
| $\Delta INV_{credit}$ | | | 0.00809 | | | 0.00789 | | | 0.0135*** | | | 0.0134*** |
| | | | (0.00490) | | | (0.00482) | | | (0.00483) | | | (0.00462) |
| $year_{>2001}$ | | | | 0.000973 | 0.00115 | -0.00190 | | | | 0.00212 | 0.00177 | -0.00168 |
| | | | | (0.00340) | (0.00273) | (0.00342) | | | | (0.00396) | (0.00294) | (0.00316) |
| Constant | 0.277* | 0.209 | 0.227 | 0.274* | 0.207 | 0.226 | 0.126** | 0.111** | 0.150*** | 0.125** | 0.106* | 0.151*** |
| | (0.130) | (0.135) | (0.141) | (0.128) | (0.134) | (0.143) | (0.0504) | (0.0539) | (0.0512) | (0.0516) | (0.0554) | (0.0507) |
| Observations | 347 | 377 | 301 | 347 | 377 | 301 | 347 | 377 | 301 | 347 | 377 | 301 |
| Number of Provinces | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Adj. R-squared | 0.739 | 0.758 | 0.772 | 0.739 | 0.758 | 0.773 | 0.704 | 0.731 | 0.736 | 0.703 | 0.730 | 0.735 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 52: Growth effects of dynamic credit indicators in $GEO_{west}$, 5-year moving averages, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| $log(INITIALGDP)$ | -0.0753* | -0.0550* | -0.0579* | -0.0758* | -0.0548* | -0.0579* | -0.00774 | -0.0107 | -0.0156* | -0.00210 | -0.0142 | -0.0156* |
| | (0.0376) | (0.0278) | (0.0294) | (0.0374) | (0.0277) | (0.0295) | (0.0138) | (0.0121) | (0.00878) | (0.0118) | (0.0132) | (0.00879) |
| $SCHOOL$ | 0.0611 | 0.0980 | 0.0523 | 0.0608 | 0.0977 | 0.0520 | 0.0264 | 0.0459 | 0.0521 | 0.000668 | 0.0607 | 0.0519 |
| | (0.154) | (0.154) | (0.202) | (0.154) | (0.154) | (0.202) | (0.0930) | (0.0901) | (0.102) | (0.0782) | (0.101) | (0.102) |
| $log(GOV)$ | 0.0619 | 0.0571 | 0.0583* | 0.0619 | 0.0571 | 0.0583* | 0.0153 | 0.0192 | 0.0232 | 0.00660 | 0.0247 | 0.0232 |
| | (0.0382) | (0.0344) | (0.0309) | (0.0383) | (0.0344) | (0.0311) | (0.0207) | (0.0185) | (0.0147) | (0.0175) | (0.0204) | (0.0147) |
| $log(OPENNESS)$ | -0.00779 | -0.00631 | -0.00195 | -0.00784 | -0.00633 | -0.00194 | 0.00243 | -0.000295 | 0.00544 | 0.00353 | -0.00117 | 0.00544 |
| | (0.0110) | (0.00831) | (0.0145) | (0.0110) | (0.00831) | (0.0145) | (0.00725) | (0.00592) | (0.00713) | (0.00633) | (0.00630) | (0.00714) |
| $\Delta CREDIT_{tot}$ | 0.0188** | | | 0.0190** | | | 0.0161** | | | 0.0155** | | |
| | (0.00680) | | | (0.00710) | | | (0.00738) | | | (0.00787) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0123 | | | 0.0123 | | | 0.0185 | | | 0.0180 | |
| | | (0.0285) | | | (0.0285) | | | (0.0294) | | | (0.0288) | |
| $\Delta INV_{credit}$ | | | 0.0222** | | | 0.0222** | | | 0.0288*** | | | 0.0289*** |
| | | | (0.00998) | | | (0.0101) | | | (0.00902) | | | (0.00910) |
| $year_{>2001}$ | | | | -0.000974 | 0.000779 | 0.000203 | | | | -0.000518 | 0.00113 | 0.000534 |
| | | | | (0.00172) | (0.00150) | (0.00202) | | | | (0.00193) | (0.00148) | (0.00200) |
| Constant | 0.286* | 0.202 | 0.226 | 0.289** | 0.200 | 0.226 | 0.166*** | 0.151*** | 0.166*** | 0.180*** | 0.141*** | 0.165*** |
| | (0.131) | (0.137) | (0.165) | (0.131) | (0.137) | (0.165) | (0.0522) | (0.0485) | (0.0540) | (0.0455) | (0.0517) | (0.0541) |
| Observations | 320 | 353 | 275 | 320 | 353 | 275 | 320 | 353 | 275 | 320 | 353 | 275 |
