Geachte heer Rector Magnificus,
Geachte heer Decaan,
Gewaardeerde collegas,
Dear friends and family

Financing future economic growth[1]

Let me start by explaining why economic growth matters to all of us.

Have a look around you right now. The things you see were produced by someone, so that you can now use them: the clothes you are wearing; the chairs and benches on which you are sitting; the electricity that powers the lights; the toilet that you might be dying to use; the sewage system that the toilet is connected to; the plane, train, car or bicycle that you took to get here.

At some point in the past these products were not available. Many people did not have access to the most basic goods and services. Things that we now take for granted.

Let's focus on the clothes you are wearing. I am sure many of them are made from cotton. In 18th century England, textile workers could only produce a limited amount of clothes in home-based "cottages". Clothing was handwoven and hand sewn, making it expensive and choice limited.

Then in 1764 James Hargreaves, an English inventor, invented the "Spinning Jenny". It was an engine for spinning wool or cotton and could be operated by unskilled workers. It could spin many spindles at a time dramatically reducing the effort needed to produce cloth.

In 1769 Richard Arkwright patented the "Water Frame". This machine was powered by water rather than manual labour. It produced a stronger and better thread than the Spinning Jenny.

Finally, in 1779, Crompton's "Mule" was invented. This multi-spindle machine combined elements of both Water Frame and Spinning Jenny to enable large-scale manufacturing of high-quality thread.

These three inventions changed the textile industry in England and moved it from the cottage industry to a factory system where textile could be mass-produced. It was the start of the First Industrial Revolution.

The new machines, power sources and ways of organizing work made the textile industry more productive and efficient. Textile could now be produced at a lower cost and the price of clothing dropped. Wages rose as the demand for labour went up. The British economy

[1] The views expressed herein are my own and should not be attributed to the Bank of England or its Policy Committees.

grew and living standards improved not only for the elite, but for virtually all parts of society. The First Industrial Revolution marked the beginning of the modern world.

I am telling you this as it is a stark example of economic growth. And why it matters.

But what do we exactly mean when we speak of economic growth?

Since World War II we measure economic growth by Gross Domestic Product (GDP). GDP measures the value of all goods and services produced in a country in a given period. Growth in GDP expands the overall size of the economy. Broadly shared growth in per capita GDP, increases the material standard of living of the typical household in a country.

American economist Simon Kuznets created GDP as a metric for economic growth during the Great Depression. He did so at the request of the US government. It was a time when only limited data were available and he constructed a simple metric that one could calculate with these data.

GDP is not a perfect measure, as Kuznets was the first to admit. For one thing, there are many forms of economic activity that GDP doesn't measure. A parent that participates in the paid labour force contributes to GDP, one who stays home to take care of children does not. For another, it fails to measure many things that affect our wellbeing, like health, education, equality of opportunity or levels of environmental degradation. In fact, some activities increase GDP but with important negative consequences. For example, cutting down parts of the Amazon rain forest and selling the timber increases Brazil's GDP but at a huge environmental cost. Finally, GDP is notoriously difficult to actually measure.[1]

The way we measure economic growth has its flaws and increasing output is not an end in itself. However, it is now well-established that economic growth is vitally important as a means to fuel social progress. It is the most powerful instrument we have for reducing poverty and improving quality of life.[2] Economic growth is the reason why infant mortality rates have fallen, why we live longer and healthier lives and why educational standards have risen.[3]

Drivers of economic growth

So what drives economic growth?

Broadly speaking there are two main sources of economic growth. One, growth in inputs used in the production process: capital and labour. Two, better use of these inputs: so-called productivity growth. Either can increase the overall size of the economy. Productivity growth, however, allows people to achieve higher material standards of living without having to work more hours. So, what we tend to care more about is productivity growth.

How can we achieve this?

