

Public wealth funds: Supporting economic recovery and sustainable growth

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Foreword

Public Wealth Funds are an idea whose time has come. This important study explains why this is so and how to create them successfully. It should not just be given close attention. Its ideas should be implemented, particularly by governments determined to “level up” regional inequalities and “build back better” after Covid-19.

The analysis suggests two powerful reasons why now is the time to establish such funds: one for the long term and the other for the short term.

The long-term argument for public wealth funds is that, by taking equity in firms with good long-run potential, they will help create businesses and so an economy that would otherwise never come into being. The public would share in the risks, but also take a share in the rewards. This long-term argument is particularly important in meeting three objectives, where the private sector is unwilling or unable to take the risks — to create new businesses in regions in decline or a permanently-depressed condition, to promote new businesses at the forefront of technology, and to accelerate the response to climate change.

The short-term argument comes from the legacy of Covid-19. Businesses are taking on a vast amount of debt, with government support. This debt will subsequently cripple businesses and so hopes for a strong recovery. It will do so by driving many into bankruptcy. It will also do so by curtailing the ability and willingness of debt-encumbered businesses to take risks, invest and so expand. Many of them will become the living dead and, in the fulness of time, die.

Many people will respond that this will be too expensive and too risky. This is the opposite of the truth. The costs will be modest, especially if government funds them by borrowing at today’s extraordinarily low interest rates. Indeed, doing so will demonstrate its understanding that what matters is not the size of its debts, but their cost and, still more, the assets the debt allows the state to create. It is the net worth of the government that should be the focus, not its debt. Focusing on just one side of the balance sheet, as the UK Treasury does, is ridiculous.

Moreover, the returns might be high, provided the funds are set up and managed in the right way. The aim is to institutionalise the funds as operationally independent entities, run by competent professionals, transparently, accountably and with clear goals. The proposal is to create five such suites of funds: a National Wealth Fund, which looks after mature assets at a national level; smaller mission-driven venture capital funds; a public climate fund; “levelling up” or regional growth funds; and, finally, urban wealth funds, to support housing and urban renewal.

These are genuinely important ideas. There has been much talk of following a “Singapore Model” post-Brexit. Public wealth funds really were part of that successful model. Done in the right way and for the right reasons, they work. These proposals for reform of the activities of the British state are timely, radical and sensible.

Martin Wolf

Chief Economics Commentator, Financial Times

November 2020

About the Institute for Innovation and Public Purpose

The UCL Institute for Innovation and Public Purpose (IIPP) aims to develop a new framework for creating, nurturing and evaluating public value in order to achieve economic growth that is more innovation-led, inclusive and sustainable.

We intend this framework to inform the debate about the direction of economic growth and the use of mission-oriented policies to confront social and technological problems. Our work will feed into innovation and industrial policy, financial reform, institutional change, and sustainable development.

A key pillar of IIPP's research is its understanding of markets as outcomes of the interactions between different actors. In this context, public policy should not be seen as simply fixing market failures but also as actively shaping and co-creating markets. Re-focusing and designing public organisations around mission-led, public purpose aims will help tackle the grand challenges facing the 21st century.

IIPP is housed in The Bartlett, a leading global Faculty of the Built Environment at University College London (UCL), with its radical thinking about space, design and sustainability.

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Executive summary

The economic collapse that has followed the Covid-19 pandemic has led governments and central banks to provide emergency funding to private firms in distress on a previously unimaginable scale. The majority of interventions have taken the form of liquidity support via direct loans or loan guarantees. However, as the second wave of the virus spreads, it is becoming clear that loading more debt on to troubled firms is not a sustainable solution in the medium to long term. Widespread defaults due to debt-induced insolvencies could lead not only to higher unemployment, but would also damage the financial system, the public finances and the wider economy.

Instead, there is an increasing case for public equity investments or swaps of loans given by the state for equity. An equity investment involves a government taking a stake in a firm. If the firm grows, the government receives a return (a dividend) and the public sector's wealth grows, or receives a capital gain if the aim is to later divest from the holding. If, on the other hand, the firm is unable to survive, the government's investment is lost. However, the advantage is that firms are not burdened by the weight of interest payments compounding over time. This may free up firms not only to keep staff on, but also to invest and innovate.

Too often in the past at times of economic crisis risk has been socialised, but rewards privatised. Equity investment helps deal with this problem and can also help to attract in other forms of 'patient finance' for priority sectors of the economy to support firms that private investors are not yet prepared to invest in. Some European governments have already provided equity investments to selected companies during the Covid-19 period. Their aims have varied, including, most urgently, saving firms that are considered economically essential or strategic, as well as allowing highly leveraged firms to keep investing. There is also recognition that the pandemic provides an opportunity for public investment on a large scale to ensure that the recovery will support societal missions such as the transition to a zero-carbon economy, dealing with regional inequalities and housing affordability.

But can governments invest successfully in selected startups and corporations? In this report we review the evidence and the short answer is 'yes', providing that government ownership is institutionalised according to the highest standards of corporate governance and structured as 'public wealth funds' that combine arm's-length independence from day-to-day politics with active and competent commercial management, as well as a high level transparency as if it were a listed holding company. In addition, the creation of such funds should be accompanied by a wider rethink of public sector accounting to take into account both the assets and liabilities side of the public sector balance sheet, in just the same way as a private firm does. This is an approach we develop over the course of this report.

Previous pandemics have, according to some studies, depressed growth for decades (Jordà et al 2020). One explanation of this is that state-backed loans given out during a pandemic build a corporate debt mountain that overwhelms many companies over the following years. Even before the pandemic, many companies in advanced and emerging economies, including those providing essential services such as transport infrastructure, had built up historically high levels of corporate debt. Although many highly leveraged firms may survive, the current situation makes them reluctant to make any additional investments.

Given that stronger corporate balance sheets could act as a general growth stimulus, it has been suggested that governments should provide selective equity capital injections. Yet how to govern public assets to generate value has received little attention compared to the vociferous debate over whether or

not to nationalise or privatise. If poorly managed, public equity bailouts risk throwing a wet blanket on growth prospects.

This report leaves the question of how and when governments should provide debt to firms aside. Instead it aims to suggest how, and under exactly what circumstances, governments can invest equity, as well as use existing public assets — via the creation of public wealth funds — to assist in crisis handling, creating sustainable growth and delivering on wider social and environmental objectives or missions. Widespread government equity ownership in hundreds of thousands of small firms is neither desirable nor practically possible. The focus of this report is on mature firms, mission-oriented venture capital prospects, and regional and urban regeneration. SMEs have different needs and proposals already exist for how to support them (TheCityUK 2020), but well-targeted state investments could help pull economies out of recession and support longer term policy objectives at the same time.

The empirical literature on countries' experiences with public wealth funds is limited, but generally supportive, provided these institutions have the right corporate governance structures. Strong examples include Singapore, which transformed itself from an economic backwater to being one of the richest countries in the world in the space of just a few decades in the post-war period; Finland; and, more recently, Sweden. However, there are also documented examples of investments being distorted by political opportunism, incompetence or corruption.

The holy grail of public asset management is an institutional arrangement that both removes governance from a government's direct responsibilities, but at the same time allows active governance of public assets with the aim of generating value for the public and a dividend that can benefit society as a whole. To this end, we suggest institutional structures that are highly transparent; insulated from day-to-day politics; have clear and simple goals; and are able to specialise in their respective area of expertise.

Governments should be able to engage firms that they own through public wealth funds in wider and long-term policy aims, missions or long-term industrial strategy. But this should be done with transparent — i.e. publicly available — owner directives, not through channels or forms of communication that remain undisclosed and lend themselves to opportunism. Also, if a government imposes short-term costs for mission achievement on firms, it needs to recognise three issues: the firms may lose business to competitors, impeding mission achievement; it may be difficult to monitor whether losses are due to mission costs or inefficiency; and the public may lose confidence in loss-making government-owned firms and eventually support privatisation. To avoid these problems, we suggest that, as a rule, governments should compensate firms for mission costs using public funds, in a transparent manner and in an open tender, if and when relevant.

A clear experience from both public and private investment funds is that specialised competence is paramount for success, both at the board level, and for CEOs and staff. Therefore, we advocate using a variety of specialised public wealth funds. This also allows more precise, relevant and simple goals and owner directives.

Public investments must also be targeted to avoid crowding out other firms or investors, and instead aim to crowd in those that otherwise might be reticent to invest. Paraphrasing Keynes, the important thing is 'not to do what others do a little better, but to do the things that are not done at all.'

Five types of public wealth fund to support recovery and growth

We believe that these principles can best be adhered to with a suite of public wealth funds (PWFs) that are wholly publicly owned and are separated into a *national wealth fund* in charge of mature assets at a

national level; smaller mission-driven *venture capital funds*; a public climate fund; levelling-up or regional growth funds; and *urban wealth funds* to support housing and urban renewal at city-region level. In this report we focus on how public wealth funds could be created and run in the specific context of the UK economy. However, the basic blueprint would apply to any high-income economy.

A national wealth fund: A national wealth fund (NWF) would be in charge of the required equity injections into mature operational assets, for example in the sectors most affected by the pandemic, or other corporates, as well as commercial real estate, but could also act as a holding company for assets that the government already owns. Firms should only be offered capital injections if they are either considered essential, in the sense that the government would incur high costs if they failed as a result of the Covid-19 crisis, or if the firms have considerable future potential that they cannot realise due to liquidity constraints. In many cases, the NWF injects equity capital when the original equity has been reduced to zero value, i.e. the company is worthless. The government then takes over the company or invests on par with other investors and then optimises the entire capital structure, including debt, and recapitalises the company if needed. The NWF acts as an active owner and helps improve the value of the assets operationally, as well as through its capital structure and business development, including helping to restructure the business, for example selling off non-core businesses or merging with other similar business to create economies of scale and a more sustainable business model.

Several smaller and more specialised mission-driven public wealth funds should also be set up with competence in their respective areas. They could specialise in providing venture capital for growth and innovation, financing the transition to a zero-carbon economy and addressing regional inequalities in line with the government's wider priority strategies, such as industrial strategy, as well as with larger international societal ambitions, such as those recognised in the Sustainable Development Goals. These funds would have a mandate to maximise public value. This means that they could invest in projects that have significant 'market-creating potential', but are not yet feasible for private venture capital. As soon as possible, private investors should be 'crowded in'.

Public venture capital funds: Public venture capital funds, as we envisage them, would instead aim at promoting economic growth and jobs in the medium to long term. Crucially, such funds would need technological and venture capital competence to be able to evaluate prospective investments and exercise constructive governance. This means that public venture funds can also be started by government agencies intending to promote innovation within their area of expertise, such as a public energy authority that has expertise enough to invest in innovative energy firms.

A public climate fund: Recent research has demonstrated that green investments may create larger economic multiplier effects than conventional fiscal stimulus (Hepburn et al 2020; IIPP 2020). However, alongside relatively low levels of return compared to more standard asset classes, investments in climate-friendly production or innovation can be unduly risky for private investors given that future policymakers may lack incentives or a political agenda that would sustain current policies. When the state becomes a shareholder through a sizable investment in — or recapitalisation of — an asset the risk calculus changes. Policymakers then have to factor in that the state itself bears economic and political costs if they change climate policies in a way that generates losses in the government-owned firm. In theory, this makes climate policies relatively more consistent and directional over time, and reduces the risk for private investors. A public climate fund could thus play a market-shaping role in supporting the UK's decarbonisation agenda.

Regional development funds for reducing regional inequalities: In the UK, Jim O'Neill, a former Treasury minister, has proposed creating a £25 billion public wealth fund which could invest equity in businesses

outside London as part of the government's 'levelling up' agenda to help underperforming regions. There is a dilemma for regional public wealth funds that finance local firms, which is that if it is forced to show a profit, it will be incentivised to invest in firms that are less risky. These are the same firms that local or other investors might find attractive. The fund will then risk outcompeting and 'crowding out' the already frail local venture capital market. Therefore, a regional public wealth fund for venture capital investment should have a clear mandate to invest in firms that have a future potential in line with government policy aims, as well as the downside risk that is likely to deter other investors. In order to take these risks, a regional wealth fund should be allowed to take a portfolio approach, absorbing individual losses, but running a profit on an aggregate level, as is the strategy for private sector venture capital funds. Alternatively, the funds could receive a transparent state compensation commensurate to the shadow price of jobs created. This shadow price could be determined by the ministry of finance and balanced in the spending review with contributions received from the national level.

Urban wealth funds: Local governments should be encouraged to aggregate their substantial real estate assets into urban wealth funds (UWFs). Other public jurisdictions, including state authorities, would be encouraged to pool real estate within the local UWFs, at least when opportunities arise for urban renewal and housing projects. Also, they can purchase real estate from distressed property owners if these can be used in renewal projects, but should avoid becoming perpetual administrators of housing and other real estate that is not suitable for development. UWFs should have a mandate to maximise the value of their portfolio in order to be able to crowd in private investors without distorting competition. Through transparent owner directives, local government can also ask that UWFs further social aims, such as housing affordability and the creation of socioeconomically mixed communities, but the costs for these should be paid for through a separate public vehicle and preferably on equal terms given to other investors as well. Pension funds, for example, requiring long-term, reliable investments would probably be good investors in better and mixed neighbourhood social housing.

Costing and accounting for public wealth funds

We estimate that even in the most expensive conceivable version, the direct fiscal cost of investing in the above mentioned PWFs would be small, around 0.1 percentage points of GDP per year, even assuming that the equity loses its value. Compared to other measures to restart the economy this is a small amount. Moreover, over time some of these investments would likely turn a profit. Historically, the yield on equity has been around 6 percent, while the cost of servicing public debt for the initial investment is negligible or even negative at current interest rates. In a more favorable scenario, with a return on equity of 5 percent, the state would earn about 0.07 percentage points of GDP per year (£160 billion) in addition to savings that may result from the achievement of various policy goals that the funds support.

The introduction of PWFs is also an opportunity to rethink public sector accounting practices. Currently, a strong emphasis is placed on narrow measures of public debt and cash, with public sector assets and liabilities neglected when fiscal sustainability is discussed. Using public sector 'net worth', (assets less liabilities) would put the focus on the long-term sustainability of public finances. Better management of public assets could add 3 percent of GDP in additional public revenues (IMF 2018) — to the benefit of society as a whole.

1. The case for public equity in the wake of the pandemic

The Covid-19 economic crisis has led the state to provide financial support to private firms on a scale not seen since wartime. The majority of interventions have taken the form of either direct loans or loan guarantees. However, as the second wave of the virus spreads there is increasing recognition that loading more debt on to troubled firms is not a sustainable solution in the medium to long term. Instead, in this report we propose governments should consider equity investments via the formation of public wealth funds (PWFs). These are wholly publicly owned but politically independent bodies operating with strict corporate governance standards. PWFs exert active governance of the firms and assets they own, usually in their own jurisdiction, for the purpose of maximising value for the public sector. PWFs can also be given societal missions and help governments achieve wider policy objectives. The focus of the report is on how this might be achieved in the UK context, but the basic blueprint we outline could be applied to other countries.

This introductory chapter provides an overview of the potential role of public equity and PWFs in supporting recovery following the pandemic. We consider the interventions that have been taken so far — oriented towards debt — and their macroeconomic consequences. We then consider the option of public equity and outline some of the key principles to justify governments taking stakes in private firms. Chapter 2 outlines a portfolio of five different types of PWF that could be created with different purposes, competencies and estimates of the public costs of each. We also consider how best to account for the value created by PWFs as part of a wider rethink of public sector accounting.

Chapter 3 of the report considers the principles for how PWFs can be effectively governed to ensure they support the economy and public sector wealth generation, have longevity and present a reduced risk of privatisation. Chapters 4 to 6 outline in more detail how the five PWFs would be structured and governed, and chapter 7 concludes. Throughout the report, we draw on real life examples of successful — and less successful — PWFs. In the Appendix we provide a number of more in-depth case studies of different countries' experiences with PWFs.

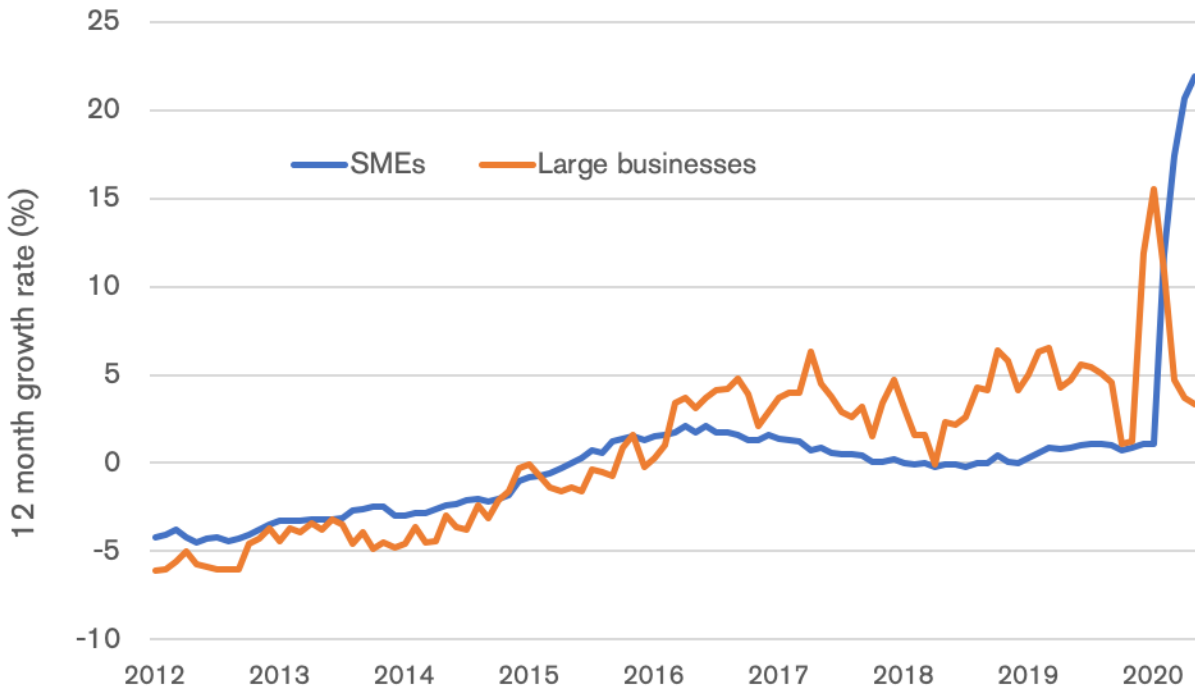
It is important to note that the report does not concern itself with government lending, guarantees or even convertible loans to firms. These can occur either as a short-term crisis response approach or can be undertaken in the longer term by institutions like state investment banks.¹ Nor does the report touch on government investments in purely financial instruments, such as is typical for so-called 'sovereign wealth funds'. Instead, the focus is entirely on how the government can intelligently make use of active domestic equity ownership.