| Number of Provinces | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Adj. R-squared | 0.738 | 0.763 | 0.765 | 0.738 | 0.763 | 0.765 | 0.703 | 0.740 | 0.726 | 0.702 | 0.739 | 0.725 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 53: Growth effects of dynamic credit indicators with dummy variable for regions, 3-year moving averages, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Dependent: $\Delta GDP_{real}$ | | | | | year<2001 | | | year>=2001 | |
| $log(INITIALGDP)$ | -0.0262** | -0.0294*** | -0.0518*** | -0.0144 | -0.00290 | -0.0314* | -0.0342*** | -0.0364*** | -0.0398*** |
| | (0.0106) | (0.00992) | (0.0121) | (0.0208) | (0.0180) | (0.0162) | (0.0109) | (0.0108) | (0.0121) |
| $SCHOOL$ | 0.0592 | 0.0405 | 0.0605 | -0.0452 | -0.0952 | -0.0515 | 0.0759 | 0.0616 | 0.0700 |
| | (0.0546) | (0.0529) | (0.0603) | (0.0970) | (0.0834) | (0.0979) | (0.0539) | (0.0498) | (0.0542) |
| $log(GOV)$ | 0.0415*** | 0.0476*** | 0.0776*** | 0.0277 | 0.0134 | 0.0504** | 0.0526*** | 0.0573*** | 0.0615*** |
| | (0.0151) | (0.0141) | (0.0169) | (0.0275) | (0.0235) | (0.0238) | (0.0166) | (0.0162) | (0.0179) |
| $log(OPENNESS)$ | -0.00773** | -0.00711** | -0.00772* | -0.00279 | 0.000386 | -0.00496 | -0.00304 | -0.00186 | -0.000741 |
| | (0.00366) | (0.00354) | (0.00439) | (0.00636) | (0.00564) | (0.00618) | (0.00453) | (0.00427) | (0.00494) |
| $\Delta CREDIT_{tot}$ | 6.85e-06*** | | | 0.0175 | | | 5.66e-06*** | | |
| | (1.31e-06) | | | (0.0133) | | | (1.05e-06) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0353*** | | | 0.0210 | | | 0.0325** | |
| | | (0.0120) | | | (0.0405) | | | (0.0132) | |
| $\Delta INV_{credit}$ | | | 0.0111* | | | 0.0273 | | | 0.00881 |
| | | | (0.00600) | | | (0.0324) | | | (0.00570) |
| $GEO_{centralnorth}$ | -0.0317*** | -0.0300*** | -0.0331** | -0.0347*** | -0.0292** | -0.0392** | -0.0187 | -0.0148 | -0.0121 |
| | (0.0115) | (0.0112) | (0.0137) | (0.0129) | (0.0118) | (0.0155) | (0.0130) | (0.0121) | (0.0137) |
| $GEO_{west}$ | -0.0220* | -0.0224* | -0.0315** | -0.0331* | -0.0255* | -0.0436** | -0.00584 | -0.00431 | -0.00294 |
| | (0.0134) | (0.0127) | (0.0154) | (0.0175) | (0.0150) | (0.0182) | (0.0124) | (0.0117) | (0.0137) |
| Constant | 0.107*** | 0.103*** | 0.125*** | 0.143*** | 0.154*** | 0.159*** | | | -0.0806 |
| | (0.0301) | (0.0321) | (0.0267) | (0.0390) | (0.0374) | (0.0480) | | | (0.0589) |
| Observations | 915 | 978 | 818 | 343 | 362 | 284 | 572 | 616 | 534 |
| Number of Provinces | 31 | 31 | 31 | 29 | 31 | 30 | 31 | 31 | 31 |
| Adj. R-squared | 0.792 | 0.801 | 0.802 | 0.736 | 0.748 | 0.779 | 0.791 | 0.801 | 0.774 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 54: Growth effects of dynamic credit indicators with dummy variable for regions, 5-year moving averages, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Dependent: $\Delta GDP_{real}$ | | | | | year<2001 | | | year>=2001 | |
| $log(INITIALGDP)$ | -0.0315*** | -0.0352*** | -0.0579*** | -0.0157 | 0.00328 | -0.0383 | -0.0349*** | -0.0310** | -0.0383*** |
| | (0.0118) | (0.0111) | (0.0132) | (0.0244) | (0.0193) | (0.0235) | (0.0133) | (0.0121) | (0.0139) |