The first driver is an obvious one: Ideas. Without ideas - without innovation – it is not possible to increase productivity.[4] When James Hargreaves invented the Spinning Jenny he

moved what we call the technology frontier. The same amount of labour could now produce more cotton thread. In other words, labour productivity increased and so did the overall size of the economy.

But innovation alone is not enough. For sustained economic growth, more is necessary. Which brings me to the second driver: Institutions.[5]

Institutions include things like contracts and contract enforcement, protection of property rights, rule of law, social safety nets, government bureaucracies and central banks. But also social norms, traditions and codes of conduct. In the words of Nobel Prize laureate Douglass North: "Institutions are the rules of the game in a society, […] the humanly devised constraints that structure political, economic and social interactions […]."[6]

Institutions are important for economic growth because they influence economic incentives in a society. They determine whether engaging in an economic activity is feasible and profitable. For example, without property rights, firms would not want to invest in R&D.

Institutions can also play a stabilizing role to the disruptive forces of innovation. Innovations can lead to a significant loss of livelihood for workers whose skills are not needed anymore. Think for example about your supermarket. Self check-out technologies have reduced the demand for checkout clerks. Or the introduction of the ATM in the 1960s. This made it much easier for you to access your money, but it reduced the demand for bank tellers. Institutions can reduce adjustment costs faced by these displaced workers, for example through social safety nets and training schemes.

A large number of empirical studies provide strong support for the importance of institutions in predicting the level of development in countries around the world.[7] From this research it is clear: institutions matter for economic growth.

So ideas and institutions are necessary for economic growth. But they are not sufficient. This brings me to the third driver: Finance. On this topic I worked for most of my career and the rest of my lecture I will focus on it.

Finance and growth

To understand the role of finance in economic growth, let me start by sharing a story that greatly influenced my academic career. A story that explains why I am standing here today talking to you about the importance of finance for future economic growth.

As a Phd student I worked at the World Bank. I had a strong interest in the problems developing countries face and was keen to understand the forces that contribute to economic development. In my mind, what mattered for development were things like health care, education, food security, employment opportunities and well-functioning institutions. Probably, the last thing on my mind was the need for finance.

At the time, I was working on one of the annual World Bank flagship publications, which kept track of all financial flows going in and out of the developing world. My task was to

monitor banks. I knew nothing about banks and was also not interested in them as in my mind they had nothing to do with development. It is fair to say I was somewhat disillusioned to have to work on something so seemingly irrelevant. I was young … and slightly foolish.

Then one day I attended a seminar by a CEO of a South African bank. He told a story that forever changed the way I thought about development. It was a story of a young entrepreneur in South Africa. This entrepreneur was producing a fabric that could be used in clothing for firefighters. An American company wanted to buy this fabric and he had a signed contract with them to produce it. The order was big and the amount of fabric that he had to produce was much larger than he was able to do with the machines he had.

So, he needed to invest to increase his productive capacity. He did not have enough savings himself, nor was he able to borrow from his friends or family. So he went to his bank, contract in hand, and asked for a loan. As I will explain later, not entirely surprising, his bank turned him down; telling him the risk was too high. He went to several other banks. They all turned him down. In the end, he had to tell the American company he could not produce the amount of fabric requested within the given timeframe. He lost the contract.

This young entrepreneur had a viable business and clearly a good product. He had signed a contract with a reputable company. Had he been able to get the loan and buy more machines, he could have hired more people to work for him. These employees would earn wages that they could spend on products from other businesses or that they could use for their children's education. Many people would be better off and economic growth would naturally occur. Unfortunately, none of this happened, as no bank was willing to give this young entrepreneur a loan.