¹ See, for example, Macfarlane and Mazzucato (2018) for an international review of the role of state investment banks in supporting industrial policy and innovation.

1.1 Covid-19 public financial support: debt and more debt

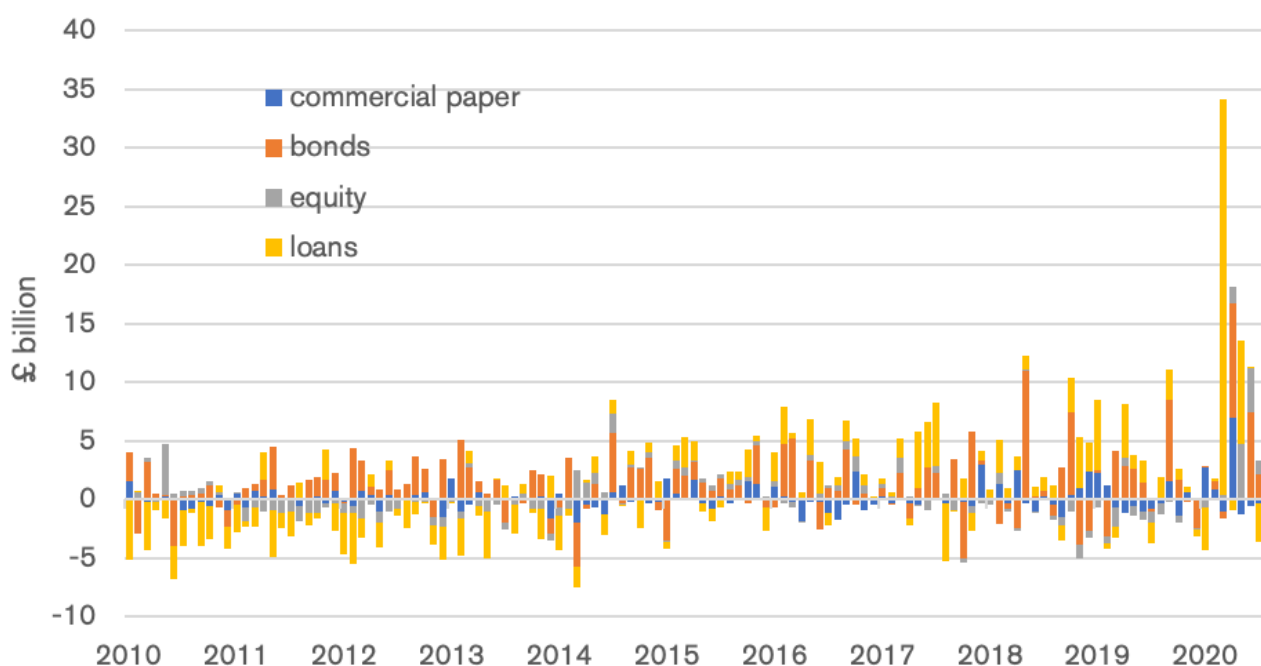
In the wake of an extraordinary drop in economic activity during the spring of 2020, governments and central banks have lent to and injected equity into private enterprises on an unprecedented scale (Table 1). Much of the UK government's financial support for companies has come in the form of state-backed loans. The government's lending schemes have provided nearly £53 billion to some 1.2 million companies through three programmes: £35.5 billion of bounce back loans, including a 100 percent guarantee for small business loans; £13.7 billion through the coronavirus business interruption loan scheme (CBILS), including an 80 percent guarantee on loans of up to £5 million; and £3.5 billion through the large business interruption scheme, which offers a partial guarantee on loans up to £200 million (*Financial Times* 2020d). This has stimulated an explosion in commercial bank borrowing, the likes of which has never been seen before in the UK (Figures 1 and 2). In many EU countries government loans and bank guarantees have been granted on a similar scale (ECB 2020).

Figure 1: Monthly 12-month growth rate of bank lending to UK non-financial businesses 2012-2020



Source: Bank of England

Figure 2: Type of non-financial business finance raised from banks and capital markets in the UK 2011-2020



Source: Bank of England

The use of public debt financing or guarantees to keep firms afloat made sense as a short-term response to the crisis, but as the second wave of the virus spreads across Europe, it is becoming clear that there will be no rapid return to 'business as usual'. Many firms in key sectors — including hospitality, transport, aviation, catering, leisure and entertainment, retail, creative industries, construction and manufacturing — have been, and will continue to be, unable to generate the revenues needed to pay back government loans. In the UK, recent official figures show that two-thirds of all businesses could be at risk of insolvency, with 43 percent of companies running on less than six months' cash reserves (ONS 2020).

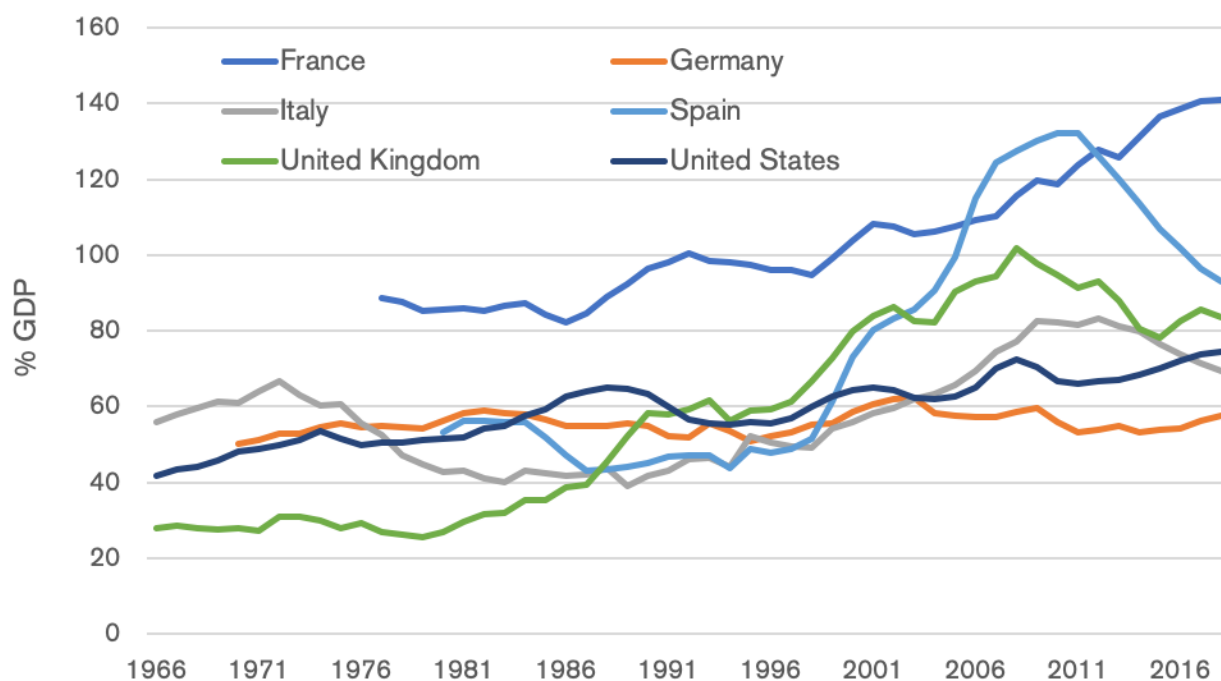
TheCityUK, the UK financial services industry body, estimates that there could be between £97 billion and £107 billion of unsustainable corporate debt in the UK by March 2021, with as much as £40 billion held by small businesses (TheCityUK 2020). Of that, between £32 billion and £36 billion would stem from the government's lending schemes. The UK Office for Budget Responsibility has similarly suggested that about £33 billion would need to be written off the value of state-backed loans in its worst-case scenario, while Andrew Bailey, the Bank of England governor, has expressed concern that the high level of corporate debt might undermine any economic recovery and warned that the public sector should be ready to ensure a response to 'the need for equity capital' (Financial Times 2020d).

A recent review of 15 major pandemic events with at least 100,000 deaths found that while the rapid and unprecedented collapse of production, trade and employment may be reversed as the pandemic eases, the long-term economic consequences could persist for a generation or more (Jordà et al 2020). One reason for this is that state-backed loans given out during the pandemic could build up a corporate debt mountain that overwhelms many companies over the coming years. Some of these firms might be able to raise new equity capital or persuade lenders to agree to write-downs, but others will be forced to close down.

Banks will fear that the loans will lead to widespread corporate failures in 2021, when companies must start paying interest on the debt. Even firms that appear to be doing well will be vetted much more closely to uncover credit risks. A number of studies suggest that high leverage impedes companies' ability to invest and grow, even among businesses that can afford to service their loans, thereby risking a significant drag on any economic revival and a deeper fall in the next recession (see, for example, Gebauer et al 2017; Goretti and Souto 2013; Cecchetti et al 2011). A high corporate debt burden also increases the risk of future financial crises (Minsky 1986).

The increase in corporate debt that is now underway also needs to be put in the broader context of the private sector debt that has been building up since the early 2000s (Figure 3). Even firms which do not face redundancies or insolvency will be reluctant to invest for many years to come given the debt overhang and low prospects of growth.

Figure 3: Non-financial corporation debt (loans and debt securities) as a % of GDP in advanced economies 1966-2018



Source: IMF Datamapper: <https://www.imf.org/external/datamapper/>

1.2 Public equity as an alternative

Under such conditions, a shift towards public equity investment and/or debt-for-equity swaps may make more economic sense. An equity investment involves the government taking a stake in a firm. If the firm grows, the government will receive a return (a dividend), or a capital gain if the aim is to later divest from the holding. If, on the other hand, the firm is unable to survive, the government's equity will be lost. The upside and downside risks are shared more equally between investor and investee than with debt-financing.

Too often in the past, at times of economic crisis — not least during the financial crisis of 2007-08 — risk has been socialised, but rewards privatised. In the UK, there is evidence that private equity firms are taking advantage of government-backed loans to buy up distressed firms in hospitality and tourism in particular (*Financial Times* 2020b). Equity investment helps deal with this problem and can also help to attract in other forms of ‘patient finance’ to support firms that private investors are not yet prepared to invest in.

Equity has a number of other advantages over debt. One is that, whatever happens in the future, the firm itself will not be burdened by the weight of interest payments which would otherwise compound over time. Another is that debt overhang hinders investment in otherwise productive activities, because potential investors fear their capital will just go to cover legacy debts (Sandbu 2020). A third advantage is that equity failures are, in most cases, more easily absorbed by investors and restructuring of equity stakes is generally easier, because they lose value automatically, while loans need to be written off in cumbersome negotiations.

The UK government has already approved a Treasury scheme called Project Birch, which has helped steelmaker Celsa, which it deems a strategically important company. It is also spending £400 million on a stake in failed satellite firm OneWeb as part of a plan to replace use of the EU's Galileo sat-nav system. In addition, the newly implemented Future Fund, designed to support innovative new firms, may end up having to convert loans to equity in firms that are unable to repay.

As shown in Table 1, a number of European countries have also made significant equity investments in key industries in their economies. Airlines, in particular, have been offered public equity stakes, but a range of different equity schemes have also been developed for medium-sized firms and firms with strong innovation potential. The biggest by far is Berlin's €6 billion bailout of Lufthansa, although this is being challenged by rival carrier Ryanair. There is likely to be much more later as other forms of government support, such as job subsidies, are tapered or withdrawn and companies have difficulties repaying their debts. For example, Germany has assembled a €100 billion ‘war chest’ for equity injections via its Economic Stabilisation Fund. Shortly afterwards, France unveiled the Plan, an economic plan, along with a €100 billion stimulus package to be spent over two years, some of which will come from the new European Union recovery fund. Only a small share of that will likely be invested as equity in private firms.

Table 1: Covid-19 government interventions in EU countries

Denmark	<p>Guarantees to the Scandinavian airline SAS from the Danish state, as well as loans and equity to startups and high growth enterprises.</p> <p>Loans and equity provided to entrepreneurs and venture firms (announced 18 April 2020). The state investment fund (Vaekstfonden) will provide equity to startups and venture firms facing difficulties in financing as private investors withdraw from the market. Available for 2020 only and a total capacity of DKK 3.4 billion.</p> <p>A new government-backed fund of DKK 10 billion (0.4 percent of GDP) will act as investor of last resort with the possibility to recapitalise large and important firms at risk of bankruptcy (announced 15 June 2020).</p>
Finland	<p>The government has allocated €700 million for acquisition of shares of state-owned enterprises, e.g. Finnair.</p>

	Investment loans for companies via Business Finland (€400 million in 2020-2022) and stabilisation funding for healthy companies with a high employment impact via state-owned private equity company TESI. These investments are not recorded in the general government deficit, but increase the government debt.
France	Temporary increase in state ownership for some firms facing exceptional difficulties (up to €20 billion), including a guarantee and loan for a total of €7 billion accorded to the Air France-KLM group.
Germany	<p>An Economic Stabilisation Fund (ESF) for larger companies will provide €100 billion for recapitalisation, €400 billion of guarantees for corporate liabilities and a credit authorisation for €100 billion to the KfW state investment bank for refinancing purposes.</p> <p>The ESF is targeting the real economy, i.e. corporations excluding banks. The fund is administered by the German Finance Agency (Finanzagentur). To qualify for investments or guarantees, companies have to meet two of three criteria (revenues exceeding €50 million, balance sheet volume exceeding €46 million or employees exceeding 249), or be declared as significant for the economy or security, or be active in specified sectors. One segment of the fund (worth up to €100 billion) consists of a recapitalisation instrument, which has equity instruments (direct equity, convertibles, hybrids, silent participations) at its disposal to invest if and when the need arises to stabilise a corporation. Applicants will have to submit evidence demonstrating that their economic survival is at risk and that they were not in financial trouble before the pandemic broke out. The Länder are in charge of implementing the programme and many of them have set up their own assistance programmes.</p> <p>In addition, €2 billion for co-investment in startups through the KfW, bringing forward a first tranche of an already planned future fund of €10 billion.</p>
Ireland	A €2 billion Pandemic Stabilisation and Recovery Fund within the Ireland Strategic Investment Fund (ISIF), which will make capital available to medium and large enterprises on commercial terms.
Italy	The Italian Government is endowing Cassa Depositi e Prestiti (CDP), its state-owned investment bank, with a €44 billion fund to make equity investments in medium to large industrial companies that are struggling because of the pandemic.
Netherlands	The budget of the SEED Capital scheme, with which the Ministry of Economic Affairs and Climate Policy (EZK) provides capital to investment funds, will be increased from €22 million to €32 million. With this scheme, the government supports innovative companies, including startups in technology (such as high-tech and eHealth) and creative areas, in obtaining venture capital from investment funds.
Spain	A €10 billion fund to support the solvency of strategic firms, managed by the Ministry of Finance (granting of participative loans, acquisition of subordinated debt or subscription of shares or other instruments of capital).
Sweden	Capital injection of SEK 3.15 billion in Swedavia (airport handling), as well as equity injection for the recapitalisation of SAS to a maximum of SEK 5 billion.

One limitation on public equity injections is the European Commission's set of rules on recapitalisations, designed to try to limit the impact on competition. Equity injections from the EU directly are also unlikely since this would be a governance challenge and might run into moral hazard issues. A proposal for a €31 billion EU 'solvency support instrument' to take equity stakes in European companies was stopped in the course of the drawn-out recovery fund negotiations (Hall, 2020).

The key challenge for a government taking equity stakes in private sector assets is not only which investments to make, but how to then manage them over time to ensure the highest possible chances of success. We argue that putting such stakes in a politically independent PWF, operated to strict corporate governance standards, is key to achieving this. PWFs should not be confused with so-called sovereign wealth funds (SWF) that usually only make financial investments in debt and equity instruments on international capital markets. In contrast, PWFs would exert active governance of the firms and assets they own, usually in their own jurisdiction. This includes monitoring the firms, taking responsibility and acting when things go awry, helping to find and execute structural transactions that create value, such as mergers or acquisitions, and helping to broker capital for such deals. PWFs can also be given societal missions and help governments to achieve wider policy objectives, as discussed in chapter 2.

1.3 Trade-offs to be considered for equity financing

In the long run, economic policy has various levers that help to reduce corporate debt, for example being able to offset interest rate payments against corporate taxes. Yet there is also a cost. With an ageing population in almost every country, there is a huge demand for relatively safe ways of saving, which, by and large, is what corporate bonds are. If tax and accounting rules induced firms to replace corporate debt with more equity financing, savers would be forced into more risky asset classes.

Here we focus on the trade-offs in the short to medium term in the aftermath of the Covid-crisis, in the case where a government is contemplating a state capital injection or has already provided loans or loan guarantees.

The most common options are:

- A. Debt restructuring, where all creditors agree to write down debt to let a firm survive. This is more likely to happen if the state loan does not have seniority. A sticking point is that debt may be structured differently for different private lenders. A lender holding more senior debt may demand liquidation if that covers the debt. Lenders with more junior debt may instead favour giving the firm a chance, which increases the chances of their debt also being repaid.
- B. Bankruptcy and corporate restructuring, where even firms that have received state loans, but remain unprofitable, are allowed to go bankrupt. Assets are sold to other firms that can sometimes start up production with less leverage. This forces lenders to write off debt and the overall burden of corporate debt falls. The more robust the recovery becomes, the less of a problem this is, but it should be seen against the backdrop that in the UK there are almost three million businesses of which 13 percent are newly created each year while another 12 percent wind down.
- C. State bailouts, where the state injects equity as part of a comprehensive capital restructuring, including forcing private creditors to write down loans or swap debt for equity. For example, investors in Norwegian Air Shuttle backed a large debt-for-equity swap that enabled the low-cost airline to unlock a state rescue.

- D. The government allows direct public equity injections into private firms or the swapping of loans for equity that is not directly coupled to a bailout, but aims at improving investment capability.

The success of any public equity injection or debt-equity swaps crucially depends on how well such capital injections are targeted. Not all firms should be helped. Productivity growth may remain subdued if so-called ‘zombie-firms’ are kept on life support too long. Some businesses will keep excess employees only as long as they receive subsidies. In some cases, it may be more efficient for the government to support laid-off workers through unemployment benefits than to pay employers to retain them indefinitely when their work no longer exists. In other cases, corporations that need money to stay afloat can borrow from markets. If they are so indebted that no one will lend to them, they can often restructure their debts in restructuring or bankruptcy procedures and get a fresh start.

