CONTINGENCY PUBLIC FUNDS FOR EMERGENCIES: THE LESSONS FROM THE INTERNATIONAL EXPERIENCE

2020

BANCO DE ESPAÑA
Eurosistema

Documentos Ocasionales
N.º 2032

Júlia Brunet, Lucía Cuadro-Sáez and Javier J. Pérez

CONTINGENCY PUBLIC FUNDS FOR EMERGENCIES: THE LESSONS FROM THE INTERNATIONAL EXPERIENCE

CONTINGENCY PUBLIC FUNDS FOR EMERGENCIES: THE LESSONS FROM THE INTERNATIONAL EXPERIENCE

Júlia Brunet, Lucía Cuadro-Sáez and Javier J. Pérez

BANCO DE ESPAÑA

Documentos Ocasionales. N.º 2032

2020

ISSN: 1696-2230 (on-line edition)

Abstract

Should societies (governments) save during economic expansions in order to cover the costs of extraordinary situations, such as natural or biological catastrophes or, more generally, economic crises? This question has been raised once again by the economic and social crisis linked to the confinement measures implemented to control the spread of the COVID-19 pandemic and the enormous public spending required to mitigate its impact. There are two general approaches in the economic literature to this debate, which are not mutually exclusive. First, the more standard approach indicates that governments, in these situations, should resort to borrowing. This allows the impact of shocks to be smoothed over time, as long as governments are sufficiently disciplined to rebuild the necessary room for manoeuvre during upswings. However, the evidence available shows that debt tends to decline only very gradually in post-crisis periods. Under the second approach, governments build up contingency funds or rainy-day funds during economic booms. International experience has numerous examples of national and regional funds of this type. This paper reviews the experience of such funds, with a view to drawing lessons as to their potential usefulness as an instrument of support in crisis situations and fiscal emergencies. Although the international evidence on their use is highly heterogeneous, it shows that when these funds are appropriately structured and sufficiently large they contribute to mitigating the impact of shocks and improving fiscal discipline.

Keywords: rainy-day funds, economic crises, natural catastrophes, biological catastrophes, government debt.

JEL classification: H12, E63, H63.

Resumen

¿Deberían las sociedades (Gobiernos) ahorrar en momentos de expansión económica para afrontar los costes de situaciones extraordinarias, como catástrofes naturales o biológicas, o, más en general, crisis económicas? La crisis económica y social vinculada a las medidas de confinamiento para controlar la difusión de la pandemia de Covid-19 y las enormes necesidades de gasto público para mitigar su impacto han vuelto a poner esta cuestión de manifiesto. La literatura económica afronta este debate desde dos ángulos generales, no excluyentes. En primer lugar, la aproximación más estándar indica que, en estas situaciones, los Gobiernos deben recurrir a la deuda. Esto permite suavizar a lo largo del tiempo el impacto de las perturbaciones, siempre que los Gobiernos sean lo suficientemente disciplinados como para reconstruir los márgenes de maniobra necesarios en las fases de expansión. Sin embargo, la evidencia disponible muestra que la deuda tiende a reducirse solo de manera muy progresiva en las etapas posteriores a las crisis. En segundo lugar, la experiencia internacional muestra numerosos ejemplos de fondos de ahorro (nacionales o regionales). En este caso, las Administraciones acumulan recursos en vehículos especiales en momentos de bonanza económica, llamados «fondos de contingencia» o «fondos de estabilización» *(rainy-day funds* en inglés). En este documento se revisa la experiencia sobre estos fondos, de cara a extraer lecciones sobre su posible utilidad como instrumento de apoyo en situaciones de crisis o emergencias fiscales. Aunque la evidencia internacional sobre su utilización es muy heterogénea, se demuestra que, cuando estos fondos están adecuadamente estructurados y suficientemente dotados, contribuyen a mitigar el impacto de las perturbaciones y mejoran la disciplina fiscal.

Palabras clave: fondos de estabilización, crisis económicas, catástrofes naturales, catástrofes biológicas, deuda pública.

Códigos JEL: H12, E63, H63.

Contents

1 Introduction

Should societies (governments) save during economic expansions in order to cover the extraordinary costs stemming from extreme events associated with natural or biological disasters or, more generally, economic crises? This question has been raised once again by the economic and social crisis linked to the confinement measures implemented to control the spread of the COVID-19 pandemic and the enormous public spending required to mitigate its impact.[1] There are two general approaches in the economic literature to this issue, which are not necessarily mutually exclusive.