Clearly, this is only one story, and a story told by someone who might not be entirely objective. But a few years earlier, the economics profession had started to wake-up to the realization that finance matters for economic growth. In a ground-breaking paper Professors Robert King and Ross Levine showed that countries with initial higher levels of financial development – measured by credit to the private sector divided by GDP - grow faster in the next 30 years.[8] In their study they use cross-country regressions which makes it hard to say anything about cause and effect. But in the years that followed many studies, using more sophisticated techniques, and more detailed firm- and household level data, provide ample evidence that finance matters for economic growth.[9]

But what about the Global Financial Crisis? Or, the unbridled growth in unsustainable and risky mortgage lending to that led up to it. That was not good for economic growth, I hear you think.

And you are right. In fact, this year's Nobel Prize in Economics was awarded to Ben Bernanke, Douglas Diamond and Philip Dybvig for offering important insights into the beneficial role banks play in the economy. But also for showing how their vulnerabilities can lead to devastating financial crises.

To understand this hybrid relationship, let's first have a closer look at how finance can have a positive impact on economic growth. For simplicity, I'll focus on one type of financial institution: banks. And one part of the economy: firms.

Finance and growth mechanisms

Let's start with having a closer look at what banks do.

The most basic function of a bank is to take savings from people with money, pool them together, and lend them to those who need money. Banks act as an intermediary between you and I (the depositors) and firms that need money to invest in long-term, risky projects. In so doing, banks transform short-term claims on the public into long- term investments.

Diamond and Dybvig, our Nobel Prize winners, showed that this so-called maturity-transformation is the most efficient arrangement, but that it also has an inherent vulnerability: bank runs may arise.[10]

Besides pooling savings, banks play an important role in allocating these funds. It is costly to evaluate firms, managers and market conditions and to decide which are the most promising firms and projects. Without banks, investors would have to undertake this costly process themselves. Banks can do it more efficiently and effectively. This is especially the case when they already have a relationship with the firm or know the industry in which it operates well. In other words, banks are better able to gather relevant information and assess risks.[11]

The presence of banks should thus ensure that more money is available at lower cost. If entrepreneurs and firms can draw on such external sources of funding instead of relying on their own savings and profits, they should be able to expand more rapidly and as a result the economy will grow.[12]

The presence of banks should also ensure that firms with the most promising growth opportunities get funding and this should spur technological innovation and productivity growth.[13] Indeed, there is growing consensus in economics that banks, among other parts of the financial system, play a central role in spurring technological innovation. Research shows that banks help allocate capital to those firms with the greatest potential to implement and commercialize promising new ideas and technologies.[14] By providing credit to firms to finance research, they can also actively shape the nature of R&D that is undertaken. Finally, access to bank credit enables firms to import and implement new foreign technologies.[15]

All of this benefits economic growth.

Is money flowing to the right firms?

Banks thus play an important role deciding which firms get to use society's savings. A key question then is: whom do they allocate credit to? If money flows to the most productive

firms, this will be good for economic growth. If it flows to less productive firms, it could put a brake on it.

Let's start by looking at different types of firms. In particular, let's compare a large, publicly listed corporation like Philips and a small business like your neighbourhood restaurant.

Obviously, when a bank gives out a loan it will want to see that loan repaid. To raise the chance of this happening, two things matter for the bank.

First, in order to assess risk accurately, a bank will need reliable information about the firm and its growth prospects. This is much easier to acquire for a large, publicly listed firm like Philips. Such firms must write extensive annual reports about their financial situation. Financial analysts often track these firms and write independent reports about them. So a lot of information is available to a bank to base lending decisions on. We call this type of information "hard information".

Smaller firms, by contrast, only need to submit an abbreviated balance sheet and limited explanatory notes in their annual financial statements. As a result, only limited hard information is available to the bank and these firms are "informationally opaque".

A bank will try to supplement the balance sheet information with what we call "soft information". This type of information is produced within a bank relationship. It is qualitative and non-verifiable. For example, when a loan officer repeatedly interacts with a business owner it will learn about the firm's creditworthiness. The quality of soft information depends on the length of lending relationship, but also on the bank's business model. Some banks invest heavily in this type of information gathering. We call these banks "relationship banks".

