The PUFFIN Project

Briefing pack for participants

Priming public sector financial institutions for the green t[redacted]

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2. Macro finance and the climate crisis

In most advanced economies central banks are the only institutions with formal powers to influence the flow of new money and credit in the economy. They also have responsibility over large swathes of financial regulation and their powers enable them – should they choose – to influence the allocation of private sector credit and financial flows generally.

But while central banks have played an increasingly interventionist role in our economies since the financial crisis, this has not coincided with any significant adjustment of their policies in - osion of research and policy analysis by central banks in this field with a particular emphasis on the ways in which climate-related financial risks (CRFR) stability mandates.[5]

1.1

Central banks are public institutions and their mandates are usually determined by governments. Since the 1990s their mandates have been strongly focused on price stability, typically an has been on acceptance that this must be balanced at all times with ensuring financial stability. One of the key lessons of the crisis was that price stability can coincide with the build-up of excessive financial risk. A recent global survey found that only
29% are mandated to support the government's policy priorities, which in most cases include sustainability goal. [6]

Since the 1990s, most central banks in advanced economies have been granted 'operational independence', meaning they are free to apply their toolkit to pursue the goals set by politicians in

1) Monetary policy, which involves influencing the flow of money and credit in the economy in order to achieve price stability (i.e. preventing excessive inflation or deflation). This is

   assets (such as government or commercial bonds) via central bank money creation. The

   Easing programs.

2) Financial regulation, which defines the rules for financial institutions at bo[redacted] level (prudential policy) and at the systemic level (macroprudential policy) to safeguard [redacted]se of defaults. It may also include [redacted] lending.

1.2 -[redacted]

[redacted]finance focuses on capital markets and the [redacted] .[7] [redacted]we summarise some of the key reaso
the green transition.

1.2.1 Central banks are public institutions with a responsibility to support wider public objectives

Although their primary objectives are predominantly pri[redacted] banks also have secondary objectives around supporting the general objectives of government. The rapid transition to a zero-carbon economy is one such objective, as is mandated by the 2015 Paris Agreement.

The role [redacted] — primarily to help [redacted]ote local economic activity.[8] Over time, the roles and responsibilities of central banks have ebbed and flowed in [9].

[redacted]20th century, central banks have had a range [redacted] their mandates. These included high or full employment, managing and reducing government [redacted] financial stability.[10] For example, c
support post-[redacted] enterprises.[11]

Central bank responsibilities have always been focused on the economic context and challenges at hand. Since c
economies, there is a strong argument that it should be integral to central bank policy agendas, even aside from the legal obligations facing all signatories to the Paris Agreement.

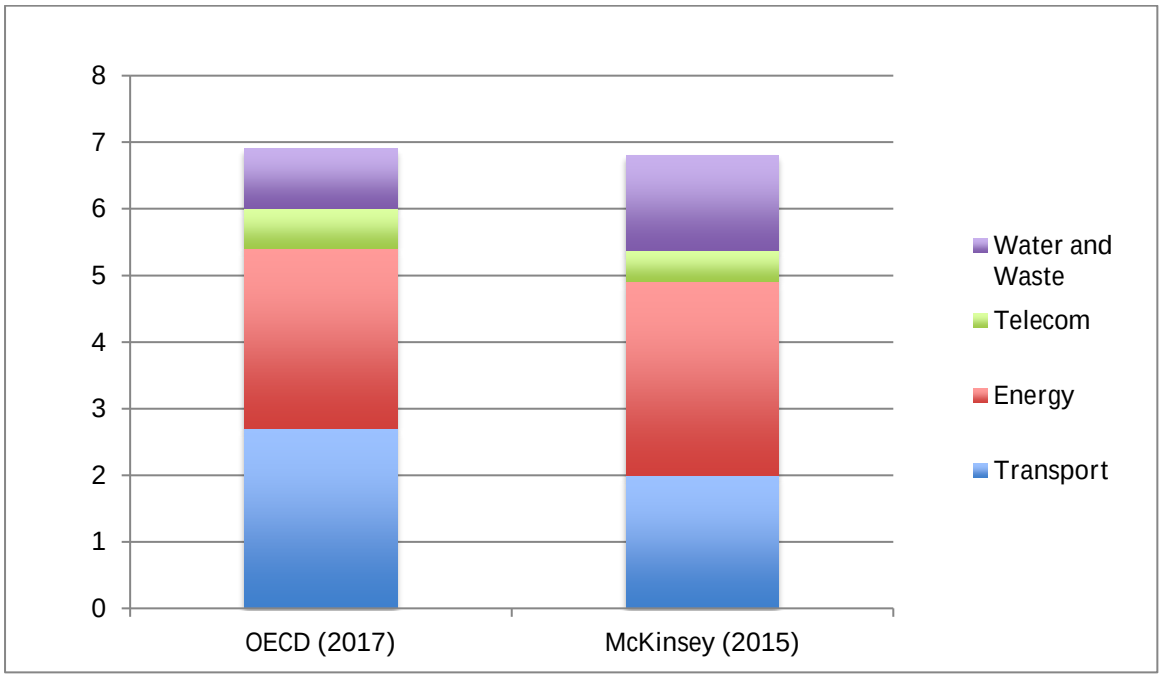
Government finance alone will be insufficient to achieve a net zero-carbon transition