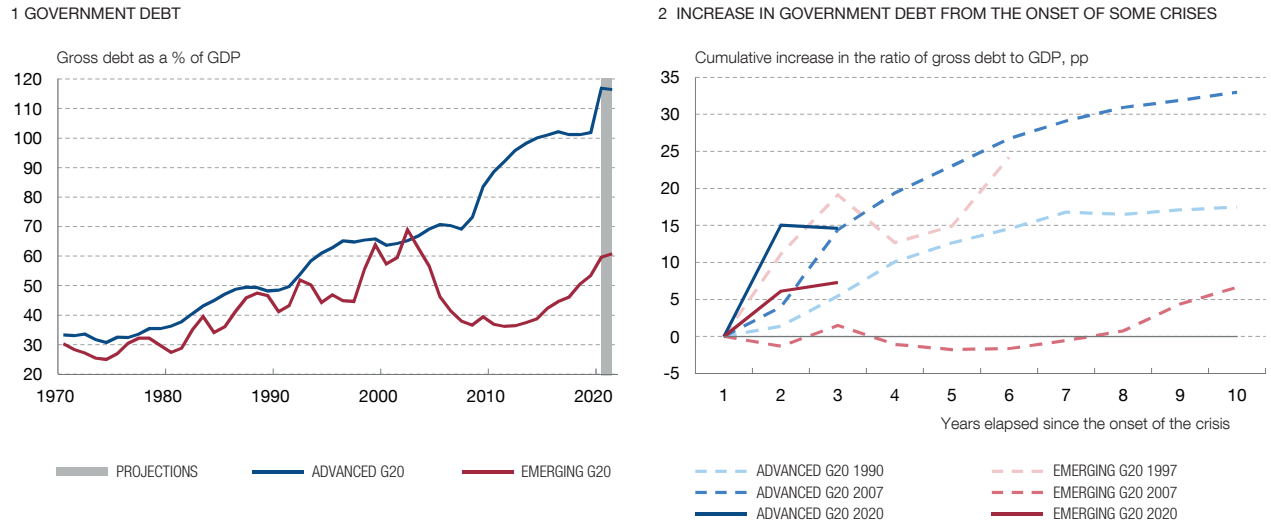
First, the more standard approach indicates that governments, in response to adverse shocks, should borrow such that levels of public spending can be sustained or even increased without necessarily having to resort to tax increases.[2] To this end, public finances should build up room for manoeuvre (fiscal space) during economic upswings for use in difficult times. From the intertemporal standpoint, under this approach – and provided that States have adequate and continuous access to the financial markets – borrowing allows the cyclical fluctuations or costs of extreme (unlikely) events to be smoothed. However, past experience shows that the capacity to build up fiscal space during boom periods is often limited. Indeed, following an economic crisis, debt tends to stand for an extended period at levels higher than those prior to the crisis[3] (see Chart 1). The economic literature suggests multiple factors that explain this hysteresis effect or protracted government indebtedness. Among the most prominent is the impact of the crises on the economies' long-term growth, which hinders the absorption of fiscal imbalances.[4] Other explanations focus more on economic policy matters, emphasising the difficulties of enacting far-reaching fiscal adjustment processes in post-crisis periods.[5]

Second, international experience offers numerous examples of specific national or regional jurisdictions building up contingency or rainy-day funds (RDFs) during economic booms. In some cases these funds are prompted by legal restrictions on the use of public debt (such as those faced by individual US State governments), or by extraordinary revenue from the exploitation of natural resources, such as North Sea oil in Norway or copper in Chile, much of which is saved for distribution over several generations or for use in exceptional circumstances. These funds may also be created to smooth any potential difficulties accessing debt markets in situations of budgetary stress, as have been seen on numerous occasions in the past, or to cope with natural disasters.[6] The advantage of these funds over the scope provided by borrowing is that their availability does not depend on the specific market situation at the time when they are needed. However, unlike debt, when it comes to allocating resources to these funds a potential "opportunity cost" problem may arise, owing

1 Cuadro-Sáez et al. (2020).
2 Hernández de Cos et al. (2018).
3 Alloza et al. (2020) for Spain and Europe.
4 Blanchard and Leigh (2013).
5 Alesina and Passalacqua (2016).
6 Cavallo and Noy (2011).

Chart 1

GOVERNMENT INDEBTEDNESS



SOURCE: IMF (2019, 2020a and 2020b).
NOTE: The government debt of the "Advanced G20" and "Emerging G20" aggregates was calculated as an unweighted average of the debts of the countries making up those aggregates. "Advanced G20" comprises Germany, Australia, Canada, South Korea, the United States, France, Italy, Japan and the United Kingdom. "Emerging G20" comprises Saudi Arabia, Argentina, Brazil, China, India, Indonesia, Russia, Mexico, South Africa and Turkey. Saudi Arabia was included in "Emerging G20" in 1991 and Russia in 1992. Government debt for all countries up to 2016 was drawn from the Historical Public Debt Database. From 2016 onwards, it was drawn from the April 2020 Fiscal Monitor, except for Bulgaria and Argentina, whose government debt was drawn from the WEO (October 2019).

to alternative uses for those resources. Rainy-day funds are built up directly by periodic contributions charged to the budget or by revenue arising on the exploitation of natural resources. But such funds could also draw on debt issuance in economic boom times, when market conditions are most favourable. Their launch is subject to a series of key decisions that determine their management and their results.