In order to structure thought on targeting specific firms for government assistance, and moving from a state loan model to a state equity model, it is helpful to consider four firm case studies:

- A. The firm with poor prospects that has received a state loan goes broke. In this case swapping a loan for state equity makes little difference — both costs and benefits are zero.
- B. The firm survives only because a state loan is swapped for equity, but prospects remain dim. In this case the state may incur a cost due to foregone interest on the state loan. More importantly, there may be an important indirect cost if the firm survives at the expense of another more productive business that might have grown instead.
- C. The firm survives due to a public equity injection or a swap and goes on to make investments with considerable future potential. In this case the direct and indirect financial impacts on the state may be positive and sometimes even substantial.
- D. The firm survives and invests regardless of the public equity. In this case there may be a direct benefit to the state in terms of rising share prices (and an increase in net worth). With long-term government borrowing costs so low, the public cost of servicing the debt would be negligible, while once the economy recovers, the debt service would be more than covered by the return on the new equity. Historically, this has been around 6 percent (Jordà et al 2019) and somewhat higher for equity in smaller firms.

Since only the latter two of the four cases yield benefits to the wider economy or state finances it is important to define criteria for these that are simple enough to be used in practice. Here we suggest three criteria. State capital injections — whether equity or equity for debt swaps — motivated by recovery should only be given to firms that are either:

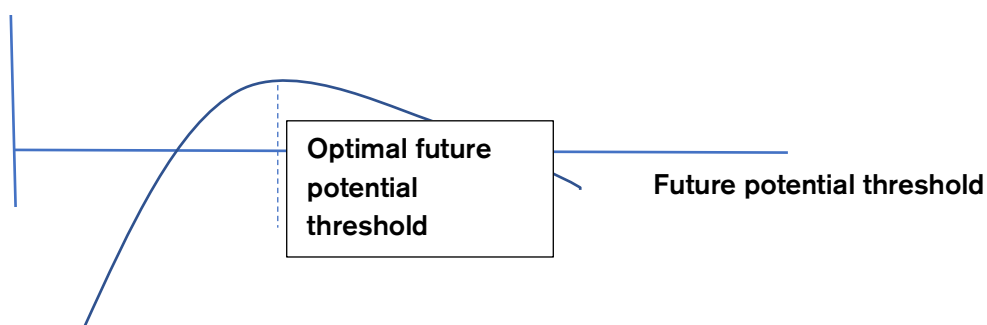
1. **Essential:** A firm that, regardless of the market valuation, is an essential service during a crisis and that the government or society needs to maintain or where the government would incur large costs if it had to provide alternatives.
2. **Credit constrained:** A firm has enough ‘future potential’ to survive, grow and invest to warrant a positive market valuation, but cannot finance itself or new investments during a crisis due to liquidity or credit constraint. The exact definition of ‘future potential’ can vary, but should be spelled out clearly. Consideration of future potential should take into account the market-shaping policies that the government and other public wealth funds are likely to implement.

3. **Of strategic interest:** Legacy industries, for instance, that need to be wound down and where government oversight is determined the most appropriate means to do that while protecting jobs and ensuring societal goals. For example, the UK oil and gas industry, where 30,000 jobs at risk (Robertson 2020), but full profits cannot be extracted from these assets without breaking the UK's commitment to net-zero emissions by 2050.

A key question is how high the threshold should be for a public equity programme for targeting only firms with future potential to survive, grow and invest. Figure 4 below illustrates the consequences for jobs, investment and state finances of setting a higher or lower future potential threshold for firms that are offered state equity swaps or injections. If the threshold is set too low, too many firms will be kept on life support instead of freeing resources for a new start or for competitors. If the threshold is set too high, many firms may unnecessarily go under, productive capacity and jobs will be lost, and the government foregoes potential capital gains.

Figure 4: Optimal future potential threshold criterion for allowing state debt/equity swaps

**Jobs, investment, or
state finances**



These criteria are relevant for public equity capital injections that are motivated by large numbers of firms becoming overleveraged during a crisis. In later chapters we will propose criteria that allow for consideration of social benefits, or 'missions', and institutional criteria that identify the circumstances under which the state has sufficient professional competence and tools to act as the supportive owner of commercial assets. Mission-driven public investment funds could have value-maximising as an objective for their aggregate portfolios, even if individual firms may not have a positive market valuation.

2. Proposed public wealth funds and estimated costs

The Table 1 (above) lists the state equity injections that European countries were planning as of October 2020. Instead of guessing how large equity investments might turn out to be in the end, a rough calculation of the fiscal consequences is presented here for the scope of the kind of public wealth funds proposed in this report. Obviously, these calculations are subject to high levels of uncertainty, not least because they depend on future policy choices, but they provide some kind of benchmark for the potential task involved in instituting wealth funds and the fiscal ramifications.

In the following chapters we will delineate a path for de-leveraging firms by offering a public equity capital injection, while still adhering to the sound principles for state investment previously outlined.² Most of the firms with unsustainable debts are SMEs. It would appear administratively daunting to offer equity to many of these. Even if it were possible, the state could hardly act as a knowledgeable and constructive owner. For SMEs, Covid-19-related debt provided by governments will probably have to be forgiven, although policymakers might also consider the use of cash grants with a temporary increased corporate profit tax as a form of conditional pay back (a more equity-like structure) (Boot et al 2020). In the following pages, we leave aside how the state may handle the large volume of loans it has granted to SMEs and instead focus on three narrower tasks for which a public capital injection is realistic.

We propose five types of public wealth fund (PWF) could be created to support different types of firms and to achieve separate policy objectives. More detail on each PWF is provided in chapters 4 to 6 of the report.

First, some strategically important firms facing bankruptcy can apply to an independent and professionally managed *national wealth fund* (NWF) capable of evaluating the need for a potential capital injection. Currently airlines are an example, but in other crises other types of firms can be in a similar position. In this way an NWF will automatically act in a countercyclical fashion. Even the mission-driven wealth funds outlined below can be given a countercyclical role by boosting the capital of an investment target during recessions.

Second, *public venture capital funds* could provide support to firms or prospective startups that have future potential and which the state may want to invest in to promote growth and jobs.

Third, a public climate fund would focus on investment that shifts markets towards decarbonisation.

Fourth, regional funds would promote levelling up and invest in local startups that are too risky for private investors.

Fifth, local governments should be encouraged to aggregate public real estate in *urban wealth funds* (UWFs) that actively work with urban renewal and housing projects. These UWFs can also offer relevant and adjacent private sector owners the opportunity to participate in development projects, as has been done by London Continental Railways at King's Cross and other developments in the UK.

² A related list of principles for state investment banks has been proposed by other authors (Mazzucato and Macfarlane 2017). State investment banks generally provide loans rather than equity investments.

Using this structure, the scope for PWFs and their fiscal consequences are calculated below, first for the UK and then for the EU as a whole. In chapter 3 we analyse in more depth the governance structure of PWFs.

2.1 What would public wealth funds cost?

As a way of calculating the maximum conceivable fiscal cost of wealth funds, we begin with TheCityUK estimate that £33-36 billion of government loans to firms are unsustainable. Half of that has gone to SMEs for which we assume no government equity is realistic. Assume, however, that the other half, about £17 billion to medium-sized and large firms, is written off in deals in which the government receives equity initially worth half the size of the foregone debt, about £8 billion. This is processed over a course of three years, so the annual investment is £2.7 billion.

Now we build three scenarios. In the maximum conceivable cost to the state scenario, the value of the state equity erodes to zero, in which case the fiscal cost is £2.7 billion a year, or 0.12 percentage points of GDP (GDP was £2.28 trillion in 2020). In the medium scenario the value of the equity is upheld. In that case the fiscal cost is zero. The government has simply changed cash for equity without affecting its balance sheet (the written-off loans are viewed as a sunk cost). In the minimum cost to the state scenario, the equity earns a return equivalent to the capital gain on equity of 5 percent, slightly below the worldwide average capital gain over the last century, which in various studies is estimated to have been around 6 percent per year (see, for example, Jordà et al 2019). In all scenarios the rate of return is net the fixed costs of starting up the PWFs and their running costs.

We assume that all funds do not replace current expenditure, but represent new money (except the urban wealth funds). To build our model further, we make the following assumptions about current UK government expenditure on venture capital and on climate; and the following assumptions on the structure of regional wealth funds and urban wealth funds:

Public venture capital for growth: Public funding for R&D (government, research councils and the devolved higher education funding councils) was £9.6 billion in 2018, 26 percent of the total. Here we assume that a growth-oriented public venture capital wealth fund invests at most 5 percent of that sum or about £500 million annually, or 0.02 percent of GDP. In the minimum cost to the state scenario we assume that the funds reach a value of £5 billion and earn an annual 5 percent capital gain.

Climate funds: UK government expenditure for environmental protection amounts to about 0.7 percent of GDP, according to Eurostat.³ Much of that is for waste management. Here we assume, nevertheless, that at most 5 percent of that sum would be invested in a climate wealth fund per year, or 0.036 percentage points of GDP. In the minimum cost to the state scenario we assume that the fund reaches a value of £5 billion and earns an annual 5 percent capital gain.

Regional wealth funds: The UK, through 17 national programmes, benefits from European structural and investment funds (ESIF) funding of €16.5 billion. Here we assume that an amount corresponding to 5

³ This figure should include the money going toward climate innovation from the Department for Business, Energy and Industrial Strategy: https://ec.europa.eu/eurostat/statistics-explained/index.php/Government_expenditure_on_environmental_protection.

percent of that sum is invested in a regional wealth fund. The net cost of this is complicated as the UK is leaving the EU. Since we are trying to arrive at a maximum conceivable cost, we assume that the regional wealth fund represents an additional cost rather than merely replacing current regional expenditures, to the tune of £0.8 billion or 0.035 percentage points of GDP. In the minimum cost to the state scenario we assume that the funds reach a value of £5 billion and earn an annual 5 percent capital gain.

Urban wealth funds: Here we assume that the funds are financed by transfers of property that the local governments or the state already own and additional project loans for renewal projects. The fiscal cost is then zero if the projects do not return a profit, as assumed in the maximum and the medium scenarios. If they do return a profit of 5 percent, as assumed in the minimum scenario, and the fund reaches a size (value of the equity) of £10 billion, then the annual profit to the state or the local government, depending on the ownership situation of the paid-in capital to the fund, could be £500 million or 0.02 percentage points of GDP.

Table 2. Annualised fiscal cost of wealth funds in different scenarios in the UK (share of GDP in percentage points)

Wealth funds	Scenarios		
	Maximum	Medium	Minimum
NWF equity purchase during crisis	0.012	0	-0.017
Public venture capital wealth funds	0.02	0	-0.01
Climate wealth fund	0.036	0	-0.01
Regional wealth funds	0.035	0	-0.01
Urban wealth funds	0	0	-0.02
Total	0.10	0	-0.067

Thus, the total fiscal cost even in the maximum scenario is small, just above 0.1 percentage points of GDP. In the minimum scenario it might even return ‘negative cost’, that is, a profit. Compared to other measures to restart the economy, the potential costs are small and there is an upside. Over time these state investments could cause public assets to increase. However, it should be borne in mind that even that effect would be small compared to the already existing stock of total public assets for the UK, which is estimated at roughly equal to GDP, or above £2 trillion. In the end, whether the direct fiscal costs are seen as large or small crucially depends on what the public wealth funds achieve. That is the subject of later chapters.

2.2 The scope of wealth funds after the pandemic in other European countries

The calculation for EU countries follows the same principles as described for the UK. The results for the EU as a whole are also similar, even though this hides differences between countries. For example, some, such as Spain, receive much larger regional support today than the UK, but others receive less.

Data on government lending to firms in the EU is not very reliable. Several mappings indicate that there are big differences between countries, but that the average may be slightly higher than that in the UK (ECB 2020).⁴ Extrapolating from the countries that the ECB mapped leaves us with an estimate of 0.48 percent of EU GDP in government lending or guarantees, spread out over three years. Making the same assumptions for the three scenarios as made for the UK, the value of the state equity in an NWF erodes to zero in the maximum cost to the state scenario, in which case the fiscal cost is 0.16 percentage points of GDP. In the medium scenario the value of the equity is upheld. In that case the fiscal cost is zero. In the minimum cost to the state scenario, the equity earns a return of 5 percent per year.

Again, we assume that all funds do not replace current expenditure, but represent new money (except the urban wealth funds). Further we make the following assumptions:

Public venture capital for growth: Public funding for R&D (government, research councils and the devolved higher education funding councils) was 0.7 percent of GDP in 2018. We assume that growth-oriented public venture wealth funds could invest at most 5 percent of that sum, or 0.035 percent of GDP. In the minimum cost to the state scenario we assume that the funds reach a value of £5 billion and earn an annual 5 percent capital gain.

Climate fund: EU government expenditure for environmental protection amounts to about 0.8 percent of GDP, according to Eurostat.⁵ Much of that is for waste management. We assume, nevertheless, that at most 5 percent of that sum would be invested in a climate wealth fund per year, or 0.04 percentage points of GDP. In the minimum cost to the state scenario we assume that the funds reach a value of £5 billion and earn an annual 5 percent capital gain.

Regional wealth funds: ESIF funding, including the national add-ons, amounts to about €92 billion per year, or 0.5 percentage points of GDP. We assume that 5 percent of that could be invested in a regional wealth fund. The net cost would then be, at most, 0.025 percentage points of GDP if no return is earned, or zero if the investment is recouped. In the minimum cost to the state scenario we assume that the funds reach a value of £5 billion and earn an annual 5 percent capital gain.

Urban wealth funds: Here we assume that the fund is capitalised by transfers of property that the public sector already owns. The fiscal cost is then zero if the projects do not return a profit, as assumed in the maximum and medium scenarios. If they do return a profit of 5 percent, as in the minimum scenario, and the fund reaches a size (value of the equity, extrapolated from our assumption for the UK) of £70 billion, then the annual profit to the state or the local government, depending on the ownership situation of the paid-in capital to the fund, could be £3.5 billion, or 0.02 percentage points of GDP.

⁴ E.g. France has lent much more than the UK, but Germany much less: <https://www.pie.com/blogs/realtime-economic-issues-watch/government-guaranteed-bank-lending-europe-beyond-headline>

⁵ This figure should include the money going into to climate innovation from the Department for Business, Energy and Industrial Strategy. https://ec.europa.eu/eurostat/statistics-explained/index.php/Government_expenditure_on_environmental_protection

Table 3. Annualised fiscal cost of wealth funds in different scenarios in the EU (share of GDP in percentage points)

Wealth funds	Scenarios		
	Maximum	Medium	Minimum
NWF equity purchase during crisis	0.016	0	-0.022
Public venture capital wealth funds	0.035	0	-0.017
Climate wealth fund	0.04	0	-0.01
Regional wealth funds	0.025	0	-0.014
Urban wealth funds	0	0	-0.02
Total	0.12	0	-0.083

It may seem surprising that the fiscal costs of equity programmes would be so low, but in fact this is in line with international experience from previous financial crises. The Swedish government made a profit on its loans and capital injections after the country went through a deep crisis in the early 1990s. Similarly, the costs of the US bailout during the financial crisis 2007-08 to the government were initially estimated to be as much as \$700 billion. However, the Troubled Asset Relief Program (TARP) recovered funds totaling \$441.7 billion from \$426.4 billion invested, earning a \$15.3 billion profit, or an annualised rate of return of 0.6 percent, and perhaps a loss when adjusted for inflation (Emergency Economic Stabilization Act of 2008 2020).

2.3 Accounting for public sector wealth

Properly understanding and making visible the longer term impacts of public investment requires for them to be accounted for correctly. The absence of a proper balance sheet, fully integrated into the budget, distorts the incentives for politicians. Governments today still focus mainly on debt, without recognising the value of their physical assets, using measures such as 'net debt' or 'debt/GDP' as key targets. This has led to wasteful short-term decisions, such as when the water utilities were privatised, because of the need for large-scale investments which negatively impacted the misguided debt measures. A privatisation might enable the reduction of debt relative to GDP. However, unless the asset is sold for more than its balance sheet value, the privatisation will reduce net worth and the government's balance sheet strength.

UK examples of wasteful privatisations include Royal Mail, the National Grid and large swathes of public land (further explored in chapter 6) (Christophers 2018, 2020). Not surprisingly, academic studies have shown that public sector net worth in the UK declined sharply during the years of privatisation, reflecting in part the under-pricing of assets sold (Florio 2002).

A focus on debt alone has also led to governments embracing much-criticised financial techniques such as the Private Finance Initiative (PFI) or Public Private Partnerships (PPP), where the main advantage was keeping debt off the government's balance sheet, which in the long run can end up costing the tax-payer much more (National Audit Office 2018) and lead to an undue transfer of public wealth to private sector partners.

With proper accounting, governments could focus on net worth — the measure used in the private sector — instead of debt alone. With net worth as the official key target, an increase in debt to finance an investment is matched with an increase in assets. This would then incentivise investments in government-owned assets, rather than encouraging wholesale privatisation, which may be for the wrong reasons and at the wrong price.

Using 'accrual-based accounting' — recording revenues and expenses when they are incurred — provides a much better guide to the long-term costs and benefits of public ownership of assets, including equity holdings in commercial assets and real estate. In addition, liabilities should include the non-debt liabilities on the government's balance sheet, such as public service pensions.⁶ Making major financial decisions and budgeting on the basis of accrual information enables decision makers to see the planned impact of a year's activities on the net worth of the government — what might be termed 'public wealth' (Detter and Fölster 2015). The value of a balance sheet approach to fiscal decision-making is increasingly being recognised. The work of the IMF, reported in the October 2018 *Fiscal Monitor*, was a major step forward in this respect (IMF 2018).

For example, a city like Pittsburgh in the US does not appear to be particularly wealthy by its own accounting. Using accounting standards followed by most cities in the United States, Pittsburgh reports assets valued at historical costs. If instead it was to report according to IPSAS Board (IPSASB), which permits the use of market value, the value of the assets would probably be almost 70 times larger. In other words, the city is operating without fully putting its hidden wealth to work. Even a modest 3 percent return yield from the portfolio of real estate would be more than the total revenues, including taxes, currently reported in the financial accounts of the city.

Poor utilisation or governance of public assets constitutes a worldwide phenomenon partly made possible due to the lack of modern accounting in the public sector. Without knowledge of the value of assets it is also hard to assess risk. The ability to identify which risks pose a threat to successful operations is a key component of strategic business planning, where the financial side of risk management relies upon audited numbers and accrual accounting. At the corporate level this requires adhering to the highest quality global accounting standards, the International Financial Reporting Standards, also known as the internationally accepted accounting standards of IFRS. Ultimately, the responsibility of any commercial business, regardless of ownership, is to minimise the risk and maximise the value of the assets.

More recent research finds that economies with stronger net worth (assets minus liabilities) generally experience shallower recessions and recover more quickly from downturns (Yousefi 2019). They have greater space for countercyclical fiscal policies and are less likely to be forced into short-term fiscal actions that are detrimental in the long run.

So far, only New Zealand has introduced modern accounting and integrated its balance sheet with the budget, using it as a tool for its budgeting, appropriations and financial reporting. Since the public sector reforms in the mid-1980s, New Zealand has achieved and maintained significantly positive net worth,

⁶ This argument is also made forcefully at the EU level, for example by Victor Gaspar: <https://www.imf.org/en/News/Articles/2020/01/28/sp012820-vitor-gaspar-fiscal-rules-in-europe>.

whereas most comparable governments, like Australia and Canada, or larger countries, such as the UK and US, have a negative net worth (Ball 2019a).