collaboratively in the same direction and bring the market with them. Ministries of finance, regulators, and central banks need to coordinate their activities and adapt their policies to address climate change, ensuring the credit and monetary system is fully aligned with the transition to a zero-carbon economy.

One argument against central banks incorporating climate change in to their policy agenda is that it is unnecessary and the 'job of government' or financial markets more generally. But the
ast. As shown in Figure 1, the total infrastructure investment required for a successful zero-carbon transition from 2015 until 2030 is

have to more than double from around current actual investment of $3 trillion to just under $7 trillion every year.[12]
required investment is nearly twice the value of the total global infrastructure stock (approximately $50 trillion)[13].

Figure 1: Estimated Green Infrastructure Requirements Per Year, 2015-[redacted]



Source: Authors' calculations based on – 'OECD (2017). Investing in Climate Growth: a synthesis. OECD publishing; Paris.', 'Brookings (2016). Delivering on sustainable infrastructure for better development and better climate'; and 'McKinsey (2016) Bridging global infrastructure gaps. McKinsey & Company, London.'

Market-based attempts at boosting green finance, such as the creation of carbon trading schemes, have been largely disappointing.[14] [redacted] from vested interests.

A mixture of high-risk-appetite and very long-term patient capital is needed on a huge scale. [redacted] on their own, to be consistent with what is needed for a 1.5 degrees transition.[15] [redacted] uncertainty abo[redacted][16]. All of these dynamics are likely to [redacted]-carbon transition.

Given this, the role of finance takes on an ever more important role in driving forward innovation [redacted]

[redacted] m sized enterprises (SMEs) — supported by government policy — [redacted]

1.2.3

1.2.4 Central banks as long-[redacted] economic development

The three types of risk identified above are interdependent. The more fossil fuels we continue to [redacted] proactively manage the transition risk on our own terms, or expose our economies to the incalculable economic cost of an unwinding climate system. Either way, it is a matter of the utmost significance for those tasked with delivering a stable and resilient financial system.

Lord Nicholas Stern has described climate change as the world's 'greatest market failure', which risks unprecedented social and economic costs 'on a scale larger than the two world wars of the [35]. The evidence suggests that a voluntary approach to risk disclosure may not be [redacted] investment and bank lending behaviour. [36] [37]

The opportunity is to 'green' macroprudential policy [redacted] lending. Very few central banks do so at the present (Brazil being one exception- see box) but many are conducting in research in to how to do this. The most obvious policy intervention would be the imposition of increased capital requirements (the amount of shareholder equity banks are required to hold for a given amount of assets) against loans carrying carbon-risk (brown loans). The latter was advocated by the recent interim report of the EU high-[redacted] sustainable finance[54]:

"A 'brown-penalising' factor raising capital requirements towards sectors with strong sustainability risks, would yield a constellation in which risk and policy considerations go in the same direction. Moreover, it would be more focused and easier to rationalise as capturing the risk of sudden value losses due to stranded assets."

-intensive loans would be to implement a counter-[redacted] the growth rate of lending to carbon intensive sectors increases or to introduce direct limits on credit extension to businesses that are severely reliant on fossil fuels[55].

From a systemic risk perspective, these sorts of measures could help to reduce carbon emissions that are yet to be priced-in, and would help central banks curb the threat of a carbon bubble.

for a different understanding of 'climate risk' at

random (and thus unknowable) outcomes with knowable probabilities. But we would argue climate risk – physical risk and in particular transition risk – is actually closer to involving random outcomes with *unknowable probabilities*, i.e. a situation of uncertainty rather than risk.