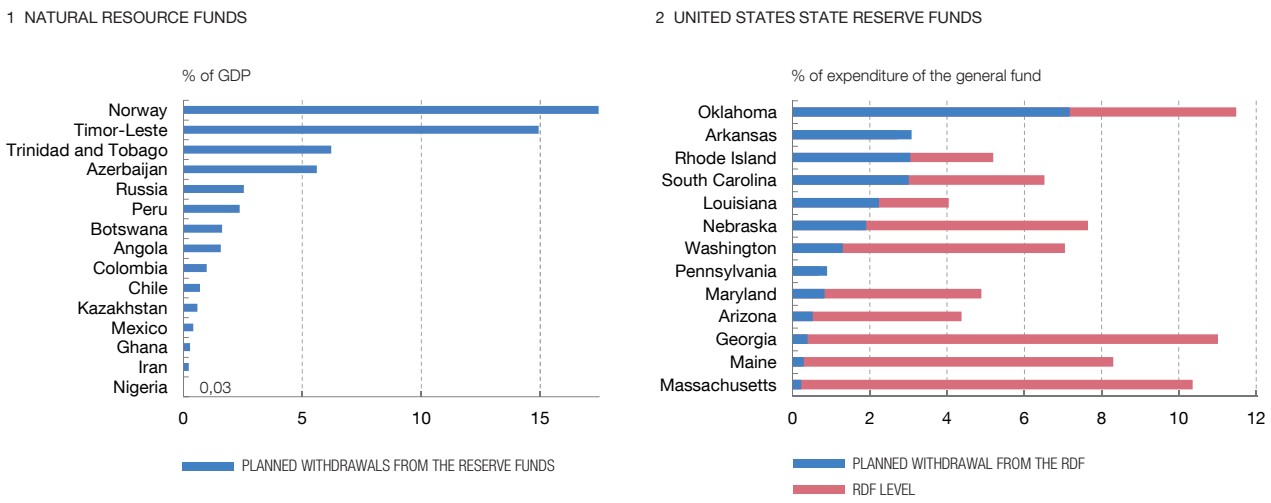
This paper reviews the international experience of rainy-day funds, with a view to drawing lessons on their potential usefulness as a support instrument in crisis or emergency situations. While the evidence on their use differs greatly from country to country, it is shown that when these funds are properly structured and sufficiently endowed, they contribute to easing the impact of shocks and enhancing fiscal discipline. In the current setting, many countries have used their rainy-day funds to tackle obligations arising from the COVID-19 pandemic. For example, in the United States, 29 of the 50 States have promulgated legislation authorising the transfer of economic resources from their reserve funds in order to address the budgetary challenge.[7] In Chile, in March, the government proposed earmarking almost half of its $13 billion[8] (almost 5% of GDP) Economic and Social Stabilization Fund, and Norway plans to draw $37 billion in 2020 and a further $29 billion in 2021 from its

7 See: State Fiscal Responses to Coronavirus (COVID-19) and COVID-19 Legislation. National Conference of State Legislatures.

8 See: Fondo soberano se reducirá a la mitad por medidas especiales. La Tercera, 23 March 2020.

Chart 2

PLANNED WITHDRAWALS FROM RESERVE FUNDS TO CONTEND WITH COVID-19



SOURCES: AMECO, National Association of State Budget Officers, National Conference of State Legislatures, Natural Resource Governance Institute and Reuters.
NOTE: The GDP figure refers to 2019, except for Iran which refers to 2017. The amounts refer to announcements for the period 2020-2021, except for Chile, which includes the withdrawals from the Economic and Social Stabilization Fund in 2020. The level of the US State reserve funds is that of the end of the 2019 fiscal year.

sovereign fund,[9] an amount which accounts in total for more than 17% of the country's GDP (see Chart 2).

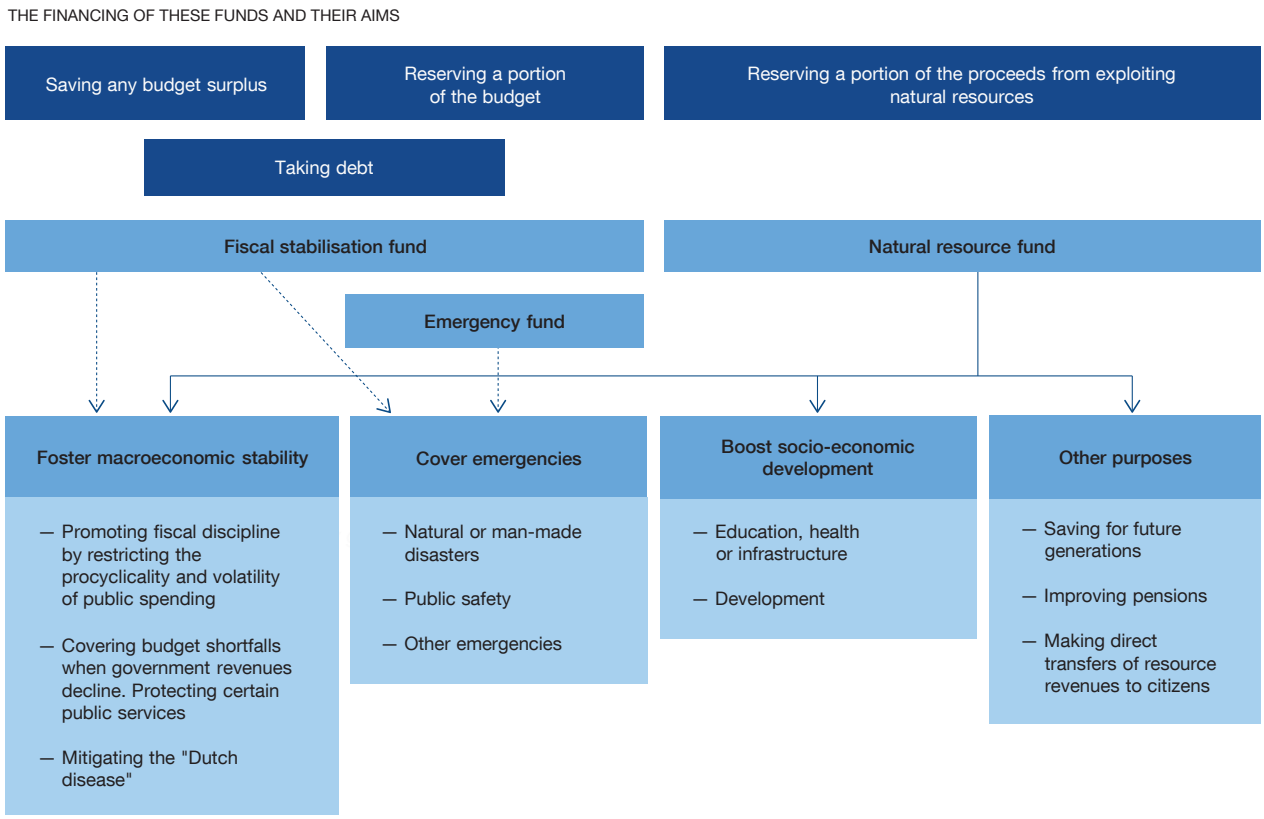
The rest of the paper is structured as follows. Section 2 reviews the main rainy-day or contingency funds available globally, setting out the benefits they offer according to the literature. Section 3 reviews and sets out systematically the main recommendations on the institutional design and management of these funds, given that decisions on the legal protection of rainy-day funds, on their management and on transparency and accountability rules are essential for the success of this type of instrument. Finally, the last section includes some lessons drawn from the review of the international experience.