Besides reliable information, the second thing that matters is a guarantee. A bank will want to have some kind of guarantee that it will receive its money back, even when the borrower does not repay the loan as agreed. This guarantee can be in the form of collateral the firm pledges, such as equipment, inventory or real estate. But also a firm's past and future cash flows can act as a guarantee.[16] Overall, it is easier for corporations like Philips to provide banks with such guarantees, as they have more useable collateral to pledge.

As a result, banks are much more willing to give credit to large firms like Philips. Small and medium-sized enterprises (SMEs), especially young ones, find it much harder to obtain credit. And if they do get a loan, it tends to have a shorter maturity, a higher interest rate and requires more collateral.[17] These SMEs are therefore more often credit constrained, and so lack sufficient finance to undertake their desired activities. Like our young South African entrepreneur.

Why could this potentially be a problem for economic growth? Well, in many countries, SMEs account for the lion's share of employment and output and especially young SMEs tend to be the drivers of innovation and productivity growth.[18] So the allocation of credit

between large, established firms and small, young firms might not be optimal for overall economic growth. I will return to this later.

Is money flowing to the right industries?

We have established that banks tend to favour lending to large, publicly listed firms over lending to SMEs. But what about the sectors they lend to? Which sectors do they favour and does that matter for economic growth?

For this let's look at credit booms, periods in which credit to the economy expands rapidly. For example, the period leading up to the Global Financial Crisis. Credit booms coincide with high economic activity and strong output growth. However, some of these booms end in a financial crisis and a sharp slowdown of economic growth (bad booms) and others do not (good booms).[19]

What distinguishes one from the other? In good credit booms, credit flows to the most productive sectors. These booms reflect or drive improvements in productivity. Therefore they positively affect future productivity and economic growth.[20]

In bad credit booms money is instead channelled to relatively unproductive sectors. The economy temporarily grows during such credit booms, but aggregate future productivity will be lower as money is moving away from the most productive sectors. These booms often coincide with an easing of lending standards and banks engage in riskier lending.[21] This makes the economy more vulnerable to the reversal in credit supply which will inevitably happen.

One of my co-authors, Karsten Muller, together with Professor Emil Verner collected an impressive dataset capturing credit cycles for 117 countries going back to the 1940s.[22] They show that the likelihood of a credit boom ending in a financial crisis is much higher when money flows to relatively unproductive sectors such as construction and real estate. The risk of a bust is even larger when this happens alongside rapid credit growth to households. This is exactly what happened in the run up to the Global Financial Crisis.

Cost of financial crisis

When a bad credit boom ends in a financial crisis, the cost to the economy can be large, enormous even when the crisis is as big as the global financial crisis. These (short-term) costs include large stock market losses, increased unemployment, falling house prices and a surge in government debt needed to bail out banks and provide support to households and businesses.

But let's hone in on the cost to firms. When a financial crisis hits, banks tend to suddenly reduce their credit supply and become much choosier in who they are lending to. There are several reasons for this. First, crises generate uncertainty about the trajectory of the economy. This makes it much harder for banks to assess the riskiness of a loan. Second, during a crisis the net worth of firms and the value of their collateral drops, making it harder

for them to give the bank a sufficient guarantee. Third, banks are themselves borrowers as well. They must raise funds in order to make loans. If banks suffer losses on the loans they made, it will be more difficult for them to attract new funding. These banks have no choice but to curb their lending. Some of them might even collapse.

So what do banks do, at least those who remain alive, when a crisis hit? In a paper with my long-term co-author Ralph de Haas we look at this question by studying the cross-border lending behaviour of banks during the Global Financial Crisis.[23] We show that banks do not blindly run for the exit. Instead, they actively reallocate their lending.

We find that banks were more likely to continue lending to countries that were geographically close, where they had more lending experience, and where they operated a subsidiary. These lending relationships had one critical thing in common: the bank was privy to a relatively large amount of information about the borrowers. I suspect this does not come as a big surprise to you given what I just told you about the importance of information for banks.