Transition risk can involve technological innovations (e.g. a sudden breakthrough in battery technology), changes in legislation and regulation (e.g. the rapid implementation of a carbon tax following the surprise election of a progressive political party) and changes in consumer behaviour (e.g. a shift in attitudes towards the purchase of plastics). These types of risk are all inherently uncertain in terms of both their impact and their time horizon. They may also be -

rapid shift in policy or vice versa) that standard statistical approaches are unable to deal with. Indeed, standard financial risk analysis is backward looking, usually based on less than five years of data observations and uses linear pricing techniques.[56]

The principle of controlling credit flows and interest rates to serve specific national interests was extensively applied in many Western countries after World War II.[57] [58]

key to the East Asian 'economic miracle' of the 1970s and 1980s and the more recent growth of the Chinese economy. There are various credit allocation policies that could be adapted to promote green investment:[59]

1.4 State investment banks and the green transition

SIBs have long played a key role financing and directing investment in many countries around the world. Their fundamental role is to promote public policy objectives by influencing the volume and direction of investment in the economy. Because the governance arrangements of SIBs typically do not create pressure to deliver short-
longer time horizon, prioritise wider social and environmental objectives, and take a different approach to risk and reward.

Modern SIBs have their historical roots in the reconstruction plans for Europe following the Second World War. The aim was to create institutions that promoted financial stability through a flow of patient finance to fund the post-
that speculative private finance could have on the economic recovery.[74] In subsequent decades, many regional, national, or subnational SIBs were created, with a diverse set of operational focus and roles.[75]

Promotional Banks'), as well as being members of the European Investment Bank, the European Union's own SIB. In 2019 the European Investment Bank announced that it will end financing for
1, and
goals of the Paris Agreement – thus becoming Europe's 'climate bank'.[76] The European
the European
Investment Bank
national promotional banks
green transit

reement

Mission-oriented investments catalyse structural economic change across multiple sectors, and stimulate multiple forms of cross-actor collaborations to work to address those problems using the entire innovation value chain, from fundamental research to applied research and cutting-edge firms. They can also generate difficult-to-predict spillover effects outside the primary investment objective.

As part of the RUFFIN project we will work with partners to explore:

- how a market-shaping, mission-oriented investment logic can be most effectively
- what policy barriers are preventing PSFIs from embracing a market shaping, mission-oriented investment logic; and
- how the broader policy landscape (e.g. regulation, taxation, state aid criteria, procurement mission-oriented investment logic.

1.5.3 Funding instruments

Different types of investment activity require different types of finance. Having different funding instruments available is important
portfolio, and to best match the optimal finance for different types of projects. For example, equity investments may be suitable for higher g-term loans may be better for lower-risk, incremental activities. Having a wide range of instruments available enables investments to be made across the business lifecycle, from the start-up phase long-term patient capital for established firms.[91]

In addition to lending operations, there is strong evidence that offering advisory services such as strategic planning, capacity building, and training programs can help to establish bankable projects that otherwise would not happen.

In establishing a product offering that SIBs are able to strike the right balance -return spectrum so that lower risk investments help to cover higher risk ones. Where success occurs, there is a strong case that the public sector in that have resulted from its risk-taking order to offset the inevitable failures.

Bank, have devised bespoke risk-reward sharing mechanisms for investments in innovative areas like drug development (see case study), although as of yet none have been

As part of the PUFFIN project we will work with partners to explore:

- which instruments are most conducive to financing green innovation, and whether there is a need to develop new tailored instruments;
- how new symbiotic type of public-private partnership for meeting climate objectives;
- whether attaching conditions to financial instruments (e.g. conditions regarding profits being reinvested, carbon footprint, etc) can be an effective way to drive behavioural change across the economy; and
- the extent to which ad training programs can help .

Case study: European Investment Bank

The European Investment Bank (EIB) is the financing institution of the European Union. The EIB
junior or subordinated loans, intermediated

finance to capture the upside from supporting innovative firms, mainly through its majority shareholding in the European Investment Fund (EIF) which facilitates access to equity for high-growth and innovative SMEs.

In recent years the EIB has also entered into a number of loan agreements with innovative companies which involve bespoke risk-reward sharing mechanisms. In 2014 the EIB and CDP million towards six drug development projects with Belgian biopharmaceutical company UCB to put up as part of a new 'at risk co-development funding' scheme set up under Horizon 2020 to
eans that the EIB shares the risks and potential rewards inherent to drug development. The EIB invested directly in UCB's R&D

1.5.4 Governance

Governance arrangements are particularly important for public financial institutions. On the one hand, it is their distinct governance structures of that enable them to play a fundamentally different role in the economy compared to that of private financial institutions. These governance arrangements typically do not create pressure to deliver short-term returns, meaning that they can provide patient financing over a longer time horizon and prioritise wider social and environmental objectives.