9 See: Walsgard and Taraldsen (2020).

2 Rainy-day or contingency funds

There are different types of government saving funds to deal with unexpected events that may prove difficult to tackle with the regular budget (see Figure 1). First are those intended to cover emergencies, to cover the consequences of natural or man-made disasters and specific public safety situations, among other circumstances. Also, the authorities may use fiscal stabilisation funds to cover budgetary shortfalls that arise when public revenues fall unexpectedly, thus allowing specific public services to be safeguarded. These funds can promote fiscal discipline by restricting the procyclicality and volatility of public spending. Currently, for instance, all State Governments in the United States have at least one of these funds. Moreover, in economies that are the recipients of high foreign exchange inflows, these funds can be used to temper the harmful effects to which these inflows can give rise[10] (the so-called "Dutch disease"), thereby contributing to macroeconomic stability. A third group of funds have a more medium-term orientation and they are usually launched to

Figure 1
SAVING FUNDS FOR FISCAL STABILISATION, COVERING EMERGENCIES AND OTHER PURPOSES



SOURCE: Banco de España.

10 Cardarelli et al. (2009). Episodes of large capital inflows are usually associated with the real appreciation of the currency and the worsening of the current account balance. More significant still, these episodes are usually accompanied by an initial acceleration and a subsequent significant decline in GDP growth.

boost socio-economic development and to save for future generations. They include most notably natural resource funds (NRFs), which build up the revenues from the exploitation of these resources and which, in addition to their medium and long-term orientation, can also meet the aforementioned and more short-term contingencies. Many countries worldwide have such funds, as is discussed below.

2.1 International experience

From the international standpoint, the most usual rainy-day funds are linked to the availability of natural resources. More specifically, an NRF is a type of sovereign wealth fund in the form of a government-owned special-purpose investment vehicle, whose main source of financing is the revenue arising on non-renewable natural resources, such as oil, natural gas and coal. The Natural Resource Governance Institute[11] had a record of 58 funds of this type of asset from 2000 to 2014, and it noted that at that time another dozen countries were considering setting up other new funds. They currently account for a total volume of $4.6 trillion, a figure four times higher than that recorded a decade earlier (see Table 1). The distribution is very uneven, since 92% of the total volume of the funds is concentrated in 10 countries, led by Norway, the United Arab Emirates and Kuwait.

The rationale behind the setting up of an NRF is usually the discovery of new deposits. In some cases, the consideration is concern over the potential impact on the economy of a large and volatile volume of public revenues which will foreseeably be exhausted in the future. In other instances, the response is a wish to ensure transparent and responsible management of an extraordinary flow of revenues, which has not always previously been the case.[12] Where these funds have been properly structured and managed, they have helped governments avert the so-called abundance paradox,[13] whereby countries rich in natural resources tend to show lower growth rates and inferior development to countries lacking such an abundance of resources.[14]

As earlier mentioned, prominent examples of this type of NRF are that of Chile, linked to the exploitation of copper mines, or those of Norway and certain Persian Gulf countries, linked to oil production. The governments of these countries use these funds with several objectives, such as covering budgetary shortfalls when revenues decline, saving for future generations, undertaking development projects or mitigating the "Dutch disease" by investing overseas. They can also be used to reduce the volatility of public spending and, in turn, to enhance its quality, promote economic growth and reduce poverty.[15]

At the regional level, the rainy-day funds of US State governments are a case in point. These funds were established in the main in the wake of the 1981-82 crisis, with the

11 Natural Resource Governance Institute (2014).
12 Frankel (2012).
13 Bauer (2014).
14 Auty (1993) and Sachs and Warmer (1995).
15 Natural Resource Governance Institute (2014).