| $SCHOOL$ | 0.0758 | 0.0523 | 0.0711 | -0.0225 | -0.102 | 0.00900 | 0.0866 | 0.0576 | 0.0771 |
| | (0.0568) | (0.0561) | (0.0650) | (0.121) | (0.0981) | (0.124) | (0.0615) | (0.0591) | (0.0640) |
| $log(GOV)$ | 0.0489*** | 0.0561*** | 0.0858*** | 0.0288 | 0.00529 | 0.0585* | 0.0519** | 0.0487*** | 0.0579*** |
| | (0.0168) | (0.0160) | (0.0186) | (0.0325) | (0.0258) | (0.0316) | (0.0203) | (0.0181) | (0.0207) |
| $log(OPENNESS)$ | -0.00867** | -0.00863** | -0.00925* | -0.00375 | 0.000364 | -0.0101 | -0.00191 | -0.000368 | 0.00124 |
| | (0.00395) | (0.00381) | (0.00475) | (0.00814) | (0.00708) | (0.00685) | (0.00539) | (0.00486) | (0.00581) |
| $\Delta CREDIT_{tot}$ | 6.70e-06*** | | | 0.0297 | | | 5.86e-06*** | | |
| | (1.42e-06) | | | (0.0243) | | | (1.27e-06) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0466*** | | | 0.0315 | | | 0.0482*** | |
| | | (0.0153) | | | (0.0641) | | | (0.0149) | |
| $\Delta INV_{credit}$ | | | 0.0246*** | | | 0.105*** | | | 0.0172* |
| | | | (0.00895) | | | (0.0324) | | | (0.00989) |
| $GEO_{centralnorth}$ | -0.0338*** | -0.0332*** | -0.0357** | -0.0375** | -0.0298** | -0.0489*** | -0.0167 | -0.0110 | -0.00780 |
| | (0.0123) | (0.0119) | (0.0145) | (0.0154) | (0.0139) | (0.0179) | (0.0139) | (0.0125) | (0.0144) |
| $GEO_{west}$ | -0.0246* | -0.0267* | -0.0359** | -0.0357* | -0.0268 | -0.0594** | -0.00400 | 0.000885 | 0.00249 |
| | (0.0144) | (0.0137) | (0.0165) | (0.0195) | (0.0165) | (0.0236) | (0.0137) | (0.0122) | (0.0141) |
| Constant | 0.135*** | 0.128*** | 0.141*** | 0.167*** | 0.184*** | 0.148*** | | | |
| | (0.0297) | (0.0306) | (0.0306) | (0.0457) | (0.0432) | (0.0526) | | | |
| Observations | 850 | 916 | 750 | 285 | 300 | 223 | 565 | 616 | 527 |
| Number of Provinces | 31 | 31 | 31 | 29 | 31 | 29 | 31 | 31 | 31 |
| Adj. R-squared | 0.820 | 0.832 | 0.837 | 0.685 | 0.707 | 0.830 | 0.806 | 0.824 | 0.787 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 55: Growth effects of dynamic credit indicators with dummy variable for regions, 3-year moving averages, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Dependent: $\Delta GDP_{real}$ | | | | | year<2001 | | | year>=2001 | |
| $log(INITIALGDP)$ | -0.00996 | -0.0265*** | -0.0553*** | -0.0175 | 0.00119 | -0.0258* | -0.0269*** | -0.0352*** | -0.0360*** |
| | (0.00862) | (0.00924) | (0.0123) | (0.0215) | (0.0163) | (0.0147) | (0.00980) | (0.0102) | (0.0115) |
| $SCHOOL$ | 0.00880 | 0.0213 | 0.0588 | 0.00139 | -0.0809 | -0.0555 | 0.0565 | 0.0509 | 0.0744 |
| | (0.0568) | (0.0551) | (0.0596) | (0.0903) | (0.0807) | (0.0858) | (0.0556) | (0.0581) | (0.0533) |
| $log(GOV)$ | 0.0183 | 0.0444*** | 0.0827*** | 0.0330 | 0.00924 | 0.0436** | 0.0419*** | 0.0560*** | 0.0553*** |
| | (0.0123) | (0.0136) | (0.0172) | (0.0286) | (0.0214) | (0.0200) | (0.0151) | (0.0158) | (0.0174) |
| $log(OPENNESS)$ | -0.00539* | -0.00641** | -0.00820* | -0.00481 | 0.000976 | -0.00349 | -0.00378 | -0.00174 | -0.00122 |
| | (0.00327) | (0.00317) | (0.00434) | (0.00568) | (0.00527) | (0.00555) | (0.00401) | (0.00418) | (0.00486) |
| $\Delta CREDIT_{tot}$ | 0.0488 | | | 0.191 | | | 0.0192** | | |
| | (0.0350) | | | (0.148) | | | (0.00761) | | |
| $\Delta CREDIT_{NFC}$ | | 0.140*** | | | 0.140** | | | 0.0636 | |