On the other hand, many of the problems that have commonly been associated with SIBs, such as
r competition with

1.5.7 Relationship with government policy and the innovation ecosystem

Successful innovation is not the product of any single body or agency, but rather of the interactions between different agencies across the entire innovation chain, which in turn interact with private actors. In other words, the wider innovation ecosystem is important.

[redacted]ose alignment between SIBs [redacted] powerful synergy between policy, regulation and financing, which can be coordinated for maximum impact. For example, new government policies can be complemented with new [redacted]

In the [redacted]how public sector financial institution can most effectively interact with national and supranational government policy and the broader [redacted]

[redacted]

Monitoring and evaluation

Whereas private tend to be evaluated on the basis of their financial performance, SIBs are often evaluated on the extent to which they are fixing perceived market failures. SIBs to be criticised on the basis of "picking winners", crowding out or funding large incumbent companies.[99] [100] While there may be some ins
monitoring and evaluation frameworks which adequately capture the additionality generated by bold mission-oriented investments (i.e. even if the original objective is not reached, an investment -wide spillover effects).

Where the aim of investments is not to fix market failures but to create and shape new markets and technologies, new monitoring and evaluation frameworks may be required in order to accurately investments made by SIBs and other PSFIs.

tor and evaluate the

how cross-

5. Conclusion and next steps

The transition to a zero-carbon economy will be compatible with the Paris Climate Change agreement and

ets are important

aligned with climate targets.

Although some PSFIs have taken tentative steps to incorporate climate change into their operations, there remai
carbon transition. In this paper we have introduced the macro-meso-micro framework, and set out some of the key questions that must be addressed if the missions, mandates, policies and activities of PSFIs are to be aligned with climate objectives. In order to answer these questions, the PUFFIN project will be organised around three distinct phases.

In phase one, which is already underway, we will focus on identifying the key barriers that are

desk research, and by building strong relationships with our key PSFI partners at macro, meso and micro level. This will involve bilateral meetings and interviews with the partners in our consortia, as well as ideation workshops that bring our partners together to identify shared issues and challenges. Our findings will be documented in a report that will be published in September 2020.

In phase two of the project we will collaboratively explore how the missions, mandates, policies, instruments and activities of PSFIs could be redesigned to better support green innovation and accelerate the zero carbon transition. We will do this interactively with partners by running in-depth mandate and mission labs with our consortia to challenge PSFI

[redacted] the missions, mandates, policies, instruments and activities of PSFIs to green innovation and accelerate the zero carbon transition, and publish comprehensive implementation roadmaps to enable PSFIs to put our recommendations into practice.

Appendix 1: Further reading – extracts from supporting papers

Patient Strategic Finance: opportunities for state investment banks in the UK

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(Extract from p.1)

T
strategic investments and nurturing new industrial landscapes, a modern industrial strategy focused on solving important societal challenges can help to rebalance the economy and reinvigorate the industrial base. A 'mission-oriented' approach to industrial policy can help to determine the direction of growth by making strategic investments across
This requires not just any type of finance but patient, long-
in many countries, patient strategic finance is increasingly coming from state investment banks (SIBs). By developing new financial tools and working closely with public and private stakeholders, state investment banks can – if structured effectively –

https://www.ucl.ac.uk/bartlett/public-purpose/publications/2018/jan/patient-strategic-f opportunities-state-investment-banks-uk

Financing green growth

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(Extract from p. 1)

Transitioning to a green economy requires both public and private investments. Given the long lead times and high uncertainty in innovation, such inves
energy and resource efficiency, and prevent the loss of biodiversity
to finance these high-risk and long-
The quantity of finance is as important as the quality. Currently, the rate of green investments is too low for green

global warming, investments in low-carbon technologies are a viable option for the economy (Skea 2015, Sgouridis et al. 2016).

Although the low-carbon transition is not just about low-carbon energy but also about reducing energy intensity across the economy, we use the case of decarbonising the energy sector to illustrate the magnitude of the challenge.

Table 1 compa -

[redacted]-carbon technologies is emerging as one of the key pivots in mitigating climate

Climate

suggest aggregate annual energy supply investments may [redacted]

[redacted]

to radically shift towards [redacted]

Mariana Mazzucato

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(Extract from p. 7)

[redacted]led), inclusive and sustainable. They are seeking to achieve this [redacted] tackling climate change, improving public health and adjusting to demographic changes.

change. The case for -defined 'missions' that are focused on solving important societal challenges is compelling and increasingly recognised. [redacted] different the financial system is key to achieving this goal.

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