Table 1

NATURAL RESOURCE FUNDS

Country		Financing resource	Year established	Fund name	Value of the assets in 2020	
					$bn	% of GDP
Algeria		Oil	2000	Revenue Regulation Fund	8	4
Angola		Oil	2012	Angola Sovereign Fund	5	5
Australia		Oil and minerals	2012	Western Australia Future Fund	103	7
Azerbaijan		Oil	1999	State Oil Fund	36	69
Bahrain		Oil	2006	Future Generations Reserve Fund	11	27
Botswana		Minerals	1994	Pula Fund	6	31
Brunei		Oil	1983	Brunei Investment Agency	40	297
Canada	Alberta	Oil	1976	Alberta Heritage Savings Trust Fund	13	4
	Northwest Territories	Minerals	2012	Northwest Territories Heritage Fund	0.02	0.0004
Chile		Minerals	2006	Pension Reserve Fund	10	4
		Minerals	2007	Economic and Social Stabilization Fund	10	3
Colombia		Oil	2011	Savings and Stabilization Fund	4	1
Equatorial Guinea		Oil	2002	Fund for Future Generations	0.1	1
Gabon		Oil	1998	Gabon Sovereign Wealth Fund	0.4	2
Ghana		Oil	2011	Ghana Heritage Fund	1	1
		Oil	2011	Ghana Stabilization Fund	0.5	1
Iran		Oil	2011	National Development Fund	91	20
		Oil	2000	Oil Stabilization Fund	0.2	0.1
Kazakhstan		Oil	2000	Kazakhstan National Fund	128	71
Kiribati		Minerals	1956	Revenue Equalization Reserve Fund	1	308
Kuwait		Oil	1953	Kuwait Investment Authority	592	439
Libya		Oil	2006	Libyan Investment Authority	66	127
Malaysia		Oil	1988	National Trust Fund	160	44
Mauritania		Oil	2006	National Fund for Hydrocarbon Reserves	0	4
Mexico		Oil	2000	Oil Revenues Stabilization Fund	6	0.5
		Oil	2014	Mexican Fund for Stabilization and Development	1	0.1
Mongolia		Minerals	2011	Fiscal Stability Fund	0.3	2
Nigeria		Oil	2011	Nigerian Sovereign Investment Authority	3	1
Norway		Oil	1990	Government Pension Fund Global	1,217	302
Oman		Oil	1980	State General Reserve Fund	24	31
Qatar		Oil	2005	Qatar Investment Authority	328	179
Russia		Oil	2004	National Welfare Fund	182	11
Sao Tome and Principe		Oil	2004	National Oil Account	0.01	2
Saudi Arabia		Oil	1952	SAMA Foreign Holdings	230	29
Timor-Leste		Oil	2005	Timor-Leste Petroleum Fund	15	896
Trinidad and Tobago		Oil	2000	Heritage and Stabilization Fund	6	26
Turkmenistan		Oil	2008	Stabilization Fund	1	1

SOURCES: Natural Resource Governance Institute (2014), Sovereign Wealth Funds Institute and the sovereign funds' websites.
NOTE: For subnational government funds, the amount is expressed as a percentage of the corresponding province's or region's GDP.

Table 1

NATURAL RESOURCE FUNDS (cont'd)

Country		Financing resource	Year established	Fund name	Value of the assets in 2020	
					$bn	% of GDP
United Arab Emirates	National	Oil	2007	Emirates Investment Authority	45	11
	Abu Dabi	Oil	1976	Abu Dhabi Investment Authority	697	274
		Oil	1984	International Petroleum Investment Authority	110	43
		Oil	2002	Mubadala Development Company	125	49
	Dubai	Oil	2006	Investment Corporation of Dubai	210	189
	Ras al-Khaimah	Oil	2005	RAK Investment Authority	1	13
United States	Alabama	Oil	1985	Alabama Trust Fund	3	1
	Alaska	Oil	1976	Alaska Permanent Fund	65	120
	Idaho	Lands	1969	Idaho Endowment Fund	2	2
	Louisiana	Oil	1986	Louisiana Education Quality Trust Fund	1	1
	Montana	Minerals	1978	Montana Permanent Coal Trust Fund	1	1
	New Mexico	Minerals and lands	1898	Land Grant Permanent Fund	20	20
		Oil and minerals	1973	Severance Tax Permanent Fund	21	21
	North Dakota	Oil	2011	North Dakota Legacy Fund	4	8
	Texas	Oil and lands	1876	Texas Permanent University Fund	21	1
	Utah	Minerals and lands	1896	Utah Permanent State School & Institutional Trust Funds	2	1
	West Virginia	Oil and natural gas	2014	West Virginia Future Fund	0.1	0.2
	Wyoming	Minerals	1974	Permanent Wyoming Mineral Trust Fund	7	19
Venezuela		Oil	1998	Macroeconomic Stabilization Fund	0.003	0.001
		Oil	2005	National Development Fund	15	7

SOURCES: Natural Resource Governance Institute (2014), Sovereign Wealth Funds Institute and the sovereign funds' websites.
NOTE: For subnational government funds, the amount is expressed as a percentage of the corresponding province's or region's GDP.