| | | (0.0289) | | | (0.0642) | | | (0.0421) | |
| $\Delta INV_{credit}$ | | | 0.0277*** | | | 0.0620 | | | 0.00335 |
| | | | (0.0107) | | | (0.0423) | | | (0.00756) |
| $GEO_{centralnorth}$ | -0.0154 | -0.0128 | -0.0312** | -0.0140 | -0.00641 | -0.0276 | -0.0151 | -0.00978 | -0.0150 |
| | (0.0126) | (0.0103) | (0.0145) | (0.0333) | (0.0119) | (0.0177) | (0.0123) | (0.0120) | (0.0133) |
| $GEO_{west}$ | -0.00469 | -0.00213 | -0.0276* | 0.00743 | 0.0113 | -0.0224 | -0.00303 | 0.000127 | -0.00395 |
| | (0.0129) | (0.0107) | (0.0154) | (0.0368) | (0.0169) | (0.0182) | (0.0117) | (0.0104) | (0.0132) |
| $\Delta CREDIT_{tot} * GEO_{centralnorth}$ | -0.0488 | | | -0.106 | | | -0.0192** | | |
| | (0.0350) | | | (0.135) | | | (0.00761) | | |
| $\Delta CREDIT_{tot} * GEO_{west}$ | -0.0446 | | | -0.192 | | | -0.0107 | | |
| | (0.0342) | | | (0.150) | | | (0.00802) | | |
| $\Delta CREDIT_{NFC} * GEO_{centralnorth}$ | | -0.109*** | | | -0.118** | | | -0.0382 | |
| | | (0.0295) | | | (0.0586) | | | (0.0459) | |
| $\Delta CREDIT_{NFC} * GEO_{west}$ | | -0.128*** | | | -0.181** | | | -0.0310 | |
| | | (0.0272) | | | (0.0887) | | | (0.0403) | |
| $\Delta INV_{credit} * GEO_{centralnorth}$ | | | -0.0158 | | | -0.0473 | | | 0.0157 |
| | | | (0.0211) | | | (0.0427) | | | (0.0286) |
| $\Delta INV_{credit} * GEO_{west}$ | | | -0.0286*** | | | -0.0725 | | | 0.00782 |
| | | | (0.0106) | | | (0.0452) | | | (0.00937) |
| Constant | 0.113*** | 0.0902*** | 0.122*** | 0.0832* | 0.123*** | 0.153*** | -0.0621 | -0.0961* | |
| | (0.0248) | (0.0315) | (0.0277) | (0.0429) | (0.0415) | (0.0476) | (0.0513) | (0.0556) | |
| Observations | 915 | 978 | 818 | 343 | 362 | 284 | 572 | 616 | 534 |
| Number of Provinces | 31 | 31 | 31 | 29 | 31 | 30 | 31 | 31 | 31 |
| Adj. R-squared | 0.794 | 0.803 | 0.803 | 0.745 | 0.750 | 0.789 | 0.791 | 0.801 | 0.774 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 56: Growth effects of dynamic credit indicators with dummy variable for regions, 5-year moving averages, estimated with Random Effects

| | RE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Dependent: $\Delta GDP_{real}$ | | | | | year<2001 | | | year>=2001 | |
| $log(INITIALGDP)$ | -0.00947 | -0.0306*** | -0.0611*** | -0.0240 | 0.00728 | -0.0416* | -0.0256** | -0.0294*** | -0.0363*** |
| | (0.00895) | (0.0100) | (0.0132) | (0.0269) | (0.0186) | (0.0218) | (0.0111) | (0.0113) | (0.0134) |
| $SCHOOL$ | 0.0104 | 0.0330 | 0.0704 | 0.0539 | -0.0795 | 0.0320 | 0.0579 | 0.0517 | 0.0854 |
| | (0.0595) | (0.0607) | (0.0647) | (0.120) | (0.103) | (0.113) | (0.0634) | (0.0692) | (0.0618) |
| $log(GOV)$ | 0.0175 | 0.0507*** | 0.0902*** | 0.0411 | 0.00207 | 0.0612** | 0.0386** | 0.0469*** | 0.0541*** |
| | (0.0128) | (0.0150) | (0.0185) | (0.0360) | (0.0251) | (0.0294) | (0.0171) | (0.0177) | (0.0202) |
| $log(OPENNESS)$ | -0.00580* | -0.00808** | -0.00983** | -0.00866 | 0.00115 | -0.0101 | -0.00326 | -0.000473 | 0.000295 |
| | (0.00339) | (0.00351) | (0.00473) | (0.00718) | (0.00680) | (0.00714) | (0.00429) | (0.00476) | (0.00555) |
| $\Delta CREDIT_{tot}$ | 0.0764 | | | 0.244 | | | 0.0340*** | | |