Almost two-thirds of governments around the world will shift to accrual-based accounting within the next five years, CIPFA and the International Federation of Accountants have predicted (IFAC and CIPFA 2018). The UK, for example, has made some changes to public financial management similar to those in New Zealand, but, as Ian Ball (2019b), the architect behind the New Zealand reforms, believes, it has not moved far enough to reap the benefits: 'The tragedy of the UK reform process is that it has gone to a great effort to put in place better accounting systems, but then does not use the information those systems produce in its fiscal decision-making' (Smart 2019). The political will required to manage public assets better — to provide full disclosure of these assets and to create the incentives to encourage policymakers to act on that — has generally been lacking (Ball et al 2020).

3. The governance of public wealth funds

The intense debate over state ownership over the last century has often been ideological. Even economists have usually argued on grounds of principle rather than considering what actually works in practice. In this chapter we argue that the merits of state ownership in general, and public wealth funds (PWFs) in particular, hinge entirely on the quality of governance. We first examine what we mean by ‘public wealth’ and consider its scale globally before examining the trend towards the privatisation of state-owned companies which has occurred since the 1980s. The final two sections focus on the governance of public wealth funds in order to benefit society as a whole. This is a preamble to the following chapters that focus on different types of wealth funds.

3.1 Public wealth is larger than most realise

Public wealth has been valued at 100-216 percent of GDP as an average for up to 38 analysed countries — high, medium and low income (Fölster and Detter 2015; IMF 2019). These include only assets that can earn a return, if managed well. It is estimated that better management of government assets could earn 3 percent of GDP in extra revenues each year—that is more than the interest payments advanced countries pay to cover their debt. What are the different forms of public wealth?

Public wealth can be divided into operational assets and real estate assets, the latter being by far the biggest asset segment, the value of which is several times that of all other assets (Detter and Fölster 2018). Excluding public parks and historical heritage sites, these government-owned commercial real estate assets account for a significant portion of each country’s land. But governments often know about only a fraction of these properties, as they don’t have a list of the assets and sometimes not even a proper underlying cadastre or land registry; that is, a system that defines the dimensions, location and titles of all land parcels or a proper public sector balance sheet based on an accrual accounting system that permits assets to be shown at fair market value.

A recent IMF study concluded that among the world’s largest corporations, state-owned enterprises (SOEs) represent 20 percent of their total equity value. The recent growth of SOEs on the world stage primarily reflects the rise of China’s economy, where SOEs still play a large role, along with other emerging market economies (*IMF Fiscal Monitor* 2020). State capitalism has been successful at producing national champions, often protected at home and then able to compete globally. Two-thirds of emerging-market companies that made it onto the Fortune 500 list are state-owned and most of the rest enjoy state support of one sort or another (*IMF Fiscal Monitor* 2020). Governments can provide companies with the resources that they need to reach global markets. They can also insist on mergers that produce global giants.

Even in an economy such as the US, which often perceives itself as having fewer public sector assets, indicative valuations of public real estate in some US urban areas, such as Boston, Los Angeles and Chicago, as well as Salt Lake County, have found tens of thousands of real estate assets.⁷ Many of these were poorly utilised and managed, and sometimes just forgotten. These are extensive portfolios much beyond the requirements needed to carry out the policy objective of the government. The value of public real estate within each of these urban areas constituted well over half the total value of the local real

⁷ Valuations made by Urban 3, a US consulting firm.

estate market and was equivalent to the GDP of each jurisdiction.⁸ Similar numbers have been produced in Europe, especially for Finland.⁹

The UK does not have a public wealth fund (PWF) at the present time. UK Financial Investments (UKFI) was created in November 2008 as part of the UK's response to the financial crisis to help bail out private banks. When most of the shares had been sold, UKFI ceased trading on 31 March 2018, and its business and assets were transferred to UK Government Investments (UKGI). Described as the government's 'centre of excellence in corporate finance and corporate governance', it advises on shareholding for 16 publicly owned businesses and arm's-length bodies, currently employing over 50,000 staff and with gross assets of almost £155 billion. These include financial sector bodies, such as the government's shareholding in the Royal Bank of Scotland Group plc and the British Bank, the Post Office, Channel 4 News and the Ordnance Survey mapping company. Although it has been able to attract a professional board and a system of regular secondments from the private sector, it does not actually hold any assets on its balance sheet. Rather, it is an advisory unit across government departments providing expertise in corporate finance activities, asset sales and other issues. Nevertheless, UKGI could play an important role in supporting the setting up of proper public wealth funds in the UK.

3.2 Privatisation is not the only game in town

Sentiments around government-ownership of firms have swung back and forth several times over the past decades. During the 1970s European governments nationalised firms in large numbers, mostly due to a combination of a political shift to the left and attempts to rescue sectors that were hit by globalisation and oil crises. Around the same time, governments in developing countries either nationalised firms or created new government-owned firms in large numbers. By the early 1980s, SOEs accounted for 8 percent of output, on average, in advanced economies and 15 percent in developing countries (Sheshinski and Lopez-Calva 2003).

Since then the debate surrounding public wealth has been almost completely dominated by the question of whether to privatise or not. This debate has usually phrased the question as a matter of principle or given circumstances. Traditionally, economists have looked for intrinsic properties in various markets that indicate market failures (which can include non-existent markets) to motivate state interventions. Public choice and new public management theories have also argued that government failures (caused by rent-seeking or corruption) can be just as, if not more, problematic than market failure, making privatisation even in the presence of various market inefficiencies more justifiable (Grand 1991). However, the efficiency of markets thesis rests upon assumptions such as perfect information and perfect competition that have never existed in reality (Mazzucato and Ryan-Collins 2019). Historical evidence suggests that the state can play a wider and more coherent market-creating and market-shaping role than a piecemeal fixing of market failures can achieve (see, for example, Mazzucato and Penna 2016; Mazzucato 2018).

A question that has received much less attention is the financial impact of the existing portfolio of public assets on the public sector balance sheet and its net worth, as well as how policy might invest in and

⁸ Apart from in the City of Pittsburgh where the value of the public portfolio was around a third of the total real estate market. However, 1x GDP of the City of Pittsburgh.

⁹ Valuations done by Datscha, since December 11, 2019 owned by [Real Capital Analytics \(RCA\)](#) in the US.

exploit these assets to boost productivity and generate fiscal space, if managed professionally. Putting to one side the social objectives that might be associated with a PWF, the question of whether to privatise hinges on how well public assets are managed compared to what a private owner might accomplish, which determines whether the government would be able to sell the asset for more than its current market value represented on the balance sheet. Otherwise privatisation will reduce net worth and the government's balance sheet strength.

The empirical literature on the performance of SOEs suffers from a lack of reliable data as many SOEs have substandard accounting and disclosure standards, while attempting to benchmark against similar businesses in the private sector can be difficult. In many cases, for example railways, the regulatory framework in which private and public firms operate has been so different as to obviate meaningful comparison (Blix and Jordahl 2020). The extant theoretical and empirical literature indicates that, on average, SOEs are less efficient than their private counterparts (Megginson and Netter 2001; Megginson 2018). Research reviewed by the IMF indicates that SOEs and other operational assets, taken as a whole, underperform and are less productive than private firms by as much as one-third on average (*IMF Fiscal Monitor* 2020). Not all studies find significant differences, however, and there are notable exceptions of what seem to be very successful state-owned firms, including in Singapore and Sweden (discussed later).

Either way, without property accounting standards it is very difficult to ascertain the true scope of these claims and to understand any hidden subsidies or other support mechanisms.

SOEs are often monopolies or quasi-monopolies. Monopoly profits may be whittled away by rents to stakeholders, such as low prices to customers, high prices to suppliers or high wages. In some cases, they must produce mandated services. State-owned postal services in many countries, for example, have a monopoly on distribution of mail, but also an obligation to serve rural areas where this entails a loss. In fact, a key factor in some of the above-mentioned studies appears to be the degree of competition. Perhaps counter-intuitively, when firms face competitive environments, state-owned firms sometimes perform as well as private firms (Bartel and Harrison 2005).

The most fruitful research, however, focuses on the reasons behind state-owned firms' success. In fact, SOEs seem to perform as well as private firms when they follow the management and corporate governance practices of private firms (Kole and Mulherin 1997). Recent research by Bloom and van Reenan (2010) involving surveys of management practices in tens of thousands of firms ascertains to what extent firms measure and follow up targets, provide their employees with incentives, manage human capital and other measures.¹⁰

A key finding in these studies is that these management practices are clearly linked to the firms' outcomes. Not just are firms that follow best practice more productive and profitable, but the connection is convincing even in non-commercial settings. For example, hospitals with better management practices show higher patient survival rates.

¹⁰ Bloom and van Reenan (2010) and Bloom, Genakos, Sadun and van Reenan (2012) describe the double-blind survey techniques and randomised sampling used to construct management data over many types of organisation and countries.

These studies also provide some insight into the problem a government faces in governing the enterprises it owns. In many cases firms are not fully exposed to product market competition and commercial risk. This may make it more difficult to instil best management practices. This challenge is even greater if governments interfere in firms' decisions or if a government is negligent of its responsibility for good governance and maintains a complete hands-off approach. The key question, which we will return to in later chapters, is how the government as an owner can ensure active and professional governance without the risk of political interference.

3.3 The need for strong corporate governance

At certain times the UK and several other European countries have governed state-owned companies through holding companies or wealth funds. Much of that was wound down during the wave of privatisation that swept the world in the 1980s.

Sweden became perhaps the first country in Europe to resist wholesale privatisation, the prevailing international trend in the wake of the economic and financial crisis of the 1990s. Instead, Göran Persson, the social democratic prime minister, installed active management of public assets, as he wanted to prove that governments can, indeed, be active and competent owners of commercial assets.

Thus, began a three-year experiment (1998-2001) of actively managing the Swedish public portfolio 'as if owned by private shareholders' (Financial Times 1999). The Swedish Experiment included consolidating the portfolio and politically insulating it, in order to introduce commercial discipline and corporate governance. In the end, the value of the portfolio increased 12 percent. Also, nearly one-third of the original portfolio was seen as non-core and subsequently divested at full market value. The value of the privatised part of the portfolio sold during these three years was almost five times the value of what was sold during the eight years when privatisation was the main policy objective of the previous conservative government. The value increase of the remaining portfolio was almost twice that of the value growth of the local stock market, which rose 6 percent over the same period.¹¹

This experiment introduced a corporate governance focus for public commercial assets more widely. Corporate governance is necessary to align and coordinate the interests of the upper management with those of the shareholders. In large firms, and especially in firms owned by the public sector, there exists a considerable gap between the interests of the owners and the management. This 'principal-agent' problem can arise between upper-management (the 'agent') and the shareholders (the 'principals'), who, in the case of SOEs, are ultimately a country's taxpayers. The shareholders/taxpayers and upper management may have different interests, where the taxpayers typically want efficiency and productivity that benefits the economy as a whole and financial profit that could supplement the budget instead of higher taxes or austerity, while the upper management may be driven at least in part by other motives, such as their personal financial compensation, or be influenced by their political masters, who may have other motives such as short-term political priorities.

Weak governance practices with public assets arises from opposing objectives, political interference, and lack of transparency and public scrutiny. Evidence of how a poor corporate governance environment

¹¹ Further detail on the Swedish model of wealth funds is provided in Appendix 1. See also Detter and Fölster (2015).

negatively affects the performance of public commercial assets has been demonstrated in numerous empirical studies (Estrin et al 2009; Megginson and Netter 2001; Shleifer and Vishny 1997). One of the issues is that governments may be tempted to use their assets to appease various interest groups.

One example is France, where business interests and unions lobby intensively and support governments that take a stake in industrial firms, such as Alstom, which it owned until 2006, using their ownership power to push for high wages and at the same time propping up the firms with contracts or regulations that also support private suppliers or other firms in the business.¹²

Corruption can also be a challenge for state-owned firms. The OECD's first report on international bribery (2014) analysed 400 international bribery cases. One conclusion was that most bribes go to managers of SOEs and not just in poor or non-democratic countries. For example, one study of the US found that those states with a greater share of the economy in government hands also have more corruption (Goel et al 1998). Causation appears to go both ways. Another study found that in states with more corrupt government officials state activities are more often directed toward areas where it is easier to be corrupt (Liu and Mikesell 2014). The Italian state holding company, *Instituto per la Ricostruzione* (see Appendix 1), was badly affected by corruption in its later years.

Of course, private sector corporate governance is also vulnerable to these shortcomings, in particular as the distance between the management and owners has increased with the growth of global stock markets. This has led to a pressure to reform corporate governance in the private sector, prompted by shareholder disquiet in the early 1990s over perceived shortcomings in corporate structures and their ability to respond to poor performance. The corporate governance 'revolution' had its origin in the UK with the Cadbury Report in 1992 on the financial aspects of corporate governance, to which was attached a code of best practice. Aimed at listed companies and looking especially at standards of corporate behaviour and ethics, the Cadbury Code was gradually adopted in the UK and beyond as a benchmark of good boardroom practice.¹³ Following a number of major corporate and accounting scandals in the US, including those affecting Enron, Tyco and WorldCom, the US government enacted a law in 2002, commonly called the Sarbanes-Oxley Act, which covers the responsibilities of a public corporation's board of directors and added criminal penalties for certain misconduct.

These various reforms have addressed some issues with private sector corporate governance, but by no means all. One current major concern is that firms have become excessively short-termist, focussing on quarterly returns rather than longer term improvements in productivity. This has led to a strategy of share buy-backs, whereby firms either borrow (taking advantage in recent times of very low interest rates) or use profits that otherwise could have supported wages or capital investment to buy up their own stock, inflating share prices in the process (Lazonick 2014). A parallel for PWFs might be governments putting pressure

¹² For example, until 2006 the French government had an equity stake in Alstom, which it rescued from bankruptcy due to its high costs with ad-hoc government orders for high-speed trains that were not be allowed to run at high speed: <https://www.ft.com/content/9be75d5c-a72e-11e6-8898-79a99e2a4de6>.

¹³ This was followed by a number of other efforts, such as the Greenbury Report, which added a set of principles on the remuneration of executive directors (in response to 'fat cat' scandals, not the least British Gas chief Cedric Brown, whose 75 percent rise in compensation angered both unions and small shareholders): <https://www.frc.org.uk/directors/corporate-governance-and-stewardship/uk-corporate-governance-code/history-of-the-uk-corporate-governance-code>.

on PWFs to generate higher short-term returns for spending purposes or to reduce budget deficits at the expense of longer term strategy. Again, establishing political independence and using net worth accounting should help reduce such pressures.

In the meantime, the development of the *OECD Guidelines on Corporate Governance of State-Owned Enterprises* was started after the Swedish Experiment and finally published in 2005. It initiated a greater focus on this vast but largely forgotten asset class. Complementing the *OECD Principles of Corporate Governance*, it contained recommendations to governments on how to ensure that SOEs operate efficiently, transparently and in an accountable manner (OECD 2015). For quite some time these were the internationally agreed standard for how governments should exercise the state ownership function to avoid the pitfalls of both passive ownership and excessive state intervention.

Nevertheless, the financial perspective of SOE governance is still largely missing. This is partly due to the absence of proper accounting in the public sector, as already described in chapter 2. 'Proper' in this context means accounting in a way that fully reflects all revenues and expenses, as well as the range of physical and financial assets and liabilities.

3.4 How to govern a public wealth fund

A government bureaucracy does not usually have the capacity to manage commercial risk and is not intended nor designed for such a purpose. This is why it has become common to delegate the management of commercial assets owned by the public sector to a separate professional institution — an independent public wealth fund that is able to use the same tools that are required for commercial assets in the private sector (Detter and Fölster 2015).

In fact, the skills needed to succeed with any wealth fund are very specialised. Deep knowledge of the technology it invests in, the scientific environment and of the experts in the field are crucial. That is why very specialised venture capital funds around Silicon Valley have succeeded, while the more generalist investors like Softbank have not. Specialised skills are important both at the board level and for the staff in public wealth funds; and they are usually quite different from the kind of competence needed in funds that only focus on financial market investments, such as so-called sovereign wealth funds (SWFs).

These insights have emerged after almost a century of trials and tribulations, often involving laying to waste taxpayers' money from ideologically driven nationalisations, as well as privatisations, without a proper analysis and understanding of its impact on the public sector net worth. Instead, the focus here is on how governance of public assets can be as effective as possible, given the challenges that public owners face.

A government owner of commercial assets faces many conflicts of interest, not least with its dual role as regulator of the business sectors where it also has an ownership stake, but also as the law enforcer and regulator of the banking system that lends to firms in these sectors (Swedish government 2012). Politicians are, understandably, generally more concerned about social welfare issues such as employment than the efficient running of large enterprises. The conflicting objectives with public sector ownership reduce accountability and clarity of purpose for managers and board members. Telling a manager to maximise multiple objectives 'leaves the manager with no objective' (Jensen 1986). Such diffuse government ownership and objectives also make it more difficult to implement incentive systems for managers (Shirley and Walsh 2000). For private sector owners in public limited companies this is more straightforward, but even so it is fraught with principal-agent issues (Alchian 1965).

Delegating technical responsibility to independent professionals should therefore come naturally in the public sector, as politicians are generally not keen to be measured and held accountable against narrowly defined targets. For some time, governments around the world have delegated public management of several core financial operations to separate professional institutions, including government debt to the debt management office and interest rates to the central bank.

Similarly, some governments have delegated the management of surplus revenue from exports to SWFs. These SWFs, often in resource-rich countries, have succeeded in generating wealth for society and future generations by investing surplus revenue in well-developed international stock markets or in real estate in stable developed markets. Note, however, that SWFs normally handle purely financial assets that require quite different skills than the public wealth funds that are the focus of this report.

Another insight is that it is good practice to develop an explicit policy on public ownership. A taxpayer stake is not a budget expense but an investment and should be treated as such. The government's aims as an owner is to ensure profitability and financial strength, and to exit from any unwanted ownership at the right time and at the right price.

Perhaps the strongest example of a successful portfolio of public wealth funds comes from Singapore (Box 1) which used these vehicles to help transform itself from developing to developed status in a single generation. By following the Singapore example, better governance of government assets could earn additional revenues that could total more than most developed countries collect in corporate tax or pay to service their debt. This is in part why a place like Singapore can afford such low taxes and yet enjoy spectacular economic growth. In a post-Covid world this effort could be critical.

Box 1: The Singaporean public wealth funds success story

Professional governance of public commercial assets has been a core component of Singapore's strategy to move the economy from economic backwater to one of the world's richest economies in the space of just half a decade. In 1971, the newly independent state of Singapore created a monetary authority and delegated management of the asset side of its public sector balance sheet to public wealth funds. Its commercial assets thereby became the management responsibility of professionals inside these funds.