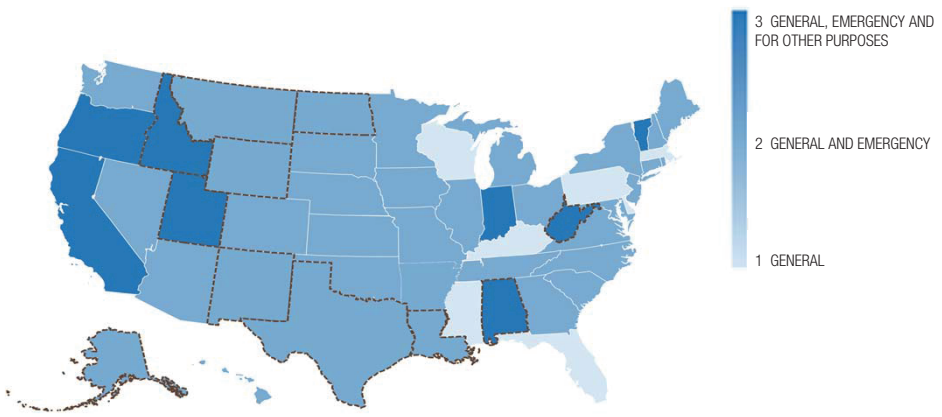
aim of mitigating financial difficulties in the following crisis episode. Currently, each of the 50 States has one or several rainy-day funds, with different goals (see Chart 3).[16] By way of example, the State of Michigan has one countercyclical rainy-day fund for economic stabilisation in general and another specific fund to safeguard aid to education, whereas Ohio has a general rainy-day fund and another fund to protect health insurance for low-income earners. Until very recently, not all US States had a rainy-day fund and, often, those in place were relatively small in volume. In aggregate terms, and since their widespread emergence in the early 1980s and until the early 1990s, the volume of rainy-day funds was very small (2.6% of the State's general expenditures).[17] After the 1990-91 crisis and with a view to reinforcing their stabilisation capacity, the funds in place increased to 4.1% before

16 White (2019).

17 The US States manage their resources through a fund (known as a "total fund") that comprises the funds confined to specific purposes, which can only be used for the purposes to which they have been earmarked (such as the link between State revenue arising on petrol tax and the financing of highway infrastructure maintenance and new projects (Cammenga, 2019)), and a general fund, whose non-reserved resources are available for any purpose. The general fund accounts for approximately 40% of the total fund.

Chart 3

STATE RESERVE FUNDS IN THE UNITED STATES



SOURCE: US National Association of State Budget Officers.
NOTE: The outlined States have an NRF.

the 2000 crisis, and to 4.7% in the run-up to the 2008 financial crisis, and thus close to the consensus figure of 5% at that time regarding the optimal size to soften the impact of the crisis on the State government's accounts.[18] Following the crisis an intense debate ensued on this type of fund, assessing matters such as the optimal size of the fund given the volatility of State revenue and expenditure, as will be detailed in the following section. Since then the average size of these funds has increased to around 7.6% of general expenditures in 2019 (see Chart 4.2).

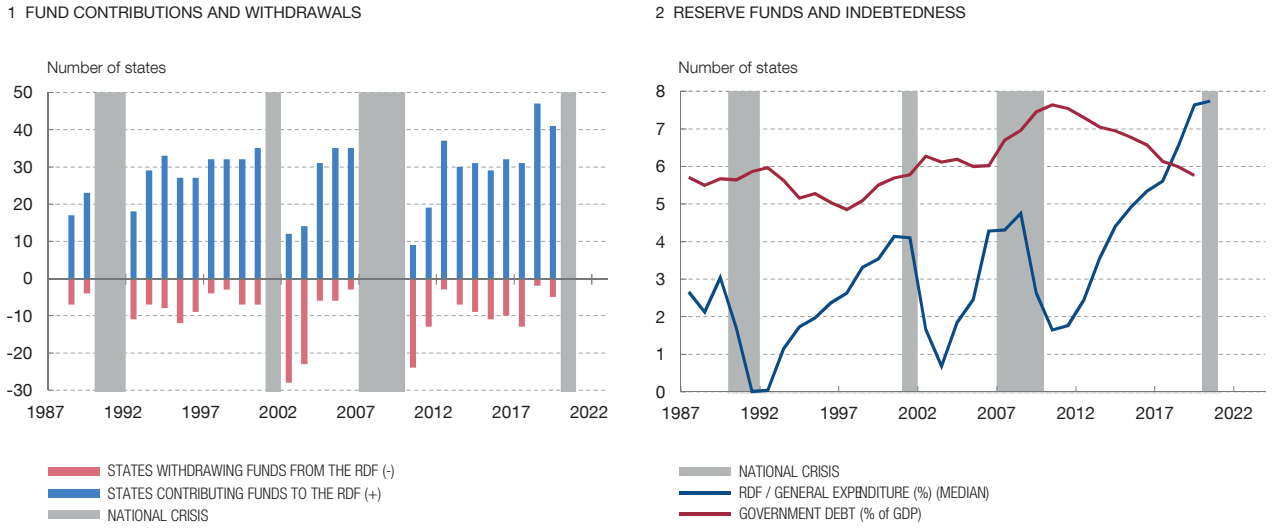
Despite the adoption virtually across the board of rainy-day funds among US States in recent decades, few papers have sought to evaluate the factors that drove States to adopt the funds as a countercyclical tool.[19] Since the early studies that correlated the adoption of rainy-day funds to recessions,[20] more recent papers have found that the probability of a State adopting a rainy-day fund is higher when the volatility of the State's revenues has increased,[21] or when the closest State has already adopted such a fund.[22] Moreover, also among the reasons cited by governments is the preference for lower debt in order to enhance the credit rating, as in Massachusetts and Wisconsin.[23]

The endowment of natural resource funds evidences high heterogeneity, as Table 1 shows. Some governments keep the amounts in such funds high, such as Norway, which

18 See, for example, Joyce (2002), Thatcher (2008) and Zhao (2016).
19 Douglas and Gaddie (2002), Gold (1984), and Wagner and Sobel (2006).
20 Gold (1984), Hou (2004), Douglas and Gaddie (2002), and Sobel and Holcombe (1996).
21 Grizzle et al. (2015).
22 Wagner (2004).
23 Loppnow (2009).