| | (0.0483) | | | (0.198) | | | (0.0129) | | |
| $\Delta CREDIT_{NFC}$ | | 0.175*** | | | 0.272** | | | 0.0922* | |
| | | (0.0345) | | | (0.112) | | | (0.0511) | |
| $\Delta INV_{credit}$ | | | 0.0401* | | | 0.144*** | | | 0.0107 |
| | | | (0.0216) | | | (0.0375) | | | (0.0112) |
| $GEO_{centralnorth}$ | -0.0103 | -0.0135 | -0.0351** | -0.00286 | 0.0230 | -0.0263 | -0.0112 | -0.00613 | -0.0162 |
| | (0.0147) | (0.0108) | (0.0159) | (0.0457) | (0.0246) | (0.0222) | (0.0126) | (0.0125) | (0.0140) |
| $GEO_{west}$ | -0.00128 | -0.000775 | -0.0313* | 0.0125 | 0.0431 | -0.0412* | -0.00103 | 0.00830 | 9.05e-05 |
| | (0.0147) | (0.0110) | (0.0168) | (0.0496) | (0.0305) | (0.0226) | (0.0121) | (0.0104) | (0.0138) |
| $\Delta CREDIT_{tot} * GEO_{centralnorth}$ | -0.0764 | | | -0.193 | | | -0.0340*** | | |
| | (0.0483) | | | (0.184) | | | (0.0129) | | |
| $\Delta CREDIT_{tot} * GEO_{west}$ | -0.0633 | | | -0.241 | | | -0.0169 | | |
| | (0.0469) | | | (0.200) | | | (0.0123) | | |
| $\Delta CREDIT_{NFC} * GEO_{centralnorth}$ | | -0.125*** | | | -0.277** | | | -0.0378 | |
| | | (0.0349) | | | (0.118) | | | (0.0558) | |
| $\Delta CREDIT_{NFC} * GEO_{west}$ | | -0.164*** | | | -0.347** | | | -0.0579 | |
| | | (0.0322) | | | (0.160) | | | (0.0467) | |
| $\Delta INV_{credit} * GEO_{centralnorth}$ | | | -0.01000 | | | -0.108*** | | | 0.0415 |
| | | | (0.0290) | | | (0.0390) | | | (0.0384) |
| $\Delta INV_{credit} * GEO_{west}$ | | | -0.0328 | | | -0.0841* | | | 0.00597 |
| | | | (0.0214) | | | (0.0502) | | | (0.0138) |
| Constant | 0.139*** | 0.110*** | 0.139*** | 0.0856 | 0.126*** | 0.143*** | -0.0356 | -0.0647 | |
| | (0.0220) | (0.0289) | (0.0313) | (0.0544) | (0.0477) | (0.0463) | (0.0515) | (0.0591) | |
| Observations | 850 | 916 | 750 | 285 | 300 | 223 | 565 | 616 | 527 |
| Number of Provinces | 31 | 31 | 31 | 29 | 31 | 29 | 31 | 31 | 31 |
| Adj. R-squared | 0.825 | 0.838 | 0.838 | 0.708 | 0.721 | 0.841 | 0.809 | 0.824 | 0.788 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 57: Growth effects of dynamic credit indicators with dummy variable for credit to GDP share, 3-year moving averages, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Dependent: $\Delta GDP_{real}$ | | | | $d(CREDIT/GDP) \leq 9$ | | | | | | $d(CREDIT/GDP) \leq 9$ | | |
| $log(INITIALGDP)$ | -0.0939*** | -0.0854*** | -0.100*** | -0.110*** | -0.0943*** | -0.106*** | -0.0174** | -0.0194*** | -0.0412*** | -0.00159 | -0.00353 | -0.0380*** |
| | (0.0234) | (0.0220) | (0.0232) | (0.0231) | (0.0214) | (0.0202) | (0.00780) | (0.00737) | (0.00976) | (0.00830) | (0.00831) | (0.0103) |
| $SCHOOL$ | 0.0875 | 0.0807 | 0.0783 | 0.0770 | 0.0619 | 0.0867 | 0.0584 | 0.0436 | 0.0616 | -0.000173 | -0.0226 | 0.0564 |
| | (0.0677) | (0.0652) | (0.0670) | (0.0758) | (0.0780) | (0.0736) | (0.0617) | (0.0600) | (0.0645) | (0.0650) | (0.0633) | (0.0717) |
| $log(GOV)$ | 0.105*** | 0.0987*** | 0.109*** | 0.133*** | 0.121*** | 0.137*** | 0.0287** | 0.0324*** | 0.0646*** | 0.00429 | 0.00796 | 0.0576*** |
| | (0.0248) | (0.0214) | (0.0204) | (0.0236) | (0.0206) | (0.0151) | (0.0122) | (0.0123) | (0.0157) | (0.0119) | (0.0122) | (0.0157) |