Singapore Government Investment Corp (GIC), was set up as the SWF primarily concerned with managing reserve liquidity, typically investing in securities traded on major international mature markets. SWFs are designed to optimize a portfolio by trading securities to achieve balance between risk and returns.

In 1974 Temasek was set up as the national wealth fund (NWF), the asset manager concerned with active management of a portfolio of operational assets, most often domestic. NWFs seek to maximise the portfolio value through active management, including the development, restructuring and monetisation of the individual assets.

Temasek consolidated all the commercial assets owned by the government, including existing holding companies and state-owned enterprises, as well as previously existing monopolies, and utilities that had recently incorporated and still resided within the respective ministries, including some real estate. The independent holding company was used to separate the regulatory and policymaking functions of government from its role as a shareholder of commercial entities. Since its inception, total shareholder return, measured in Singapore dollars, has averaged 15 percent per year (Temasek annual reports).

Many of Temasek's holdings are now world-leading companies within their sector, such as the telecom operator Singtel, the largest company by market capitalisation on the Singapore stock exchange; DBS Bank, the largest in Southeast Asia; and PSA International, one of the largest port operators in the world. Other well-known brands within Temasek include Singapore Airlines and ST Engineering, one of Asia's largest defence and engineering groups, as well as CapitaLand, one of Asia's largest real estate companies. Temasek's political insulation is reinforced by professional boards and a risk management system that puts responsibility and accountability solidly with the board of each holding.

The board of Temasek, as well as those of its holdings, consists of independent non-executive directors recruited on merit. Almost half of both management and staff are non-Singaporeans. Transparency and clear objectives are also strengthened by Temasek having a credit rating.

The joint market value of GIC and Temasek significantly exceeds Singapore's public liabilities and is more than 1.7 times the annual GDP of the city state. As a result of this strong balance sheet, Singapore has consistently received the top credit rating — AAA — from the three main credit-rating agencies. Both funds deliver a significant surplus to the government (Detter et al 2019).

Goh Keng Swee, the deputy prime minister of Singapore at the time, believed strongly that independent institutions with commercial discipline and governance tools borrowed from the private sector would be most appropriate in managing commercial assets (Goh 1972). Singapore's emphasis on efficient governance has shored up public support, while many countries that have neglected governance have instead seen waves of support for privatisation.

These various insights support establishing politically insulated, but wholly government-owned, public wealth funds, at arm's-length from short-term political influence with sole ownership responsibility, including for any potential exit strategy. Even though the funds are wholly government-owned, these in turn can share ownership of firms with private investors. In fact, that will be normal outcome of many bailout situations, or situations where the wealth fund has invested in a startup early, but crowds in private investors later.

Governments should be able to engage firms that they own through public wealth funds in wider policy aims, missions or industrial strategy. But this should be done with transparent owner directives handed to

the boards of the public wealth funds rather than politicians getting directly involved in individual firms. The boards should be recruited from politically independent experts. Channels or forms of communication that are undisclosed and lend themselves to opportunism should be avoided.

Through open owner directives the government can coordinate the public wealth funds' activities with other government policies and missions. This can have a direct and positive impact in some cases. For example, if a public wealth funds bails out an airline company it could demand and finance investment in more fuel-efficient planes, which are good for business and furthers environmental policy.

However, if the government, through owner directives, imposes costs for mission achievement on the firms that the funds own, four problematic issues arise. First, the firms may lose business to competitors, obstructing mission achievement. Second, it becomes much more difficult to monitor whether losses are due to mission costs or inefficiency. Third, if there are other minority owners it will usually be illegal for a majority owner to impose costs on the firm that affect minority owners. Fourth, the public may lose confidence in perpetually loss-making state-owned firms that will be accused of being inefficient. Eventually some government will likely privatise those firms.

To avoid these problems, we suggest that, as a rule, governments should compensate firms for mission achievement in a transparent way. For example, the Swedish government has engaged both state-owned and private steel companies in one of Europe's most ambitious decarbonisation plans, but offers to pay for mission costs in a transparent way without distorting competition (Fossil Free Sweden 2020).

Transparent financing of missions or industrial strategy in a way that does not distort competition also stands the best chance of avoiding the issue of state subsidies. Within the EU many types of state subsidies to firms are illegal. Even countries outside the EU face difficulties in agreeing trade treaties if they favour individual firms, be they state-owned or private, as is illustrated by the Brexit negotiations, the dispute over Boeing and Airbus or the disputes over Chinese state-owned firms. Both the EU framework and most trade agreements allow instead for various forms of transparent financing of government policy aims that are given on terms that do not distort competition.

Given the inherent weakness of public sector corporate governance practices described above, including opposing objectives, political interference, and lack of transparency and opportunities for public scrutiny, governments need to pay special attention to five fundamental principles for public wealth funds in order to mitigate the conflicts of interest that exist with public assets:

1. **Transparency:** Achieving the same standards of accounting, transparency, risk management and corporate governance as for a listed holding company, including IFRS accounting, timely quarterly and annual reports made available online. This should be supported by a wider public sector balance sheet based on audited numbers and accrual accounting integrated with the budget, based on International Public Sector Accounting Standards (IPSAS). This enables governments to better manage their revenues, expenses, assets and liabilities with a similar approach as for the corporate level (Ball 2020).
2. **Clear objectives:** Having value maximisation as the sole objective is paramount. For some of the funds we propose this means maximisation of commercial value; for others value can be defined differently in terms of social or public value. In either case, anything other than value maximisation would distort competition and open the door to both financial failure, waste and corruption.

3. Be an active owner: Transparent owner directives should be used to align public wealth funds' governance of firms with policy goals, missions and industrial strategy. While PWFs would be operationally independent from a balance sheet perspective, key ministries, in particular the ministries of finance and industrial policy, still have a coordinating role to ensure their activities are aligned with wider government policy. In practice this would mean coordinating business investment plans; identifying and activating technological interdependencies and synergies; and shaping the long-term strategies of operating companies in line with strategic public policy objectives, such as decarbonisation. The funds should also help corporates and startups with partnerships and structural deals that improve the chances of success. That can also mean selling or merging startups with other firms along the way.
4. Political insulation. The portfolio should be kept at arm's-length from short-term political influence, including avoiding political appointees at every level, as well as on the board/supervisory board. This also serves as protection for politicians. Clearly, delegating the responsibility to the board comes with accountability. Successfully insulating the holding company and the portfolio will also be the best foundation to recruit the relevant capacity from the private sector. Market-based incentive systems are important, but secondary to the ability to work in a truly professional environment. 'Market-based but not market-leading compensation', as expressed in the Swedish government policy guidelines for SOEs, is the balance to make compensation politically acceptable, along with showing results (Swedish government 2009).
5. Don't do harm: Avoid investments that crowd out other firms or investors. If the current expected market value is positive, crowd in private venture capital. If not, plan to crowd in private venture capital at a later stage when there is less uncertainty.

These five principles are connected; like the spokes of a wheel, all must be equally strong and tight in order for the wheel to turn smoothly and with least wear. Otherwise the wheel soon bends. Political independence without transparency will create a behemoth lacking checks and balances; political independence without a clear objective becomes a wrecking ball against fair competition and efficient capital allocation. Keeping a clear objective is not possible without both transparency and political independence. Each principle must be carefully reflected in the governance structure, and continuously upgraded and refined over time.

4. A national wealth fund for mature assets

In The various tasks that public wealth funds (PWFs) can be designed for require different governance structures and guidelines, beyond the general principles formulated in the previous chapter. This chapter focuses on the design of a fund to rescue and govern mature corporations that provide essential services or, for other reasons, require a state capital injection. We call this type of PWF a national wealth fund (NWF).

A government intending to rescue commercial companies that risk going bankrupt by becoming an active owner of these assets can learn lessons from the 'bad bank' concept. This approach has been used successfully in the past and has today become a valuable solution for governments seeking to restructure individual banks or an entire banking system. Successful examples include the US Savings & Loans crisis in the 1980s, the Swedish banking crisis in the 1990s and more recently the European banking crises of 2007-08.

The concept is simple. The bank's assets are divided into two categories. On the one hand are the troubled assets, such as nonperforming loans and businesses it wants to exit, as it seeks to lessen risk and deleverage the balance sheet. What are left are the good assets that represent the ongoing business of the core bank. In the most popular version of the bad bank model is a separate off-balance sheet holding company with an efficient and focused management that has clear incentives for portfolio reduction, in order to maximise the value of bad assets (Brenna et al 2009).

In many respects such a vehicle is very similar to an NWF, in that it borrows tools from the private sector. For all intent and purposes, it should be structured just as any holding company in the private sector, be it a private equity fund such as EQT, or a private holding company such as the Wallenberg family vehicle Investor or Industrivärden, now controlled by the Lundberg family. Albeit that these private entities are listed vehicles, which may not be conceivable in many countries, the ambition should be to emulate the best international standards of listed companies, including corporate governance, transparency and incentive structure, in order to best serve society.

At the moment it is mainly the transport sector and in particular airlines, airports and to some extent railways that are presumed to need substantial equity support by governments, but no doubt other sectors and types of companies will follow. The critical issues for success are that the portfolio is manageable in terms of both number of assets and type of assets, so as to allow a professional restructuring and transformation of the portfolio.

When the Swedish banking system crashed in 1992, Sweden's taxpayers eventually came out of it very well through the creation of Securum as the bad bank, an independent holding company that took over the troubled debt and the collateral behind the debt. The latter was subsequently converted to ownership of several thousand loans and more than a thousand companies, of which two-thirds were listed companies. A large number of the loans were unwound by the summer of 1994, and five operational companies and three real estate companies were divested through initial public offerings (IPOs), after comprehensive restructuring and transformation. Five years later, by the summer of 1997, Securum itself could be wound down (Bergström et al 2003).

Furthermore, following the sale of the government's stake in the so-called good bank, the banks merged into what was to become Nordea and the restructured entity was ultimately sold back into the private sector at a considerable profit in 2013.

One important strategic question for the government was how long Securum was to be given before being liquidated. A decision on the lifetime of the holding company was required in order to find the best balance between minimising the costs to government and maximising the amount that could be repaid to the state when the company was wound up (Bergström et al 2003). Some additional lessons from this experience would include, first, move fast as businesses in need of equity support must determine quickly whether and how firms could be reorganised with respect to both operation and financial structure, and re-emerge as a going concern, with moribund parts of the business closed down. Second, maintain commercial principles. Always invest with the aim of maintaining competitive neutrality. The terms of the investment must be structured in a way that gives the company and its owners no grounds to request more state funding than is necessary, combined with the incentives to facilitate a swift exit, yet it must be sufficient to ensure that the operations can return to profitability without additional government assistance.

A number of countries have gone beyond the temporary bad bank concept and maintain permanent PWFs for corporations that they wish to keep over longer periods. These include Finland (see box below), Italy and Austria (the latter two are discussed in the Appendix). In all three cases, there were periods where the funds played an important role in supporting economic growth and industrial policy goals, but all three were also subject to damaging political influence in other periods. Appendix 1 provides further experience with national wealth funds from various countries that support the conclusions and insights in this chapter.

Box 2: Solidium — the Finnish national wealth fund

Solidium, the Finnish national wealth fund, is a limited liability company that started acting as the professional asset manager of minority shareholdings of nationally important companies in 2008. It was to some extent inspired by its Swedish equivalent — Förvaltningsaktiebolaget Stattum. Solidium's holdings are considered as non-strategic by the government and any divestment of holdings does not require a decision by the Parliament. Hence the management of the portfolio can be regarded as fully commercial, strictly adhering to private sector discipline.

Holdings include Sampo Group, the largest financial institution in the Nordic region, Elisa and Nokia in telecoms, StoraEnso and Valmet in the paper and pulp-related business, as well as SSAB and Outokumpu in steel. The total return on Solidium's equity holdings has been 8 percent per annum and the value of the equity holdings has increased from €5.5 billion to €5.7 billion since 2008, on top of a €5.9 billion paid out as a dividend to the state during the period (Solidium 2020).

The majority of the operational assets owned at the national level, however, remains inside the government bureaucracy, consolidated under the Prime Minister's office, including Fortum, the energy company, Finnair, the airline, Finnavia, the airports, Postia, the postal service, VR, the rail company and Patria, defence, as well as several companies within the oil and gas sector, such as Neste, Gasgrid, Gasum and more. This was motivated by the small nation's proximity and very special history with the gigantic neighbour to the East — the Soviet Union.

In the peace agreement concluded between Finland and the Soviet Union after WW2, Finland managed to maintain its independence, but lost more than a tenth of its territory and one of its main cities to the Soviets. The agreement also included a mutual defence provision which saw Finland stake a middle ground between the Western and Eastern blocs, preventing it from joining any formal commercial tie-ups with Western Allies. Soviet influence loomed large, not only in domestic politics, but also in industry and business. Among other things the country was not allowed to receive any aid under the Marshall Plan, although this was badly needed. Instead, it had to pay war reparations to the Soviet Union and, when this was fully paid, trade with its Eastern neighbour rose to more than 25 percent of Finland's total. Not until the fall of the Soviet Union was it possible for Finland to move closer to Western Europe, and in 1995 join the EU and in 1999 replace its local currency with the Euro.

Maintaining the independence of Finnish industry from undue influence has consequently been paramount, while growing the economy and developing the welfare state to the benefit of the entire population. Given its recent history, the Finnish economy does not have the same depth of private sector capital as other Western European countries. Instead, the state has to a large extent played the role that private capital does in other market economies.

The absence of political insulation and having such a substantial part of the public commercial portfolio under the responsibility of the Prime Minister's office comes at a price, not only in economic terms, but sooner or later also political. In December 2019 the Social Democratic Prime Minister Antti Rinne faced heavy criticism as the ultimate ownership manager of Finland's state-owned postal service, whose workers went on strike for two weeks in November. Without the political insulation between a holding company and politics, the PM could not deny responsibility and was forced to resign.

In Finland, government-owned real estate has also been centralised under a government agency, Senaatti Properties, again inside the Prime Minister's office. It has a portfolio of some 8900 properties with a market value of around €4.1 billion.

An NWF in charge of mature assets should have a strict mandate to maximise value. The reason for this is twofold. First, a multitude of objectives makes it impossible to evaluate whether a fund is successful. Second, governance of mature assets requires a specialised competence different from that required for evaluating and governing venture capital investments or climate-oriented investments. The specialised mission-driven funds that we propose in the next chapter will be better equipped to handle such investments.

The NWF would be in charge of the equity capital injections to the larger corporations that fulfil the criteria listed below, but could also act as the holding company for assets that governments already own, such as state-owned companies or real estate.

A government owner of mature assets will always be held accountable for the company or asset it has invested in. This is why it should take a corresponding responsibility for its ownership through regular voting shares, with at least equal voting rights to that of other shareholders. Such equity holdings should be placed in an independent NWF at arm's-length from short-term political influence in order to facilitate a speedy recovery.

In reality, regardless of the size of the government shareholding, a company will be perceived as the government's responsibility when things go wrong. Therefore, it will be politically difficult for any PWF to relinquish its influence by having only non-voting shares.

The remaining questions a government would need to determine are: the time period it will give the NWF to restructure and transform the portfolio into viable entities before divesting? What value return is expected and what that yield should be dedicated to?

For the NWF owning mature assets, it will be vital to optimise the capital structure and minimise the entire liability side through all available methods, including debt restructuring, before deciding on the size of the capital injection. Once fully capitalised, the NWF will have to focus on the operational efficiency to restore profitability, as well as the business development side, shedding non-core business as well as achieving critical mass by acquiring or merging with other businesses that would add value.

In brief, the basic recipe for a NWF would be:

1. Screening: Companies submit their business case to the NWF, together with a proposed capital structure and the amount required to put the company on an even keel. The NWF analyses the business plan and offers terms.
2. Capital restructuring: In many cases the NWF takes over the entire company or invests on a par with other investors and then optimises the entire capital structure, including debt, and recapitalise the company if needed.
3. Business development/restructuring: Sells off of non-core business or mergers with other similar businesses to create economies of scale take place.
4. Basic criteria:
 - a. Do not invest in firms without considerable future potential unless they are essential in the sense that they provide services that the government would otherwise have to produce at even higher cost.
 - b. Do not invest in firms that have many competitors which are likely to fill the gap left by a failing firm.
 - c. Focus on firms that want to invest, but are constrained by credit or liquidity rationing.
 - d. The NWF can also act as holding company for firms that the state owned even before the Covid-19 crisis.

The process of taking over private sector assets requires government to distinguish between mature industries and innovation/entrepreneur-led enterprises. Both should be organised and held in separate legal entities with separate boards, organisation and financial resources at arm's-length from each other. Both vehicles would require the applicants to present a forward-looking business plan with a realistic outlook for a post-Covid market, including a capital structure. The recipe for mission funds, or public venture capital funds, is set out in the next chapter.

5. Mission-driven public wealth funds to support innovation, climate and regional economic development

TheCityUK (2020) notes in its report on recapitalizing UK businesses that there are businesses which can repay their debts, but nonetheless need growth capital in varying forms to rebuild cash reserves, invest in working capital and relaunch after the crisis. It proposes the creation of growth shares for business (GSB) for these businesses, but does not develop the idea further. This was followed up by a report from the ScaleUp Institute claiming a 'capital gap of £15 billion per year and including suggestions such as expanding programmes like British Patient Capital, the British Business Bank, and Innovate UK and its direct deployment of innovation and R&D investment capital (ScaleUp Institute et al 2020).¹⁴ The authors argued that a new Future Opportunity Fund (over and above the already implemented Future Fund) should be developed to allow the UK to effectively invest in emerging sectors and industries, such as the carbon net-zero challenge, as well as drive forward on wider sustainable goals.

While broadly in line with the direction of our proposals, we would argue that these policy reports focus on the volume of funds rather than the criteria and mechanisms for precise targeting and governance. The various missions into which state investments might be channelled should be handled separately from the national wealth fund (NWF) proposed above. One reason is that an NWF should have a goal of maximising market value and be held accountable for that, while mission-driven funds can make investments in ventures that are not expected to make a profit individually, but have a (small) chance of either paying off handsomely financially or creating significant social or public value. A second reason is that mission-driven funds will need other types of specialised competence than an NWF.

Some would also argue that many possible public equity investments can have several effects simultaneously. Investing in an innovative green energy project may, for example, promote climate change, technological advancement and investment in a disadvantaged region. One might think a consolidated public wealth fund could handle all types of equity capital injections. Different types of investments, however, require different types of competence. Experience from venture capital markets suggests that specialised funds do better than generalist funds.

One fairly obvious way to organise mission-driven public wealth funds (PWFs) is to use the expertise that the government already has. US federal agencies, for example, have increasingly been encouraged to instigate venture capital investments in technologies that are useful to them within their operations, quite similar to how private firms usually encourage spin-offs or suppliers to innovate, and invest in them to facilitate the cooperative effort.