Chart 4

USE OF THE RESERVE FUNDS IN THE UNITED STATES



SOURCES: National Association of State Budget Officers and National Bureau of Economic Research.

has the biggest NRF globally at $1.2 trillion, equivalent to three times the country's GDP. Other governments keep their natural resource funds at a bare minimum, as is the case in Equatorial Guinea and Mongolia. Likewise, at the regional level, some US States have set up a rainy-day fund, but without hardly endowing it (the cases of Kansas, Montana and Pennsylvania). Other States, however, amassed more than 230% of general expenditures in reserve funds, such as Alaska in 2011, although this has since fallen to 48% of the State's general expenditures (almost 5% of GDP). Across the heterogeneity in place, there is broad consensus in the literature about the effectiveness of these funds for mitigating the impact of shocks when these funds are properly structured and sufficiently endowed.

2.2 Benefits of the funds according to the literature

Generally, the literature and the experience available suggest that the results of these types of funds have been positive, though not in all instances.[24] For the specific case of countries with sizeable revenues arising on natural resources, creating the natural resources fund as a saving cushion has involved segregating the course of public spending from that of revenue, which has afforded public finances greater stability and has enabled them to reduce their debt.

In Norway, Botswana and Chile, NRFs have contributed to heading off the "Dutch disease" and to macroeconomic stabilisation. In particular, the Norwegian fund has restricted

24 See, inter alia, Addison and Roe (2018), Natural Resource Governance Institute (2014), Al-Sheikh and Erbas (2012) and Schmidt-Hebbel (2012).

excessive and procyclical public spending, and it has fulfilled the goals of providing for the adoption of a countercyclical fiscal policy and, at the same time, of increasing pensions. In this economy, moreover, monetary policy and fiscal policy measures as a whole have helped prevent pressures on price levels and the exchange rate.

The impact of NRFs on well-being and socio-economic development is also uneven depending on the economy in question. The literature shows an impact that is generally positive, as in Botswana[25] and Indonesia,[26] which have invested in health and education. Other examples in which the NRFs have contributed to fiscal discipline are Chile and Kuwait, attaining a situation where the spending budget is not tightly linked to revenue, as was the case before the NRF was established, and meaning that substantial reserves have been built up. Other examples, such as Alaska, illustrate that the assets of the fund provide revenue to all the State's residents. There are other cases, however, where the results have not been so successful, such as in Venezuela, Oman and Azerbaijan.[27, 28]

In the case of the funds of the US States, the literature shows – for the period in which not all States had a rainy-day fund – that the States with a fund save more than those without, and that States save significantly more after adopting such a fund.[29] It is further seen that the existence of a strict saving rule correlates with less fiscal stress,[30] and that a State's capacity to smooth expenditure over the course of the economic cycle depends largely on the structure of the saving and fund withdrawal rules governing the fund.[31]

The relationship between credit ratings, bond yields, loan costs and rainy-day funds has also been acknowledged.[32] In any event, these funds can only compensate for cyclical fiscal imbalances, i.e. one-off situations such as the reconstruction of infrastructure following a natural disaster, as opposed to permanent (structural) situations, such as a region's decline in population, in which rainy-day funds would only have the capacity to temporarily mask a difficult situation for the public coffers.[33]

There is broad consensus in the literature about the capacity of rainy-day funds to help overcome fiscal constraints, and to maintain fiscal discipline and stability during recessions and fiscal emergencies.[34] Indeed, some papers assert that the use of a rainy-day fund may reduce the State's default risk and lower its funding costs.[35]

---

25 Lewin (2011) and Acemoglu et al. (2003).
26 Bauer et al. (2016).
27 OECD (2017).
28 Fasano (2002) and Johnson (2012).
29 Hou and Duncombe (2008), Knight and Levinson (1999) and Wagner (2003).
30 Sobel and Holcombe (1996), Levinson (1998) and Wagner and Sobel (2006).
31 Wagner and Elder (2005).
32 Grizzle (2010), Wagner (2004) and Mattoon (2003).
33 The Pew Charitable Trusts (2017).
34 Hou (2003 and 2004), Marlowe (2005), and Schunk and Woodward (2005).
35 Wagner (2004) and Mattoon (2003).