| $log(OPENNESS)$ | -0.00740 | -0.00789 | -0.00757 | -0.00827 | -0.00926 | -0.0119* | -0.000547 | -0.000536 | -0.000759 | 0.00160 | 0.00159 | -0.000273 |
| | (0.00604) | (0.00567) | (0.00623) | (0.00644) | (0.00607) | (0.00623) | (0.00261) | (0.00263) | (0.00294) | (0.00220) | (0.00201) | (0.00270) |
| $\Delta CREDIT_{tot}$ | 3.75e-06*** | | | 2.91e-06** | | | 5.98e-06*** | | | 5.90e-06*** | | |
| | (1.18e-06) | | | (1.39e-06) | | | (1.29e-06) | | | (1.56e-06) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0206 | | | 0.0165 | | | 0.0362** | | | 0.0453** | |
| | | (0.0151) | | | (0.0145) | | | (0.0182) | | | (0.0212) | |
| $\Delta INV_{credit}$ | | | 0.0154* | | | 0.00853 | | | 0.0217*** | | | 0.0186* |
| | | | (0.00827) | | | (0.0102) | | | (0.00819) | | | (0.00990) |
| $d10(CREDIT/GDP)$ | 0.00150 | 0.0108 | 0.00704 | | | | -0.0110 | 0.00511 | 0.00236 | | | |
| | (0.0118) | (0.00765) | (0.00975) | | | | (0.00678) | (0.00562) | (0.00825) | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{tot}$ | 0.0416 | | | | | | 0.0854*** | | | | | |
| | (0.0393) | | | | | | (0.0264) | | | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{NFC}$ | | -0.000952 | | | | | | -0.000270 | | | | |
| | | (0.0315) | | | | | | (0.0320) | | | | |
| $d10(CREDIT/GDP) * \Delta INV_{credit}$ | | | -0.0179 | | | | | | -0.0202* | | | |
| | | | (0.0126) | | | | | | (0.0115) | | | |
| Constant | 0.212** | 0.188** | 0.246** | 0.200** | 0.157* | 0.158 | 0.112*** | 0.106*** | 0.117*** | 0.142*** | 0.133*** | 0.129*** |
| | (0.0899) | (0.0850) | (0.113) | (0.0976) | (0.0925) | (0.100) | (0.0313) | (0.0329) | (0.0320) | (0.0261) | (0.0269) | (0.0335) |
| Observations | 870 | 910 | 795 | 776 | 808 | 712 | 870 | 910 | 795 | 776 | 808 | 712 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.796 | 0.799 | 0.807 | 0.799 | 0.802 | 0.817 | 0.792 | 0.796 | 0.802 | 0.798 | 0.800 | 0.816 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 58: Growth effects of dynamic credit indicators with dummy variable for credit to GDP share, 5-year moving averages, estimated with Fixed Effects and Random Effects

| | FE | | | | | | RE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Dependent: $\Delta GDP_{real}$ | | | | $d(CREDIT/GDP) \leq 9$ | | | | | | $d(CREDIT/GDP) \leq 9$ | | |
| $log(INITIALGDP)$ | -0.0990*** | -0.0871*** | -0.104*** | -0.119*** | -0.0994*** | -0.114*** | -0.0268*** | -0.0326*** | -0.0447*** | -0.0262** | -0.00363 | -0.0523*** |
| | (0.0231) | (0.0212) | (0.0229) | (0.0234) | (0.0207) | (0.0203) | (0.00927) | (0.00927) | (0.00997) | (0.0108) | (0.00847) | (0.0108) |
| $SCHOOL$ | 0.0903 | 0.0849 | 0.0804 | 0.0869 | 0.0761 | 0.0991 | 0.0800 | 0.0756 | 0.0702 | 0.0754 | -0.0295 | 0.0863 |
| | (0.0727) | (0.0691) | (0.0722) | (0.0797) | (0.0817) | (0.0750) | (0.0659) | (0.0625) | (0.0687) | (0.0739) | (0.0638) | (0.0730) |
| $log(GOV)$ | 0.110*** | 0.0993*** | 0.112*** | 0.144*** | 0.125*** | 0.144*** | 0.0428*** | 0.0525*** | 0.0703*** | 0.0411** | 0.00905 | 0.0790*** |
| | (0.0254) | (0.0209) | (0.0197) | (0.0258) | (0.0211) | (0.0150) | (0.0146) | (0.0152) | (0.0162) | (0.0162) | (0.0125) | (0.0164) |