Others confirmed the importance of information in domestic contexts for various countries. These studies show that during the Global Financial Crisis, banks reduced credit especially to smaller and younger firms and to those with shorter lending relationships.[24]

In fact, relationship lending played a critical role in alleviating credit constraints for smaller firms. In another paper with Ralph de Haas, this time together with Professors Thorsten Beck and Hans Degryse, we show that banks specializing in gathering soft information, the so-called relationship lenders, were more likely to continue lending to these firms.

Still, financial crises always coincide with sharp reductions in credit and this has important implications. Our other Nobel Prize winner, Ben Bernanke, who incidentally happened to be the Chairman of the Federal Reserve Board when the Global Financial Crisis started, received the Nobel Prize for highlighting these negative effects. He showed that the Great Depression of the 1930's became so deep and protracted in large part because bank failures destroyed valuable banking relationships. The resulting contraction in credit supply left significant scars in the real economy.[25]

Why is that the case? If firms rely on banks to finance their investment or working capital, they must suddenly make do with less money. This naturally affects their ability to do business and can even lead to bankruptcies.

This is not necessarily a bad thing. Crises can expedite the removal of unproductive firms and new, more productive firms can enter the market. When this happens, a productivity-enhancing reallocation of resources will take place. But, stronger credit frictions can push economic growth down if otherwise healthy and productive firms cannot grow or new firms do not enter. These negative effects can last for much longer than the crisis itself.

For example, Professors Petr Sedlacek and Vincent Sterk, two former MInt Phd students, show that during the Great Recession not only a smaller number of startups entered the US

economy, but those that did enter also created less jobs over their life-cycle. Business cycle conditions at entry can thus have long-lasting effects on the growth potential of firms. [26]

While financial crises are hard on large firms too, SMEs tend to be hit by a double whammy. Not only do they often lose access to credit. They are also more vulnerable to the sudden fall in demand which often accompanies a financial crisis. As a result they often experience a much sharper income decline.

One can thus say that SMEs are a bit screwed when a financial crisis hits. But there seems to be at least one saving grace: having cash on your balance sheet. As my friend and serial entrepreneur Tomas once said: "During a crisis cash is everything!" With my Bank of England co-authors Andi Joseph and Christiane Kneer, I show that indeed that is the case. During the Global Financial Crisis, cash-rich SMEs in the UK were able to continue to invest while their rivals without cash had to divest. When the recovery set in, the cash-rich firms were in a much better position and could keep outperforming their rivals for many years to come.

Financing future economic growth

Let's now turn our attention to the future. We all know the world is facing challenging times. High levels of inflation, a war on the European continent and climate change. These are big challenges with no easy solutions.

Let's first talk about inflation. Productivity affects inflation. A more productive workforce produces more goods and services at a lower cost per unit. This lowers prices. Productivity growth can thus help bring inflation down. This is particularly important when the workforce shrinks as seems to be happening right now. We have all seen the signs "staff wanted" in the windows of many shops and restaurants.

However, many advanced countries have experienced a slowdown in productivity growth since the Global Financial Crisis.[27] What this means is that workers today produce roughly the same amount in 1 hour as a similar worker 10 years ago.

The economics profession has been thinking quite a bit about this so-called "productivity puzzle" and its close companion the "investment puzzle". But the phenomenon is not well understood. And, as with so many things in economics, we have not yet reached consensus as to what the key drivers are. Several explanations have been proposed. These include a decline in competition, shareholder activism and short-termism, and rising investment in intangibles, such as R&D, software and branding.[28]

But there is another driver, which in my view needs more attention: financial frictions facing startups and SMEs.

You know by now that it's harder for SMEs to access bank credit, that banks more likely cut credit when a crisis hits and that high cash balances can help SMEs to weather the storm.

But it turns out that the economics profession still barely understands how SMEs actually finance themselves.