For example, the CIA launched a venture capital arm in 1999. In-Q-Tel, as it was called, its offices nestled amid Silicon Valley's top-tier venture firms on Sand Hill Road, has reportedly started making money. The

¹⁴ The Patient Capital Review (PCR) laid out the analysis of the issues surrounding release of such capital pools. There has been action taken on the majority of the PCR recommendations, for example establishing British Patient Capital, re-focusing EIS and VCTs on knowledge-intensive firms and implementing a regional Angel programme through the British Business Bank. However, most initiatives are only part way to being fulfilled and currently sub-scale to meet the full structural challenges in play, let alone the now significant Covid-19 cyclical challenge.

organisation provides startup capital and access to frontline users in return for equity and technology. The Army then started a similar fund and NASA has also jumped in the game with its Mercury Fund, which is constructed along the lines of In-Q-Tel. More recently, the US Department of Health and Human Services' Biomedical Advanced Research and Development Authority launched the Division of Innovation, Research and Ventures to identify promising health security solutions, and then invest in these companies as part of a public private partnership.

Often, government agencies such as these already finance research and development or test facilities. In that sense they have the technical expertise to engage more in the form of venture capital. One issue is whether such funds should aim to make a profit. Mixing investments that should be made with the aim of maximising return with those where losses can be motivated by social value can enhance the risk of lobbying, political short-termism and organisational inefficiency. And, vice versa, if mission-driven funds feel compelled to show profits they may end up mainly competing with private venture capital.

5.1 Why mission-driven funds should be allowed to make losses

Most missions require innovation. Innovation involves a classic case of externalities. New knowledge dissipates and benefits many, not just the inventor. Traditionally, economists have leaned toward dividing innovative activity into basic research, often state-financed at universities, and development for which incentives are provided through the patent system. Yet the patent system doesn't appear to be functioning effectively. A raft of research, most notably Griliches (1992), showed that the social value of firms' R&D is on average many times higher than what the innovator earns. Similarly, large-scale financing of basic research at universities leaves much to be desired. In one of the most thorough analyses of the 100 most important innovations each year in the US over the last 40 years, Block and Keller (2008) find that only 6 percent originated at universities. Instead, small, research-intensive firms in cooperation with and often financed by state-owned applied research institutes and innovation agencies, such as DARPA, most often delivered important innovations.¹⁵

Various strands of research support a clear role for ambitious state innovation ventures. Some propagate these in terms of broad missions that involve a wide range of policy instruments, not just limited to public venture capital (Mazzucato 2018). Similar conclusions arise from the literature on optimal innovation policy against the background of imperfect or asymmetric information.¹⁶ We review the empirical evidence on the case for public venture capital investment in more depth in Appendix 2.

The evidence suggests that while competition generally abets innovation, it will often foster intense efforts to win the next patent ahead of competitors, even at the expense of what is most socially beneficial in the long run.¹⁷ As a result there can be too much overlapping research and too few, high-risk 'moon shot'-type investments that have greater long-term potential.

¹⁵ Similar results are found for European countries by Lissoni et al (2008), Henderson et al (1998) or Bourellos (2013). See also Mazzucato (2013, 2017).

¹⁶ For example, Burstein and Murray (2016) or Galasso, Mitchell and Virag (2017).

¹⁷ One of the earliest analyses is by Wright (1983). Later studies, for example by Judd m.fl. (2012), elaborate on the reasoning.

Even at universities, the scientific peer-review system normally used to allocate research grants also seems to favour safe projects at the expense of moon shots.¹⁸ Among the reasons are psychological mechanisms such as various forms of cognitive bias, egotism and guarding of territory. Another reason is that committee decisions often favour projects that many already agree on, which leans towards conservatism. Because of these biases some research funders, like the American National Science Foundation (NSF), have at times tried to induce their decisionmakers to allocate funds to more risky projects that are permitted to bypass the usual peer review process.

For these various reasons there is a case for the public sector to invest in innovations even when the market valuation is not positive. We define such projects as fulfilling the following criteria:

Market-creating potential: A firm or innovations and investments that a firm is engaged in can potentially generate very large social value arising from diffusion of innovations, creation of new markets or environmental or social gains. The probability of success may be small, but if the social and market value in the case of success is very large, these firms may still have significant market-creating potential. A positive expected profit, or market valuation, is not a criterium for market-creating potential, but a positive expected social value is.

Governments have various levers to promote projects that have market-creating potential, ranging from education, taxes and subsidies to research grants or purchase of innovations. A crucial question for this report is when is a public equity capital injection warranted? A sparse modern research literature attempts to answer such questions with regard to the information that state actors and firms have. The logic is, in many ways, intuitive: if it is very unclear how a mission might best be achieved then grants and grand challenge prizes are the better choice of policy instrument (Takala et al 2020). If there are concrete technological ideas that can be turned into patents and enterprises, then public equity financing may be a preferable option.

While there are strong reasons for mission-driven public equity programmes, there are also risks. Public equity can crowd out competitors and private venture capital. Even innovation financing is affected by lobbying; for example, universities have become serious lobby organisations (see, for example, Buchanan 1980). Therefore, it is important to evaluate public equity injections with a realistic appraisal of what they might achieve given the fundamental uncertainties, not what they might achieve in the best of circumstances. Some benefits and costs may be quite diffuse and therefore easily abused by those who want to exaggerate them.

The basic principles for our proposals follow, divided into the different types of mission-driven funds for growth and jobs, climate and levelling up. In chapter 5, we explore urban wealth funds as a third category of NWF.

5.2 Public venture capital funds

The Future Fund implemented in the UK in May 2020 can be seen as a step toward a public venture capital wealth fund, but, as implemented so far, is primarily a package of loans for startups, although they will automatically convert into equity if they aren't been paid off by the time of the next funding round or

¹⁸ Examples of studies are Fölster (1991, 1995), Guthrie m.fl. (2017), Foster m.fl. (2015) and Rzhetsky m.fl. (2015).

the end of the loan's lifetime.¹⁹ This risks leaving the Future Fund in a position similar to a bad bank, having to devolve many failed firms.

A public venture capital fund would instead aim at promoting economic growth and jobs. Preferably, a public venture capital fund should actively seek out its own investment opportunities. It should be able to invest in projects that could pay off well, but may have a negative expected market value. In fact, those are the kinds of projects that give the greatest additionality. It has a mandate to maximise social or public value. This means that it can invest in projects that have significant 'market-creating potential', but are not yet feasible for private venture capital.

Criteria for public venture capital funds are proposed as follows:

1. A public venture capital fund crucially needs technological capacity and venture capital competence to be able evaluate prospective investments and exercise constructive governance. Sometimes this means that innovation funds can be started by government agencies intending to promote innovation within their area of expertise.
2. Public venture capital should be selective and not as widely granted as growth capital.
3. Any risk of crowding out competitors and private venture capital should be avoided. An exception might be startups with strategic or defence importance when the competitors are in countries that are not considered reliable from a national security perspective.
4. The focus should be on firms or innovations that have 'market-creating potential', meaning a possibility of developing game-changers with significant social value. For these, a government capital injection can be warranted even for some firms that are not able to repay current government loans or have an expected positive market valuation.
5. The focus should be on specific innovations. If the technological ideas are hazy, consider grand challenge prizes or grants instead.
6. If possible, invest so as to crowd in private venture capital and its expertise, following the example of the Israeli Yozma or similar programmes. These offer at most a third of the required capital with the remainder to be put up by private investors. However, for firms with a significant market-creating potential, but negative market valuation, a greater government capital share, or even a 100 percent government ownership, may be necessary. In this case private capital should be invited to join in later rounds.
7. The entrepreneur or innovator should be incentivised — a government shareholder should not usually be a controlling shareholder. This will require some creative solutions to preserve the upside for the entrepreneur or innovator and any capital injection convertible only under certain circumstances, a feature not uncommon in the venture capital industry.

Sometimes crowding in private capital can be achieved with surprisingly little public capital. For example, the UK announced the new Longitude Prize for development of new antibiotics in 2012 (NESTA 2020). A few years after the prize was instituted a few startups had in fact begun work on specific antibiotics. Over the past year, three American antibiotic startups with promising drugs have gone bankrupt and many of the

¹⁹ To this is added R&D support issued via InnovateUK.

remaining companies were quickly running out of cash. After some prodding it turned out that the partnership with the World Health Organisation, the European Investment Bank and the Wellcome Trust induced 20 of the world's largest pharmaceutical companies to create a \$1 billion fund to buoy financially strapped biotech startups that are developing new antibiotics. The new AMR Action Fund (AMR 2020) will make investments in roughly two dozen companies that have already identified a promising drug with the goal of bringing two to four novel antibiotics to the market within a decade, according to the International Federation of Pharmaceutical Manufacturers and Associations, an industry trade group that is administering the fund.

5.3 Public climate funds

Engström et al (2020) analyse policies that combat both the coronavirus crisis and the climate crisis based on data on emissions, employment and Covid-19-related layoffs across sectors, and previous research. They conclude that, among climate policies, labour-intensive green infrastructure projects, planting trees and, in particular, carbon pricing, when coupled with reduced labour taxation, boost economic recovery. Among coronavirus policies, aiding services sectors (leisure services such as restaurants and culture, or professional services such as technology), education and the healthcare sector appear most promising, being labour-intensive yet low emission (see also Hepburn et al 2020).

There is scope for state interventions that help the recovery, but also improve climate in the long run. For example, there has been a broad debate about conditioning bailouts to firms in polluting sectors (see, for example, Mazzucato and Andreoni 2020). If bailouts can be credibly conditioned on future changes in activity, then they can potentially assist climate policy. Consider airlines: a wave of bankruptcies will wipe out current shareholders, but the aircraft assets and its operations will be sold to new owners or merge with other similar companies once the health crisis subsides, and these new firms will operate according to market incentives. In theory a bailout will save current firms, but the government can then set conditions on their future behaviour in line with climate policy, such as reducing the number of short-haul flights for which feasible low-emission alternatives exist.

On the other hand, there is the risk that applying bailout conditionalities leads to substitution effects, with other private companies in better economic health taking over the activity that has been 'conditioned'. For example, the bailout given to Air France comes with the requirement that the company halve its carbon emissions from domestic routes, essentially forcing it to cut back services on some routes. But if Air France cuts back on certain flights, will this simply lead to other airlines taking over these routes? For reasons like these economists often prefer to try to internalise externalities with climate taxes or subsidies that do not distort competition and maintain a level playing field between firms. Having said this, taxing carbon emissions has proved enormously politically challenging. This means that 'second best' options such as bailout conditionalities, which may be more acceptable to the public, might appear appealing. These will only work, however, if they also help the bailed out firm to become more competitive, rather than merely representing a cost that puts it at a disadvantage relative to competitors. For example, during the crisis a firm may desist from investments that are good for the climate and long-run profits due to liquidity or credit constraints. In this case a bailout coupled with conditionality stands a good chance of promoting climate policy without jeopardising the long-term survival of the firm.

In any case, this discussion concerns bailouts where the government provides loans. A lender has no other means of exerting influence than conditions. In this report, however, we set aside the question of when and

how governments should lend to firms and focus on when and how to inject equity capital. That is a very different role. The government then assumes responsibility for many strategic questions that determine the firm's long-run prospects. Conditions as such are not even needed, at least if the government becomes a majority owner. Instead, transparent owner directives should be sufficient to ensure coordination with policy goals, missions or industrial strategy. As argued above in chapter 4, however, imposing mission costs on firms involves several problems that may obviate the intended effect or even be illegal. Usually it will be better to transparently reimburse firms for mission costs in ways that do not distort competition.

One crucial reason for capital injections via a public climate fund is that investments in climate-friendly production or innovation can be unduly risky for private investors. They have to factor in that a future government may completely change policies, as climate policies are not normally time-consistent, meaning that future policymakers may lack incentives or a political agenda that would sustain current policies.

When the state becomes a shareholder through a sizable investment in — or recapitalisation of — an asset the calculus changes. Then policymakers have to factor in that the state itself bears a sizeable share of the economic and political costs if they should change climate policies in a way that generates losses in the government-owned firm. This makes climate policies relatively more time-consistent and reduces risks even for private investors in other competing firms in the same sector.

Importantly, however, this reasoning implies that a state should still apply the principle that climate externalities are internalised. Equity investment should complement green taxes and subsidies, not replace them. But the state capital injection and owner directives to invest in climate-friendly production serves as a commitment to maintain climate policies and should not imply that the firm is asked to desist from maximising long-run returns or lose ground to competitors that do not have state owners.

Apart from these motivations, the reasoning above concerning public venture capital for innovations can also apply to climate innovations. On the downside, the arguments against public ownership also weigh in. Various stakeholders may lobby for public ownership for reasons that are quite different from climate and innovation motives.²⁰

Some find that state-owned enterprises (SOEs) more often use climate friendly production, such as renewables, compared to private owners (Prag et al 2018), but others find the opposite (Sampson and Zhou 2018). It remains unclear whether this is actually due to direct mandates from government owners or because they benefit from a number of advantages that are linked to their state ownership and close proximity to the government, or even support in various forms. Outside the EU, SOEs can be heavily subsidised. It could also be that SOEs sell off less politically opportune parts of their business, without much affecting the country's overall mix.

While governments do finance demonstration plants and other climate research, and state-owned energy companies invest in new technology, climate-oriented government venture capital in startups is not that common (Mazzucato and Semieniuk 2018). One example, however, is the Global Energy Efficiency and Renewable Energy Fund (GEEREF), an international fund-of-funds, domiciled in Luxembourg, which

²⁰ For example, various studies show that the history of state-owned airlines is littered with examples of inefficiency, very high wages for pilots and high prices for customers. See, for example, Backx et al (2002) or Lopéz-Bonilla and Lopéz-Bonilla (2008).

deploys public sector funds to catalyse private sector investment in clean energy projects. GEEREF started in 2008 with €112 million from the European Union, Germany and Norway, and has since been further capitalised with an additional €110 million from private investors. GEEREF's investments aim to achieve a 'triple bottom line': provide access to sustainable energy, combat climate change and deliver compelling financial returns. Its target is to catalyse investments sufficient to generate 1 gigawatt of clean energy capacity, thereby avoiding 2 million tons of carbon dioxide emissions and potentially supporting the energy needs of 3 million people (GEEREF 2015).

As proposed here, a public climate wealth fund can also invest in technological innovations that are climate oriented. In some cases, they might overlap with the public venture capital funds described above. Their main focus, however, will likely be climate investments that are not primarily startups and innovations, but aim to assist climate policy by helping to nudge markets toward system changes. Examples might be investments in networks of charging stations for electric cars, home insulation, garbage recycling, clean energy demonstration facilities, autonomous taxi services and so forth.

One important difference to the other funds is that a public climate fund needs to be much more in tune with the government's climate policy. The success of such investments depends on how climate policy is implemented using other instruments, such as environmental taxes, regulations, procurement and subsidies. And the investments lock in the government and make it more costly to change climate policy at a later stage. As argued above, this can be a good thing since it tends to make climate policy more predictable and therefore crowds in other investors as well.

Criteria for public climate fund investments should be:

1. Climate mitigation public wealth funds depend on technological capacity, venture capital and climate policy competence to be able evaluate prospective investments.
2. The focus should be on projects with good evidence of potentially large carbon-reducing effects. Investments in projects that are likely to result in substitution effects, that is, apparent reductions in carbon emissions that are probably negated by market substitution, should be avoided. Consider blended finance, that is, adding research grants to the equity investment, if the project is far from being ready for private venture capital.
3. Look for potential startups that private venture capital shuns because of large policy risks, that is, uncertainty about future climate policy regulations, taxes and subsidies.

5.4 Regional public wealth funds

In economically disadvantaged communities, where a few small hard-to-restart businesses are vital to community life, support may be warranted for both economic and social reasons. In the short term these regions may be harder hit by economic shocks. In the long term productivity in these regions is lower than the wage rates that are negotiated at a national level or that are deemed politically acceptable. In the UK, supporting regional economic development is a top priority for the government — the 'levelling up' agenda. Jim O'Neill, a former Treasury minister, has proposed creating a £25 billion public wealth fund which could invest equity in businesses outside London to support regional rebalancing.

Governments regularly spend considerable amounts on labour market policies — unemployment benefits, training, job subsidies — in disadvantaged regions. Based on the efficacy of these subsidies economists often calculate shadow prices of creating a job. These can also be used to evaluate public investments,

giving a rough idea of the trade-offs. Investments may be less profitable than in other regions, but still worthwhile if they help the state save on other employment subsidies or unemployment benefits.

In disadvantaged regions it can be harder to find innovative ideas and the supply of regional entrepreneurs that invest their own capital may be limited. Centralised credit-scoring techniques used by commercial banks and other investors will typically be influenced by statistical regional bias. As a result, loans to firms or startups from disadvantaged regions are more often rejected without serious consideration.

Thus, mid-size and smaller firms in disadvantaged regions may find it harder to get funding even when viable. If an economically viable firm employing 100 workers closes because it has had no revenue over much of this year, the risk is much higher in a disadvantaged region that specialised workers will be dispersed, its capital stock will be sold during liquidation, and the norms and routines that enable it to function will be lost forever. Even if its exit leaves a big economic hole, a startup would not easily step in and fill it.

A dilemma for a regional public wealth fund that finances local firms is that, if forced to show a profit, it will be incentivised to invest in firms that are less risky. These are the same firms that local or other investors might have found attractive. The public investment fund will then risk outcompeting and crowding out the already frail local venture capital market. That is a probable cause of the mixed results for mission-driven regional policy in the large empirical literature.²¹ Some studies find positive but often small effects. Others find no or negative effects. Alas, hardly any studies consider regional institutions that actually invest in equity rather than providing loans, subsidies or advice.

Therefore, a regional public wealth fund for venture capital investment should have a clear mandate to invest in firms that have a future potential as defined earlier, as well as downside risks that likely deter other investors. In order to take these risks, such a regional wealth fund should be allowed individual losses that are compensated by profits on other investments, creating profits at an aggregate level, as is the strategy for private sector venture capital funds. Alternatively, it could be compensated by the state with amounts commensurate to the shadow price of jobs created. This shadow price could be determined by the ministry of finance and balanced in the spending review with contributions received from the national level.

Putting equity and debt into a small firm locks an investor — in this case the government — into a long-term commitment. This only makes sense if it is matched by thorough knowledge of the firm's management and prospects, and this comes from being locally based and having a long-term relationship with it in a way that even a local government-run regional wealth fund may find difficult.

Equally fraught would be giving local government excessive influence over capital injections. Local governments in many countries are already among the country's largest property owners, but also among the least efficient property managers (see chapter 5). Some countries' experiences with local savings banks, such as the US or Spain, highlight the risk that local stake holders are often too enthusiastic about local investments. In order to be custodians or owners of local firms, local stake holders should be held strictly to comply with standards of corporate governance and adherence to value maximisation.