| $log(OPENNESS)$ | -0.00753 | -0.00928 | -0.0104 | -0.00803 | -0.00975 | -0.0137* | -0.00127 | -0.00203 | -0.00170 | -0.000121 | 0.00145 | -0.00162 |
| | (0.00687) | (0.00651) | (0.00651) | (0.00746) | (0.00716) | (0.00690) | (0.00304) | (0.00313) | (0.00295) | (0.00317) | (0.00203) | (0.00298) |
| $\Delta CREDIT_{tot}$ | 3.61e-06** | | | 2.43e-06 | | | 5.88e-06*** | | | 5.85e-06*** | | |
| | (1.45e-06) | | | (1.71e-06) | | | (1.50e-06) | | | (1.69e-06) | | |
| $\Delta CREDIT_{NFC}$ | | 0.0330 | | | 0.0267 | | | 0.0449* | | | 0.0698*** | |
| | | (0.0219) | | | (0.0215) | | | (0.0230) | | | (0.0268) | |
| $\Delta INV_{credit}$ | | | 0.0296* | | | 0.0211 | | | 0.0379*** | | | 0.0316** |
| | | | (0.0158) | | | (0.0144) | | | (0.0145) | | | (0.0137) |
| $d10(CREDIT/GDP)$ | 0.00145 | 0.0106* | 0.00733 | | | | -0.00989* | 0.00659 | 0.00277 | | | |
| | (0.00887) | (0.00605) | (0.00888) | | | | (0.00550) | (0.00492) | (0.00756) | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{tot}$ | 0.0429 | | | | | | 0.0815*** | | | | | |
| | (0.0357) | | | | | | (0.0251) | | | | | |
| $d10(CREDIT/GDP) * \Delta CREDIT_{NFC}$ | | -0.00966 | | | | | | -0.00871 | | | | |
| | | (0.0324) | | | | | | (0.0313) | | | | |
| $d10(CREDIT/GDP) * \Delta INV_{credit}$ | | | -0.0279* | | | | | | -0.0308** | | | |
| | | | (0.0164) | | | | | | (0.0148) | | | |
| Constant | 0.254*** | 0.220** | 0.264** | 0.239** | 0.197* | 0.186 | 0.132*** | 0.119*** | 0.126*** | 0.141*** | 0.157*** | 0.132*** |
| | (0.0898) | (0.0910) | (0.118) | (0.0991) | (0.100) | (0.113) | (0.0329) | (0.0344) | (0.0318) | (0.0351) | (0.0243) | (0.0344) |
| Observations | 813 | 857 | 736 | 719 | 756 | 657 | 813 | 857 | 736 | 719 | 756 | 657 |
| Number of Provinces | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Adj. R-squared | 0.820 | 0.825 | 0.836 | 0.824 | 0.827 | 0.850 | 0.821 | 0.826 | 0.836 | 0.830 | 0.832 | 0.855 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 59: Investment effects of industry credit growth by industrial sector, 3-year moving averages, estimated with Random Effects

| | RE | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Dependent: | $\Delta INV_{tot}$ | $\Delta INV_{auto}$ | $\Delta INV_{energy}$ |
| $\Delta REV_{ind}$ | 0.599*** | 1.482** | -10.21 |
| | (0.151) | (0.683) | (10.40) |
| $\Delta CREDIT_{firm}$ | 0.00502 | 0.889*** | -1.912 |
| | (0.0155) | (0.150) | (2.047) |
| $\Delta STATECAP_{ind}$ | 0.0614 | -0.278 | -1.943 |
| | (0.0377) | (0.230) | (2.417) |
| $\Delta FORECAP_{ind}$ | -0.0404*** | -0.186 | -3.440 |
| | (0.0131) | (0.203) | (3.512) |
| $GEO_{centralnorth}$ | 0.0167 | -0.0845 | 0.995 |
| | (0.0111) | (0.0681) | (1.122) |
| $GEO_{west}$ | 0.0249** | -0.110 | 2.824 |
| | (0.0103) | (0.236) | (2.560) |
| Constant | 0.0797*** | 0.165 | 9.652 |
| | (0.0275) | (0.216) | (9.215) |
| Observations | 437 | 81 | 326 |
| Number of Provinces | 30 | 21 | 29 |
| Adj. R-squared | 0.568 | 0.868 | 0.185 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 60: Investment effects of industry credit growth by industrial sector, 5-year moving averages, estimated with Random Effects

| | RE | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Dependent: | $\Delta INV_{tot}$ | $\Delta INV_{auto}$ | $\Delta INV_{energy}$ |