Most of us, including myself until recently, think that a large share of SMEs finance themselves with bank debt. However, in a new paper with Vasso Ioannidou and my Bank of England colleagues Sudipto Karmakar and Elena Markoska, I show that in fact a very large share of UK SMEs don't have any debt: before the covid-pandemic a staggering 80 percent.

In fact, the share of what we call "debtless SMEs" has steadily increased since the beginning of the 21st century. An international comparison for SMEs is not yet available, but data for publicly listed firms indicate that the trend is not exclusively an UK phenomenon. The share of publicly listed firms without debt has increased in several advanced countries, including the Netherlands.[29]

Why are so many SMEs in the UK debtless? Perhaps a cultural bias against debt, with British entrepreneurs not liking loans. The fact that the UK has a common law system could be another reason. Common law better protects shareholders and creditors and puts more risk at the borrower. However, as both culture and legal systems don't change much over time this cannot explain the upward trend.

What about a change in industry composition? Perhaps the "debtless firm" phenomenon is due to the growth of industries that traditionally rely less on debt. Or, perhaps the rise of the gig economy generated an influx of micro firms, which tend to be self-financed.

While these changes in industry composition likely play a role, a quick look at the data suggest more is going on. As you can see, the upward trend intensified during the Global Financial Crisis. This gives us some clue. It suggests a growing reluctance of UK banks to allocate credit to the smallest and youngest firms. This can have important implications for productivity and economic growth.

Let me offer another story. My partner Graeme owns a successful medium-sized business that never had any debt. The business is more than 20 years old and been profitable since its incorporation. It has plenty of savings and owns valuable equipment that can be used as collateral. At least in theory, it should be easy for his business to get a loan.

When I quizzed Graeme about why he didn't have any debt, he told me that he once tried to get a loan to buy a property for his business. Financially it would have made a lot of sense. The monthly mortgage payments would be much lower than the monthly rent he was paying for his office space. His bank was willing to give him the loan. But he would have had to supply a large down payment and still have a significant amount of cash left on his balance sheet. On top of that, he had to provide the bank with a personal guarantee, meaning that if his business went bankrupt, he would lose his house as well. Surely that was not a risk he (and presumably many other small business owners) was willing to take. In the end, he did not buy the property, and continues to pay a large sum of rent every month.

From the outside, it is hard to determine why his bank put up such strict borrowing conditions. But if Graeme had been able to borrow, his business would have saved a lot of money over time. He could have used this money to grow his business. He could have hired more staff and invest in new technologies to increase the productivity of his workforce. The resulting increase in output would have contributed to the growth of the UK economy.

This is only one anecdote, but given the very large and rising share of debtless SMEs in the UK, his is unlikely an exceptional story. If even in countries with highly developed financial systems many high-potential SMEs do not get funding that allows them to invest and grow to their optimal level, that has big consequences for economic growth. The growing share of debtless SMEs is potentially an important contributing factor to the slowdown in productivity growth.

Since the Global Financial Crisis, the economics profession has paid closer attention to SMEs. The emergence of detailed firm-level data covering not only publicly listed firms but also the smaller firms in the economy, has allowed us to learn a great deal about how SMEs react to shocks and the specific challenges they face.

However, this literature has almost exclusively focused on SMEs with debt. Given the large number of debtless SMEs, in the UK and presumably in other countries as well, there is an urgent need to widen our scope. Why do so many SMEs remain debtless? How much does this affect their ability to invest, grow and innovate?

This is even more important given the challenges to climate change that we are facing. As I said at the beginning of my lecture: GDP is a flawed measure of economic growth and output growth is clearly not an end in itself. The climate crisis we face makes this all the clearer. We urgently need to start working towards a more sustainable economy, including making the transition towards net-zero. Innovation and implementation of new technologies will be crucial to reach this goal.