²¹ For example, Pienkowski and Berkowitz (2015) provide an extensive literature review on studies of EU regional policy or cohesion policy. See also European Parliament (2019).

In summary, criteria for regional public wealth fund investments should be:

1. Regional wealth funds need the capacity to work with people who have good knowledge of the region without giving regional stakeholders influence over project selection. The latter creates a bias toward poor investments.
2. There should be a focus on projects with good growth prospects, but which do not require what we have termed market-creating potential. In many disadvantaged regions there may simply not be that many project ideas with such a potential. There should be no pressure to invest budgeted funds if there are too few reasonable prospects.
3. There should be a good idea of the shadow price of unemployment in the region and this benchmarking should be used to guide investment in firms that have a negative expected market value, but are still worth investing in for regional development.

6. Urban wealth funds

The Covid-19 economic crisis has put huge financial pressures not only on firms, but also on commercial real estate owners as firms have been unable to pay rents. In the US, for example, estimates suggest commercial property may have lost one-quarter or more of its value, with hotels particularly badly hit (*Financial Times* 2020). In the UK, since 16 March, just over half of retail rents and just under 70 percent of leisure rents have been subject to some form of renegotiation, according to consultancy Remit (*Guardian* 2020). This collapse in asset values raises questions about the value of the collateral backing commercial mortgages throughout the financial system.

An urban wealth fund (UWF) could potentially play a role in supporting commercial property in distress, for example by offering to buy up property at a reduced rate when there is a potential for future redevelopment. UWFs should, however, avoid becoming long term administrators of property that has little prospect of being developed further.

Internationally, UWFs have been effective vehicles for developing real estate and ensuring the rise in land values that comes from public investment in infrastructure, in particular transport, is captured by the public purse rather than leaking out to small number of private land-owners (Ryan-Collins et al 2017).²² One of the best known examples is the Mass Transit Railway of Hongkong (MTR), which develops real estate in order to fund subway construction (Box 3). MTR's strategy has been to acquire land at pre-development prices and then sell or lease the land at development prices upon completion of the new infrastructure, thereby capturing the land rent itself.

In South Korea around half of all residential land development and almost all industrial land development is carried out by the Korean Land Corporation (KLC)²³. Since being formed in 1975, the KLC has played a key role in transforming the economy of South Korea by efficiently managing land and promoting economic development. The KLC's functions include developing and selling land for residential use, acquiring idle and vacant land for resale, and developing new towns (Kaganova 2011). This has helped ensure that land and housing has remained affordable in South Korea — between 1995 and 2013 the ratio of house prices to income declined from a base of 100 at the beginning of 1995 to 62.3 at the end of 2013, while the UK's shot up from 100 to 167.7 (Muellbauer 2014).

²² For example, it has been estimated that the extension of the London Underground's Jubilee Line, which opened in 1999, increased local residential land values within 1000 metres of each of the stations by £13 billion (Riley 2001).

²³ In 2009 the KLC merged with the Korean National Housing Corporation to become the Korean Land and Housing Corporation.

Box 3: Hong Kong's Mass Transit Railway

Hong Kong's Mass Transit Railway (MTR) could be described as a segmental UWF: it focuses on a segment of the real estate market. It operates an integrated rail transit system that owns rail infrastructure, the adjacent land and much of the adjacent real estate. It runs the subway and rail system in Hong Kong. Although MTR was listed on the local stock market in 2000, the government remains the majority shareholder. MTR operates a predominantly rail-based transportation system comprising domestic and cross-border services, a dedicated high-speed airport express railway and a light-rail system. The entire system stretches across a land area slightly larger than that of New York City, but instead of needing subsidies, MTR has generated revenue from the development and management of vast infrastructure and property investments, including helping to significantly increase the delivery of new residential homes in Hong Kong. Many of its stations are incorporated into large housing estates or shopping complexes. Residential and commercial projects have been built above existing stations and along new line extensions. MTR pays a substantial dividend to the city, providing an income for the government that has been deployed to pay off existing debt and develop other assets. Today it is one of the most profitable railway systems in the world, while ticket prices are low by world standards.

Initially, the Hong Kong government lent the MTR Corporation (MTRC) HK\$800 million and granted it the development rights for the land above the stations. The MTRC bought the undeveloped land from the government at greenfield value and then sought commercial partners to develop the stations, offices, flats or shops above it. Once the railway was built the land was leased for rent to shops, banks and restaurants at greatly increased values due to the presence of the railway and adjacent developments. This model is known as the railway + property model (R+P model) and has continued to be used by the MTRC to build all subsequent lines in Hong Kong (Purves 2015).

Rather than requiring public subsidy, as is common with many railway systems, the MTR contributes significantly to the public purse. In 2015 MTRC reported profits of HK\$ 13,138 million, of which \$HK 2891 million came from property development and HK \$3668 million came from property rental income. As the majority shareholder, most of these profits returned to the Hong Kong government.

Although, the UK has historically favoured privatising public land over commercial development (see Box 4), there are a few exceptions, including the Crown Estate and London Continental Railways (LCR). London Continental Railways has learned from the MTR's R+P model and successfully developed areas around stations in some of the larger cities in the UK. These include King's Cross station, once a run-down part of central London but now a highly desirable area with higher rents and international and local companies, and the International Quarter of the Olympic Village for the 2012 Olympic Games. LCR is focusing on property development and land regeneration in several UK cities, often in connection with railway stations, such as Stratford in London, as well as stations in Birmingham and Manchester.

Another strong example of a British public urban wealth fund is the £14 billion (€16 billion), Crown Estates, one of the largest property managers in the UK. The Crown Estate is an independent commercial business, created by an Act of Parliament, with a diverse portfolio of UK buildings, shoreline, seabed, forestry, agriculture and common land. It has been particularly successful in turning low-yielding land into better-yielding wind farms, as well as managing its central London portfolio of assets. The business generates valuable revenue for the government and over the last 10 years has contributed £2.6 billion to HM Treasury (Crown Estate 2020).

Box 4: The privatisation of British publicly owned real estate

With the exception of the £14 billion (€16 billion) Crown Estates, one of the largest property managers in the UK, the default option in the UK when it comes to public real estate has been privatisation. Since 1979 the UK government has sold what is perhaps half of its portfolio, or some 2 million hectares of land, or 10 percent of Britain (Christophers 2020). It is by far the largest element of Britain's privatisation programme, dwarfing the much better-known sale of council housing under Margaret Thatcher's Right to Buy programme in the 1980s. An estimate by the Office for National Statistics concluded that public real estate accounted for some £8.5 trillion worth of assets.

The privatisations of public real estate in the UK, which at current prices would be worth around £400 billion, took place in piecemeal fashion over a matter of decades, often at cutdown prices. Even allowing for inflation, the public sector did not realise anything close to current value from the sales, leaving the public balance sheet in a depleted state (Christophers 2020). As an example, the government lost up to £4.2 billion after selling off 55,000 homes for military families to Terra Firma, a private equity firm, according to a National Audit Office report (*Guardian* 2018).

What is left of the portfolio remains hidden or unaccounted for. Efforts to see this vast wealth from a financial perspective and to understand its value and potential opportunity cost have fallen on deaf ears due to the failure of seeing accrual accounting as a tool to manage the public finances. Instead, the UK has a public financial management system based on cash numbers that distorts incentives and decisions for politicians towards privatisations.

Without independent holding companies to professionally manage and develop the portfolio, a government bureaucracy such as the Office of Government Property (OGP), tasked with better understanding the fragmented portfolio from an operational perspective, will obviously be met with suspicion from the various departments that actually own the assets. Given the track record and pre-disposition to privatisation, government departments will not be inclined to share much information about their real estate. An agency without the structure and mandate to develop the assets and generate an income will, by default, be seen as a privatisation agency, along the lines of similar agencies in Eastern Europe, such as the State Property Fund in Ukraine.

Sweden has also developed several segmental wealth funds focusing on a segment of urban renewal to manage its real estate assets better, including those of the Ministry of Defence and Education as well as health care assets at the regional level (see Appendix 1 for further information).

Urban wealth funds offer huge potential to improve the availability and affordability of housing. For example, recent studies in four London boroughs have shown that perhaps as much as 20 thousand homes could be created by increasing the density of existing estates to 'central' density levels. This would be some 50 percent of the Greater London Authority's 10-year new homes target in three of the four boroughs, with 'central' density being equivalent to of 210 dwellings per hectare (dpha) (Hanna 2016). Such renewal might invoke protest, but careful engagement with residents in the design and redevelopment plans, helping to create more liveable communities, could alleviate this. Where adjoining public and other brownfield land is also mobilised, a fourfold or even fivefold increase in the number of homes could be achieved (Adonis 2015).

Helping to increase the supply of housing is in itself important in order to keep the cost of housing in check. Increasing demand with low-rent schemes without increasing supply typically leads to housing queues, in particular when low rents are offered indiscriminately. Some cities, like Munich, instead target rent subsidies to low-income earners. When their income increases, the rent subsidy is gradually withdrawn. At the same time developers are required to build a share of flats in any new project with a standard that the rent subsidy scheme allows, and they have to ensure that these flats are interspersed with other flats in order to avoid low-income concentration. More generally, such schemes will be more effective where there are restrictions on speculative demand, for example taxes on capital gains or second homes, and subsidies for home purchasers in particular if not tied to new-build.

There can be two additional motives for urban public wealth funds beyond aiding availability and affordability of housing. A public wealth fund that is endowed with a substantial portfolio of public real estate can also facilitate planning and help to resolve conflicts among landowners for a particular project that is to be developed. A public wealth real estate fund could, for example, offer land swaps to owners who need to be persuaded to give up their land to support larger scale developments. Sometimes landowners may also find it beneficial to partner with such a dedicated public wealth fund when navigating the bureaucracy surrounding development projects that affect them.

In some cities the advantages of an urban wealth fund focused on real estate development are used actively to mitigate segregation. Munich, for example, has a municipal agency for city renewal.²⁴ This agency is an active partner in large-scale renewal and development. It can use its housing and commercial property to engage in land swapping deals in order to facilitate development. As mentioned above, it also works with the city planning unit to ensure that renewal and new developments blend housing for different income groups to avoid segregation.

Munich has an unusually stable and competent political leadership. Many local councils do not. In the UK recent speculative forays into the commercial property sector, partially driven no doubt by increasing pressures on budgets from austerity policies, demonstrate the risks for councils investing in a relatively volatile asset class (*Guardian* 2020). Local authority purchase of commercial property accounted for nearly

²⁴ Münchner Gesellschaft für Stadterneuerung GmbH is owned by the municipal housing agency, which also owns an agency for the development of commercial property.

70 percent of all shopping centre investment in the first quarter of 2018 (Williams 2018). The collapse in commercial real estate yields due to Covid-19 could create serious financial problems for many of these councils.

A better option might be to vest commercial assets in an independent urban wealth fund as a ringfenced corporate vehicle owning all commercial assets at an arm's-length distance from short-term political influence. However, local government would maintain strategic control of the portfolio to ensure economic benefits follow long investment cycles beyond individual election periods. Consolidating all commercial assets under an independent single entity allows the production of an integrated business plan for the assets as a whole and the introduction of transparency at the highest international standard.

Mission-driven wealth funds for urban renewal and housing are analysed in detail in the book *The Public Wealth of Cities* (Detter and Fölster 2017), which describes many examples of urban wealth funds that appear to have worked well or better than the disorganised and decentralised real estate management that is common in many cities. In fact, failed cities that struggle with economic problems, a lack of jobs and segregation are often cities that fail to manage their real estate and other assets well. In contrast, successful cities often put management of real estate into politically fairly independent entities such as a municipal development companies (like Munich), or more specialised segmental development corporations (like MTR or London Continental).

Local governments should be encouraged to aggregate their real estate assets into urban wealth funds. Also, they could purchase real estate that can be used in renewal projects from distressed property owners. A similar proposal has recently been made by the Affordable Housing Commission (2020). Experience suggests, however, that urban wealth funds should avoid becoming perpetual administrators of housing estates, shopping centres or other real estate. They should focus on being dynamic, and acquiring assets in order to develop them and increase the supply of housing.

Other public jurisdictions, even state authorities, would be encouraged to pool real estate within local urban wealth funds, at least when opportunities arise for urban renewal and housing projects along with adjacent private sector owners, as is often the case with developments of railway stations (for example, King's Cross) or waterfront developments (for example, Hamburg and Copenhagen — see Box 5).

Box 5: Urban wealth funds in Hamburg and Copenhagen

At the local level, Hamburg in Germany and Copenhagen in Denmark have developed professional urban wealth funds (UWFs), which, in the latter city even helped fund the extension of the subway.

Hamburg redeveloped its old harbour, a 2.4 km² large inner-city district, under the auspices of HafenCity Hamburg GmbH, a holding company and UWF. This resulted in 7000 residential units and offices for some 35,000 people, while paying for schools, universities and kindergartens, as well as a landmark concert hall.

Copenhagen also developed an old harbour, as well as an old military garrison in the city centre. With a total area of 5 km², By og Havn I/S (City and Port) is the largest UWF and urban development project in Europe, resulting in more than 33,000 new residential housing units, 100,000 workspaces and a new university for more than 20,000 students, as well as new parks, and retail and cultural facilities. With the financial surplus from its operations, the UWF has been able to help fund part of the extension of the local metro system, as well as other infrastructure investments required by the developments and the city.

As mentioned above, the real estate sector has been seriously affected by the Covid crisis. The behavioural changes stemming from lockdowns have led to increased home-working and collapses in retail trade, leading to bankruptcies and rent payment defaults, causing considerable economic damage to property owners. Some of them may already have received crisis loans, which, in order to optimise the firm's capital structure, would benefit from being swapped for equity. Government involvement in any such complex discussions should be very selective and only be for loans over a certain critical size, and then only through an UWF that has the professional capacity to act on equal terms with the other creditors.

A key issue is that UWFs should have a mandate to maximise the value of their urban renewal projects and also try to crowd in private investors. On the other hand, their long-term objective or mission could be to increase availability and affordability of housing, and at the same time ensure that development projects mitigate segregation and concentrations of poverty, as well as develop new educational facilities, from kindergartens to universities, such as in Copenhagen, or cultural facilities such as in Hamburg.

There are several ways of combining these goals. An UWF could have a mandate to maximise value via increasing the supply side of the housing equation. Through transparent owner directives local government can also ask that UWFs further social aims such as housing affordability and the creation of socioeconomically mixed communities. The local or national government could then directly pay for achievement on the demand side, such as paying for the running cost of the subsidised housing or the cost of schooling or higher education. The advantage of this method is that expenses for the achievement of social aims are transparent and also available to other actors, for example pension funds that want to invest in urban renewal and housing.

Other less clear-cut ways would be to let the UWF be a value-maximising daughter company of a non-profit municipal housing agency. This is the path chosen in Munich, allowing a separation of urban renewal projects in cooperation with private developers on the one hand, and transfer of profits toward housing goals on the other. On top of that Munich has a municipal rent-subsidy scheme that is available to low-income earners regardless of who owns the real estate.

In summary, urban wealth funds should adhere to the following basic guidelines:

1. There should be in-kind capitalisation of the fund using property that the public sector already owns within the relevant jurisdiction.
2. Value maximisation must be a prime objective for initiating and participating in urban renewal and housing projects, in order to create viable partnerships with private developers and avoid crowding out. The aims of housing affordability and mitigating a concentration of low-income earners should be paid for through a separate vehicle and preferably regardless of who owns the real estate.
3. Through a better understanding of the public sector real estate portfolio and the use of modern public sector accounting, a UWF can help accelerate urban renewal or development projects that encompass several councils in order to further increase housing production to achieve the best possible overall city development. The potential for increasing housing volumes through the active use and more professional management of the existing portfolio of public real estate is huge.
4. UWFs should actively promote mixed-use developments that mitigate segregation and create multi-use areas where workplaces are interspersed with homes.

7. Conclusion

The recovery from the Covid-19 pandemic looks set to be more painful than many first imagined. Whole sectors of the economy face prolonged reductions in income as enforced local lockdowns continue through the winter of 2020 and into spring of 2021. Even when the health threat posed by Covid-19 is eventually reduced, many firms may find their old business models are no longer fit for purpose as citizens work from home more often and purchase more goods and services online.

In many advanced economies governments have already stepped into the breach to provide massive injections of liquidity to support firms of various types. As the economic downturn drags on, however, debt financing will inevitably become a less sustainable option, both for individual firms themselves and for the wider economy. Heavily indebted firms will be reluctant to invest and will struggle to attract finance at just the time such investment is most needed to reboot the economy. The sluggish recovery from the 2007-08 crisis demonstrates that more and cheaper debt is not always the solution when demand is lacking in the macroeconomy.

Under such conditions, public sector equity investments or debt-for-equity swaps become an attractive option. By taking stakes in strategically important firms, governments can not only maintain jobs and provide a financial cushion to allow for firms to recover and invest, but also ensure the taxpayer earns some reward when the economy does come out the other side. Too often in the past, at times of crisis risk has been socialised, but rewards privatised. The advantage of equity investment is that in some cases the state earns a return when an ailing firm gets back on its feet and is sold off; in other cases the state can make a longer term investment, hopefully attracting in other forms of 'patient finance', in firms that private investors are not yet prepared to invest in. A public wealth fund in this sense is a commitment device that can provide direction and confidence for investments in future industries at a time when there are huge pressures to do so, not least in order to shift to a more sustainable economy.

However, whenever the state engages in commercial investments, new kinds of risk arise. The dangers of cronyism, conflicts of interest, inefficiency and corruption are evident in the history of state-owned enterprises. In this report we argue that public wealth funds operating independently of government as commercial entities offer the best approach to dealing with these challenges. By separating public wealth funds into a *national wealth fund* in charge of mature assets that have run in to trouble, mission-driven *venture capital funds* focussed on innovation, climate and regional growth, and *urban wealth funds* to support housing and urban renewal, value maximisation and social objectives can be managed more transparently and more efficiently. A national wealth fund should have a goal of maximising market value and be held accountable for that, while the mission-driven funds can make investments in ventures that are not expected to make a profit individually, but have a (small) chance of either paying off handsomely financially or creating significant social value. Mission-driven funds will need other types of specialised competence than the national wealth fund.

While these wealth funds would be operationally independent from a balance sheet perspective, key ministries, in particular the ministries of finance and industrial policy, still have a coordinating role to ensure the wealth funds' activities are aligned with wider government policy. In practice, this would mean coordinating business investment plans; identifying and activating technological interdependencies and synergies; and shaping the long-term strategies of operating companies in line with strategic public policy objectives such as decarbonisation.

Such coordination must be done in a way that is open and transparent, with appropriate governance mechanisms in place to avoid interference in day-to-day activities or capture by special interest groups. This is better achieved through the articles of association and owner directives that are open, rather than other channels that involve more informal or non-disclosed communication.