| $\Delta REV_{ind}$ | 0.670*** | 1.121* | -3.272 |
| | (0.160) | (0.673) | (6.370) |
| $\Delta CREDIT_{firm}$ | 0.00844 | 0.899*** | -1.028 |
| | (0.0238) | (0.188) | (1.214) |
| $\Delta STATECAP_{ind}$ | 0.116** | 0.612 | 0.00924 |
| | (0.0570) | (0.907) | (1.605) |
| $\Delta FORECAP_{ind}$ | -0.0609*** | 0.470 | -5.028 |
| | (0.0106) | (0.757) | (5.190) |
| $GEO_{centralnorth}$ | 0.0222* | -0.0810 | 0.640 |
| | (0.0126) | (0.0980) | (0.781) |
| $GEO_{west}$ | 0.0245* | -0.227 | 1.796 |
| | (0.0129) | (0.290) | (1.674) |
| Constant | 0.0622* | 0.303 | 7.144 |
| | (0.0359) | (0.246) | (6.651) |
| Observations | 376 | 40 | 266 |
| Number of Provinces | 29 | 19 | 28 |
| Adj. R-squared | 0.653 | 0.972 | 0.195 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 61: Growth effects of investment by industrial sector, 3-year moving averages, estimated with Random Effects

| | RE | | |
|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) |
| $log(INITIALGDP)$ | -0.0310*** | 0.00447 | -0.0430*** |
| | (0.0101) | (0.0363) | (0.0137) |
| $SCHOOL$ | 0.0501 | 0.199** | 0.119** |
| | (0.0454) | (0.0963) | (0.0528) |
| $log(GOV)$ | 0.0488*** | 0.0285 | 0.0600*** |
| | (0.0147) | (0.0517) | (0.0183) |
| $log(OPENNESS)$ | -0.00511 | 0.00468 | -0.00532 |
| | (0.00327) | (0.00583) | (0.00464) |
| $\Delta INV_{tot}$ | 0.173*** | | |
| | (0.0277) | | |
| $\Delta INV_{auto}$ | | 0.0317*** | |
| | | (0.00915) | |
| $\Delta INV_{energy}$ | | | -0.000360*** |
| | | | (6.55e-05) |
| $GEO_{centralnorth}$ | -0.0292*** | -0.0115 | -0.0262* |
| | (0.0101) | (0.0204) | (0.0142) |
| $GEO_{west}$ | -0.0245** | 0.0269 | -0.0157 |
| | (0.0122) | (0.0275) | (0.0161) |
| Constant | 0.0920*** | 0.0330 | 0.195*** |
| | (0.0284) | (0.0989) | (0.0448) |
| Observations | 932 | 108 | 454 |
| Number of Provinces | 31 | 22 | 30 |
| Adj. R-squared | 0.820 | 0.944 | 0.826 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 62: Growth effects of investment by industrial sector, 5-year moving averages, estimated with Random Effects

| | | RE | |
|---|---|---|---|
| Dependent: $\Delta GDP_{real}$ | (1) | (2) | (3) |
| $log(INITIALGDP)$ | -0.0361*** | 0.0295 | -0.0444*** |
| | (0.0105) | (0.0479) | (0.0155) |
| $SCHOOL$ | 0.0641 | 0.310*** | 0.183*** |
| | (0.0464) | (0.0807) | (0.0544) |
| $log(GOV)$ | 0.0564*** | -0.00209 | 0.0599*** |
| | (0.0157) | (0.0677) | (0.0216) |
| $log(OPENNESS)$ | -0.00579 | 0.00190 | -0.00658 |
| | (0.00366) | (0.00683) | (0.00509) |
| $\Delta INV_{tot}$ | 0.196*** | | |
| | (0.0287) | | |
| $GEO_{centralnorth}$ | -0.0316*** | -0.0136 | -0.0278* |
| | (0.0109) | (0.0256) | (0.0154) |
| $GEO_{west}$ | -0.0270** | 0.0384 | -0.0175 |
| | (0.0128) | (0.0396) | (0.0179) |
| $\Delta INV_{auto}$ | | 0.0449*** | |
| | | (0.00220) | |
| $\Delta INV_{energy}$ | | | -0.000492*** |
| | | | (0.000130) |
| Constant | 0.127*** | -0.0927 | 0.181*** |
| | (0.0290) | (0.102) | (0.0639) |
| Observations | 870 | 60 | 389 |
| Number of Provinces | 31 | 21 | 30 |
| Adj. R-squared | 0.853 | 0.966 | 0.838 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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