SMEs face a significant challenge. We still know very little about their financing needs, but the funds to adapt to a climate-neutral economy are likely significant.[30] Who is going to provide this funding when SMEs are either reluctant or unable to turn to banks for loans?

These important challenges require the attention of the economics profession. But they also require policy makers to start focusing more on the supply side. Governments can encourage highly productive start-ups entering by giving them tax incentives as I show in a recent paper with Ralph de Haas and Vincent Sterk. Public investment can be part of the solution as can the development of strategic plans for different parts of the economy.

Finally, financial innovation might need to play an important role. Given its role in the global financial crisis, financial innovation is often looked upon with scepticism. But financial innovation does not need to be bad and might very well be necessary for sustainable long-run economic growth. Without appropriate financial innovation, our financial systems may become less effective at identifying and financing firms with the most promising growth opportunities.[31] The challenge is to support financial innovation that contributes to

sustainable long-term economic growth, while ensuring the stability of the financial system as a whole.

Our world is changing and we face big challenges. But these challenges also give us opportunities. The opportunity to create a dynamic, nimble economy that encourages innovation. The opportunity to redefine what we think economic growth should entail. And the opportunity to move towards a sustainable economy with more focus on equal opportunity. As Albert Einstein once said: “In the middle of difficulty lies opportunity.”

I have now come at the end of my lecture. But before I let you go, I want to take the opportunity to thank all of those who directly or indirectly contributed to my appointment as professor of Financial Economics at the University of Amsterdam. A few should be mentioned by name: Roel Beetsma and Han van Dissel, the current and former Dean of the Faculty of Economics and Business; the Executive Board of the University of Amsterdam; my Phd supervisors Henk Jager and Stijn Claessens; my colleagues of the MInt group and the Bank of England; my co-authors; my dear family and friends, my partner Graeme; and especially my mom and dad who have always supported me in every way they could.

Ik heb gezegd.

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[1] Stiglitz, Sen & Fitoussi (2009)
[2] Dollar, Kleineberg & Kraay (2013)
[3] Stiglitz, Sen & Fitoussi (2009)
[4] For example, Romer (1990) describes a theoretical model of growth based around innovation.
[5] See, among others, Smith (1776), Mill (1848), Coase (1960), North (1991).
[6] North (1991)
[7] Hall & Jones (1999); Acemoglu, Johnson & Robinson (2001)
[8] King & Levine (1993)
[9] See Popov (2018) for an extensive literature review

[10] Diamond & Dybvig (1983)
[11] Another function that banks perform is monitoring investments and exerting corporate governance after providing capital to firms.
[12] Evidence for this mechanism was first provided by Rajan & Zingales (1998). They show that industries that for technological reasons depend more on external finance grow faster in countries with a more developed financial sector.
[13] Schumpeter (1912)
[14] King & Levine (1993); Levine (1997); Brown, Fazzari & Petersen (2009); Comin & Nanda (2019)
[15] Bircan & De Haas (2020)
[16] Lian & Ma (2021)
[17] Chodorow-Reich et al. (2021)
[18] Haltiwanger, Jarmin & Miranda (2013); Acemoglu et al. (2018)
[19] See for example, Schularick & Taylor (2012); Jordà et al. (2013)
[20] Coimbra & Rey (2017); Gorton & Ordonez (2020)
[21] Dell'Ariccia, Igan & Laeven (2012)
[22] Muller & Verner (2022)
[23] De Haas & Van Horen (2013)
[24] Iyer et al. (2014); Ongena, Peydro & Van Horen (2015)
[25] Bernanke (1983)
[26] Sedlacek & Sterk (2017)
[27] See, for example, Gordon (2012) and, for a recent survey, Fernald & Inklaar (2022)
[28] Akcigit & Ates (2021), Syverson (2017); OECD (2015); Gutierrez & Philippon (2017)
[29] Bessler et al. (2013)
[30] OECD (2021)
[31] Laeven, Levine & Michalopoulos (2015)