In addition, public wealth funds will require Institutional capacity and expertise. This is likely to involve hiring from the private sector and industry, and from the financial sector, as well as investing to develop commercial acumen and in-house skills within the existing public sector. There has been a strong push in the UK for outsourcing various activities over the past decades. Public wealth funds would offer the opportunity to develop in-house scientific and technical capacity to meet the long-term challenges of decarbonisation, changing demographics, the emergence of artificial intelligence and digitalisation.

We estimate that even in the most expensive conceivable version, the total fiscal cost of these four types of public wealth funds would be small, around 0.1 percentage points of GDP per year. In the least costly scenario, a profit would be returned. Compared to other measures to restart the economy, these are small amounts. Moreover, over time these investments could cause the value of public assets to rise, releasing funds to support other government objectives.

For public wealth funds to be properly evaluated, accrual accounting is required whereby both the assets and the flows of income associated with those assets are included, as well as their liabilities. Current practices, which view public wealth purely in terms of government debt or deficits, are outdated and damaging in terms of long-term thinking about creating public value. Much of the 'income' that accrues to private sector enterprises and private real estate owners are really economic rents that have little to do with productive investment or innovation (Mazzucato et al 2020; Christophers 2020). There is little reason why governments should not capture such rents for the public purse.

Appendix 1: Selected European countries' experiences with general public wealth funds

European countries have experimented with managing public wealth for a wide range of different purposes, and with varied results, for almost a century. This appendix considers the experiences of four countries to provide further contextual background to the examples provided in the main text.

Austria

Austria has one national wealth fund (NWF) for corporates in ÖBAG; and one for real estate in BIG. ÖBAG (Österreichische Beteiligungs AG) had its origins in IBV (Industriebeteiligungsverwaltung), a holding company created after WW2 as a counter-measure to prevent vital industrial assets being pillaged by the Soviet occupational forces.²⁵

The reconstruction of Austrian industry was more difficult in 1945 than it had been after WWI. This time there were not only heavy direct effects of war, but also occupation damages arising from the confiscation of industrial enterprises by the Soviets, the cost of 10 years' presence of Allied troops and the partition into zones of occupation until Austrian independence in 1955.

This plunder continued until the early summer of 1946, when the Soviet policy changed from taking Austrian assets back to Russia, to managing them for a profit on location under the special Administration for Soviet Property in Eastern Austria (USIA) unit, with all industrial assets and properties being expropriated (Bischof et al 2000). The US response was substantial economic support through the Marshall Plan, under which Austria received per capita more than any of the other 15 participating countries.

In addition, the Austrian government launched a coordinated industrial policy that saw the nationalisation of more than 70 firms in essential industries and services, including the three largest commercial banks, heavy industries, including hydro carbons, coal, mining, iron and steel, iron and steel products, shipbuilding, and electrical machinery and appliances. This portfolio was restructured and reduced to 19 holdings and consolidated inside a holding structure that produced up to 25 percent of the gross national product until the end of the 1970s (Aiginger 2003).

Despite its disadvantageous post-war starting position, Austria's economy grew by an average of almost 8 percent per annum, not least because of the injections of investment capital from the Marshall Plan aid funds and the post-war boom that spread to Austria.

The public ownership influence on this industrial complex was mission-oriented, first of all with the aim of saving of the domestic industry from being plundered by the occupational Soviet forces, but also of rebuilding the Austrian economy. The political considerations soon took precedent over the commercial

²⁵ IBV was set up in 1956, when ownership rights over the nationalised manufacturing firms were transferred from ministries. In 1966 it was replaced by ÖIG (Österreichische Industrieverwaltungs-GmbH), which in 1970 was then transformed into an Aktiengesellschaft (AG), called ÖIAG (Österreichische Industrieholding AG). In 2015, ÖIAG was turned into a limited liability company (GesmbH) called Österreichische Bundes- und Industriebeteiligungsholding (ÖBIB), which is permitted to make new acquisitions. In 2018, ÖBIB was once again reorganised into an Aktiengesellschaft (AG), public limited company, called ÖBAG (Österreichische Beteiligungs AG).

(Grünwald 1982). As an example, the political bargaining over senior management positions in state-owned enterprises (SOEs) was so common that it was even written into law and resulted in the proportional representation of parties on management boards, with SOEs reorganised after nearly every national election (Stiefel 2000).

In 1986-89 the Austrian NWF was restructured as if a private industry, borrowing the tools from the private sector and renamed ÖIAG (Österreichische Industrieholding AG). This change of policy emerged when the government realised that, due to the critique of the opposition, mass media and private entrepreneurs, as well as to the people's fear of tax increases, a majority of voters would no longer tolerate further subsidies to public industrial firms (Belke and Schneider 2004).

As a result, during part of the coming period political appointees were explicitly prohibited. During the 1990s, particularly following the EU deregulations and as Austria joined the EU in 1995, many of the holdings were partially or completely privatised, including Voest-Alpine, the international steel company, Flughafen Wien AG, the airport, Telekom Austria, and Austria Tabak.

In 2015, the Austrian NWF was renamed ÖBIB and political independence was again almost completely abolished, with the managing director of the holding company reporting directly to the finance minister. There was no supervisory board, but rather a government-controlled advisory panel responsible for nominating board members. The strict commercial objective was replaced with a policy objective and the specific mission to help promote technology and secure jobs, despite many of the holdings, such as the energy group OMV, Telekom Austria and Austrian Post, being listed entities.

Since 2018, the Austrian NWF has once again been a public limited company, or an Aktiengesellschaft (AG), called ÖBAG (Österreichische Beteiligungs AG). Since the Covid-19 crisis it has been much debated if it should once again take a role in supporting Austrian industry.

In addition, Austria has managed to consolidate some of the real estate owned at the national level under a proper commercial holding company, called BIG (Bundesimmobiliengesellschaft m.b.H), owned by ÖBAG. It is one of the largest property owners in Austria, with more than 2000 properties with a value of over €14 billion. The portfolio consists of educational buildings, such as schools, universities and special properties, but also office and residential properties previously owned by the Federal Ministry of Education, Science and Research, the Austrian universities and the Federal Ministries of the Interior and Justice.

Italy

Italy's IRI (Istituto per la Ricostruzione Industriale — Institute for Industrial Reconstruction) was one of the first national wealth funds in Europe. It was set up in 1933 during the Depression. Together with IMI (Istituto Mobiliare Italiano — Italian Industrial Finance Institute) these two holding companies were created to bail out failing firms and banks. With the nationalisation of the three largest banks, IRI became the owner of approximately 20 percent of the shares of all joint-stock companies in the country. Its original mandate was to restructure its portfolio of assets, which included companies active within telecom, steelmaking, electricity generation and distribution, and mechanical engineering, as well as a dominant position in shipbuilding and shipping. Although this effort was not intended to carry out nationalisations, by 1934 almost half of the share capital in Italy and three-quarters of the Italian economy ended up were controlled by the state (Toniolo 2013).

After WW2, US support and Marshall Plan aid helped to rebuild the war-ravaged country and its basic industries. IRI played a significant role in reconverting military productions into civil activities, as well as

planning the use of Marshall Plan funds for the country as a whole. Soon, Italy became fully integrated into European trade and became one of the leading industrial nations in Europe. In the boom years of 1958–63, the country enjoyed industrial growth rates of more than 8 percent per year.

Given its dominant role in the Italian economy, IRI played a substantial role in rebuilding Italy and helped promote the development of a modern steelmaking industry, as well as the creation of national infrastructures such as telecom, radio and television networks, motorways and a national airline. For quite some time it was seen as a positive example of cooperation between public and private capital, as many of its holdings were listed on the stock market and issued corporate bonds.

IRI's main objective was to provide for the industrial development and modernisation of the economy. However, in the 1960s, and more so with the 1970s crisis, it became apparent that the governance of IRI was political and not commercial, with inefficiencies and societal objectives such as investments to develop the southern regional economy and to maintain full employment. The latter generated substantial fiscal costs (Toniolo 2013).

By 1980, IRI was one of the largest conglomerates in the world and the largest commercial grouping in Europe, by sales. It had more than a thousand different holdings, ranging from the motorway system, telecom and Alitalia, the airline, to banks, steel and food companies, with more than half a million employees in total. At that time IRI was also very much involved in high-tech sectors such as semiconductors, aerospace, industrial automation, railway signalling and nuclear technologies.

Privatisations of its holding started in the 1980s and accelerated after the Tangentopoli investigation in 1992, a nationwide judicial investigation on political corruption, resulting in the demise of the political establishment of the so-called First Republic and the disappearance of many political parties, as well as the suicide of some politicians and industry leaders after their crimes were exposed (Vannucci 2009). An added incentive for privatisation was that it helped Italy reach the convergence criteria required by the EU to qualify as one of the founding members of the Eurozone.

By 2002 IRI had been dissolved. Some of its remaining assets are still held by the Minister of Economy and Finance, others by CDP (Cassa Depositi e Prestiti), a government bank for economic development.

Sweden

In Sweden, the entire cadastre and land registry went digital, starting in the 1990s and managed by Lantmäteriet. Lantmäteriet is the Swedish mapping, cadastral and land registration authority, a public authority that has been mapping Sweden since 1628 and reports to the Ministry of Finance (Lantmäteriet 2020).

The data is publicly available through unique identification (UID) numbers of both plots and owners. This makes it possible to instantly understand the ownership structure and vital data of any real estate owned by the public or private sector. In addition, Datscha, the Swedish property technology company, has further developed a property-related information system based on public and private sources, which provides an online solution for instant market data, including valuations. This service is so far available in Sweden and Finland, as well as in the UK. However, the UK government has still not been able to retrieve and consolidate the relevant data on its portfolio of public real estate. This explains why it is so far only an efficient tool for the private sector in the UK.

The public sector in Sweden has, to some extent, consolidated public real estate in separate holding companies, not least at the local level, such as the SEK 205 billion (€20 billion) portfolio of the City of Stockholm in the urban wealth fund (UWF) Stockholm Stadshus AB (SSAB) or the County of Stockholm holding company Locum's portfolio of almost SEK 31 billion (€3 billion) in Landstingshuset I Stockholm AB.²⁶

At the national level, Vasakronan started out as the central government property agency, was turned into a commercial holding company in 1993 and is today regarded as one of the more professional real estate companies in Sweden, owned by the state pension fund. It has a portfolio comprising 174 properties with a total market value of around SEK 157 billion (€15 billion) and has had total yield of almost 12 percent for the past ten years.

Several ministries have transferred at least some of their real estate into separate holding companies, or segmental public wealth funds (PWFs) such as the SEK 91 billion (€9 billion) Akademiska Hus for the Ministry of Education or Vasallen for the Ministry of Defence. Also, the SEK18 billion (€1.7 billion) Jernhusen owns the property adjacent to the railway system, which was previously owned by the national railtrack monopoly. It has learnt some lessons from MTR, the Hong Kong railway company that built an entire subway system the size of New York City without using taxes, but by developing the properties adjacent to its stations.

Greece

On the back of the European debt crisis and starting in 2009, consolidating public wealth at the national level became a vital component to help Greece out of its economic crisis. In 2011, the HRADF (Hellenic Republic Asset Development Fund S.A.) was set up to make the asset side transparent and help create fiscal space. However, the intended structure was altered in the process and HRADF ended up not owning any assets, and thereby became a mere advisor to the various ministries that still owned the assets, or a virtual privatisation agency.

The second effort, in 2016, saw the creation of a more comprehensive NWF, HCAP (Hellenic Corporation of Assets and Participations S.A.), which managed to consolidate the operational as well as the real estate assets at the national level into one single holding company.

To capture fully the potential of its portfolio of these assets, HCAP should be made fully operational, as if it were a publicly listed company expected to produce dividends for the benefit of Greek society as a whole. This would also include the government lifting any restrictions in terms of compensation, so as to enable the board of HCAP to organise and employ the relevant in-house expertise and management that would allow HCAP to develop the operational and real estate segment to reach its full value. In order for HCAP to be able to pay a dividend on its commercial assets, in line with the private sector, it must be allowed to pay for the required expertise in line with the private sector.

²⁶ These figures and the figures in the following paragraphs can be found in the respective organisations' annual reports, [Locum Annual Report 2018](#), [SSAB Annual Report 2019](#), [Vasakronan Annual Report 2019](#), [Vasallen Annual Report 2019](#), [Akademiska Hus Annual Report 2019](#) and [Jernhusen Annual Report 2019](#).

Appendix 2: Review of empirical evidence on public venture capital wealth funds

In much of the economic research literature mission-driven innovation has received scant attention. For example, in an ambitious review of research on innovation policy, Bloom, Van Reenen and Williams (2019) conclude that market economies are likely to under-provide innovation. In the longer run, increasing the supply of human capital is effective. In the short run, they find R&D tax credits or direct public funding seem the most productive. However, they largely neglect the difference between direct public funding for university research as opposed to mission-driven R&D, where public funds can also be used for direct investments or grand challenge prizes.

In spite of this lack of interest, mission-driven innovation has become more popular in recent years (see, for example, Mazzucato 2017, 2018). One trend is an increasing use of grand challenge prizes, especially in the US. Government agencies have conducted more than a thousand grand challenges and coming prizes are listed on a common site, Challenge.gov. Empirical evaluations have generally been positive, but conclude that the exact organisation makes a big difference to the results.²⁷ They emphasise the import of a clearly defined challenge, and simple and transparent rules.

Another mission-driven innovation trend has mostly disappointed. Twenty years ago, a popular mission was trying to build or encourage regional clusters in the hope of seeding new Silicon Valleys. These have rarely succeeded (Lerner 2009).²⁸

Several studies find more encouraging evidence for an increasing number of government venture capital investments. NASA, Darpa and even the CIA claim successes. The US Small Business Investment Company programme has been running since 1958. Much attention has also been lavished on Israel's Yozma programme, established in 1993. It initially sought to attract experienced international venture investors, who had to come up with \$12 million of their own capital and work in partnership with an Israeli firm. Yozma would provide investors with \$8 million in matching investments, with a capped upside to further attract private investors. In the two decades after Yozma was established, Israel went from having no venture capital (VC) sector at all to having the highest VC penetration in the world as a share of GDP. Factors contributing to the programme's success include that its capital was spread across many small funds, and that it fostered relationships between local and international venture capitalists.

Brander et al (2010, 2015) compare the exit performance of a large number of commercial enterprises in 25 countries that obtained at least part of their funding from government sponsored venture capitalists (GVCs) with those that received funding from only private venture capitalists (PVCs). They conclude that a modest amount of GVC finance seems to improve the performance of entrepreneurial ventures relative to ventures supported purely by private venture capitalists. High levels of support from GVCs are instead associated with weaker performance. According to these findings, a little bit of government support appears to raise investment returns, but too much government support has the opposite effect. In other words, GVC finance may be at its most effective when it remains disciplined by private venture capital.

²⁷ Two examples from the larger literature are Brook and Lyndhurst (2010) and Kay (2011).

²⁸ Ross Brown et al (2016) provide an instructive example in their analysis of the failure of Scottish Regional innovation policy.

Instrumental variable regressions suggest that endogeneity in the form of unobservable selection effects cannot account for these effects of GVC financing.

Luukkonen et al (2013) examine the performance of government venture capital funds and emphasise post-investment, value added activities by GVC firms and independent venture capital (IVC) firms using a survey addressed to young high-tech, VC-backed firms from seven European countries. The survey gauged the importance of the contribution by the first lead investor in a variety of activity areas, as assessed by the investee companies. Using a composite indicator of the value added, they find no statistically significant difference between the two types of investors. However, the profiles of value added differ across investor types and, in particular, the contributions of IVC funds prove to be significantly higher than those of GVC funds in a number of areas, including the development of the business idea, professionalisation and exit orientation.

Owen et al (2019) investigate the effectiveness of GVCs in funding early stage entrepreneurial ventures. Combining primary data from a number of sources, they discover positive impacts of GVCs on turnover and employment in funded ventures, along with effective targeting of specific funding gaps. Significant issues remain, including a lack of liquidity in follow-on funding and a requirement for longer time horizon in funds, as firms typically fall behind in development schedules. They conclude that there is a need for greater flexibility in GVC-backed funds.

Murray et al (2012) provide an overview of the literature and emphasise a number of lessons. Among them are that funds are managed exclusively by professional investment executives who are incentivised to achieve commercially attractive fund returns. They confirm a risk that governments are liable to impose non-commercial constraints on the goals of hybrid venture capital funds (HVCFs), often starting from a position of inadequate knowledge of VC industry operations. They argue that governments often employ staff from existing public programmes to design finance enterprise groups, but they rarely have appropriate skill sets or industry experience at the required level of competence.

Somewhat different from GVCs are state investment banks that usually lend and invest in many different sectors and infrastructure projects. Mazzucato and Macfarlane (2017, 2018) map their design features. They argue that governance arrangements are vital to the success and legitimacy of state investment banks. Management teams should be free of day-to-day political interference to make independent, long-term decisions. Such capacity for autonomous decision-making has historically been key for successful 'innovation bureaucracies', they argue.

This point is underlined by different perspectives on particular investment banks, such as the Brazilian BNDES, which has sometimes been described as mission-driven.²⁹ Musacchio and Lazzarini (2014) analyse state-owned assets in Brazil and show that BNDES loans transfer subsidies to large firms without any substantial benefit in terms of improved firm-level performance or investment. Campaign donations appear to influence BNDES allocations. They find that BNDES does not generally pick underperforming projects. Politically connected firms are not necessarily underperformers. Still, the BNDES achieves little and its function, according to Musacchio and Lazzarini, is merely to shuffle funds to firms that support the right politicians. This illustrates one of the pitfalls that state-owned enterprises should avoid.

²⁹ See, for example, Mazzucato and Penna (2015).

One public investment bank that is meticulous in its evaluation is the European Investment Bank (EIB), the financing institution of the European Union (EU). The EIB's current activities are aligned to four priority areas: innovation and skills, SMEs, infrastructure, and climate and environment. The EIB evaluates the activities of its daughter, the European Fund for Strategic Investment (EFSI), which makes actual equity investments in an unusually lucid way with respect to additionality (EIB 2018).

Operations provide additionality when: (a) they address market failures or sub-optimal investment situations; and (b) they could not have been carried out in the period during which the EU guarantee can be used, or not to the same extent, without EFSI support. Additionality is defined by carrying a risk EIB Special Activities (SA) status with a standard counterfactual assessment of how the project would have (or would not have) proceeded without support.

Similarly, the Ireland Strategic Investment Fund (ISIF) invests on a commercial basis following strict criteria for additionality and avoiding displacement, as well as earning a commercial return.

In sum, the empirical evidence, while not overwhelming in volume, provides some support for innovation-oriented state-owned venture capital investment. Yet it also emphasises the importance of political independence, specialised competence in the technologies involved, entrepreneurship, venture capital experience and a strict focus on investment criteria, such as additionality and social value generation.

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