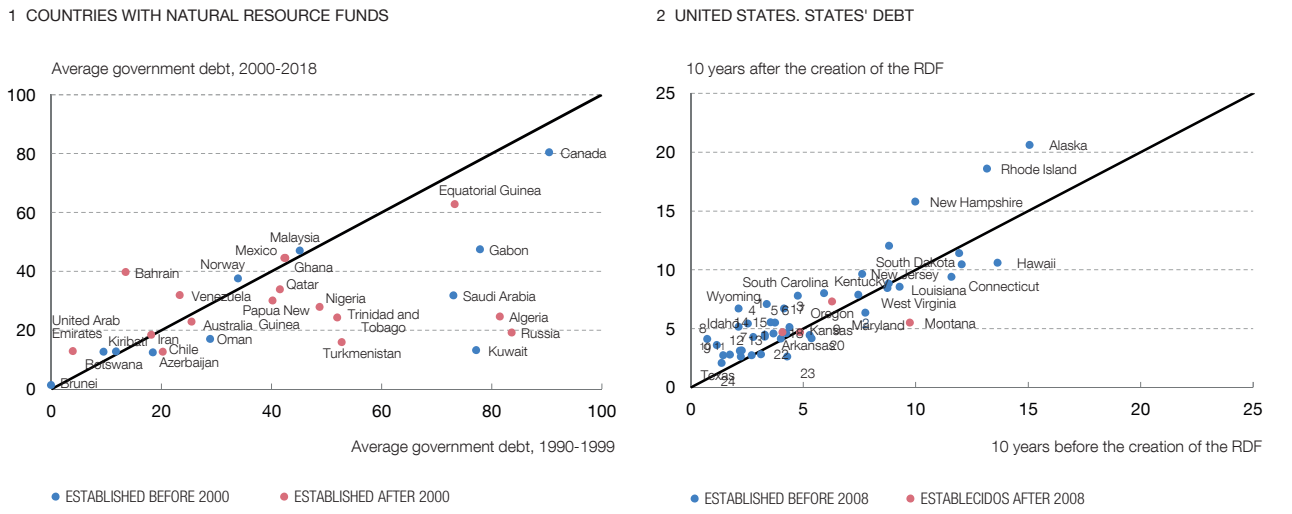
2.3 Contingency funds as an alternative to other fiscal instruments?

Pre-endowed and protected reserve funds can act as an alternative to public debt at times of crisis. In countries with natural resource funds, their debt can be seen to moderate once they have been set up. Many natural resource funds have been set up since 2000, such as those of Australia, Chile and Dubai. For most, lower levels of public debt are observed in the years following the creation of their NRFs (they feature below the 45° line in Chart 5.1). The key lies in the availability of the funds – which have been previously set aside and protected – when they are needed. In the current circumstances, Norway's resort to its reserve fund to finance the consequences of COVID-19 instead of issuing debt is an example of this. Chile, which has one of these macroeconomic stabilisation funds, has also used the profits generated by its NRF to finance its fund for tackling and mitigating the effects of the pandemic.

The reduction in debt is not discernible at the State level in the United States given its now low volume. Indeed, debt levels are seen to be relatively similar in the previous decade and following the creation of the reserve funds (most States are clustered around the 45° line in Chart 5.2). In this case the reserve funds continue to be an alternative to debt, given that the States cannot tap debt unless limited amounts are involved. By way of example, the debt of the Spanish regional governments at end-2018 ranged from 14% to 42% of regional GDP, with the average standing at 23.3% of GDP.[36] In the United States,

Chart 5

CHANGE IN INDEBTEDNESS AFTER CREATING THE RESERVE FUNDS

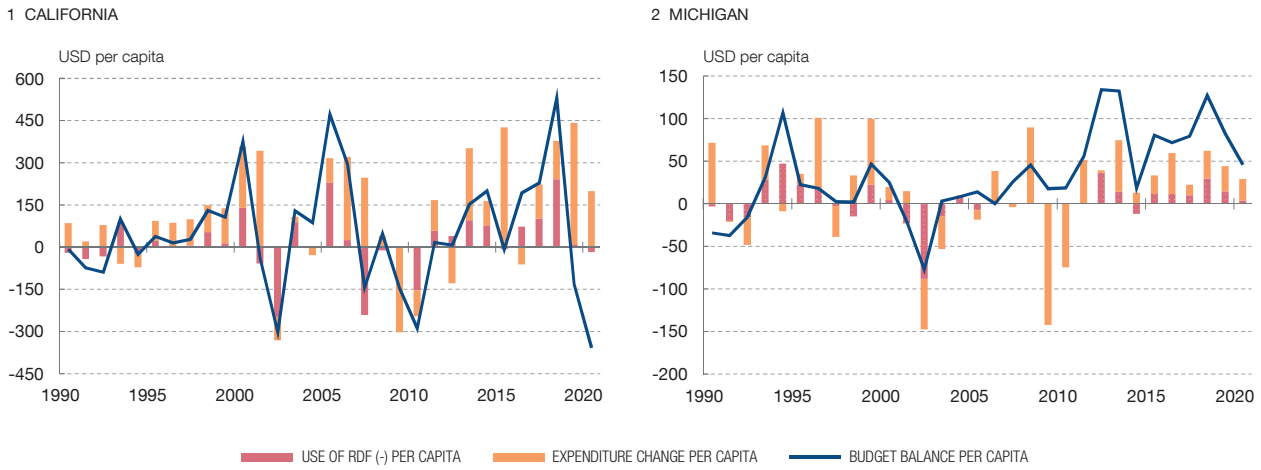


SOURCES: World Economic Outlook, Bureau of Economic Analysis and Census Bureau.
NOTE: 1: North Dakota; 2: Illinois; 3: Oklahoma; 4: New Mexico; 5: Utah; 6: Wisconsin; 7: California; 8: Nebraska; 9: Mississippi; 10: Indiana; 11: Arizona; 12: Tennessee; 13: Michigan; 14: Ohio; 15: Virginia; 16: Minnesota; 17: Missouri; 18: Alabama; 19: Pennsylvania; 20: Nevada; 21: Washington; 22: Delaware; 23: Georgia; 24: North Carolina.

36 Banco de España Statistical Bulletin. Regional (Autonomous) Governments. 30 September 2020.

Chart 6

GOVERNMENT EXPENDITURE, BUDGET BALANCE AND USE OF RESERVE FUNDS



SOURCE: National Association of State Budget Officers.
NOTE: The data for the endowment of the reserve fund (RDF) for 2020 and for general expenditure are estimated.

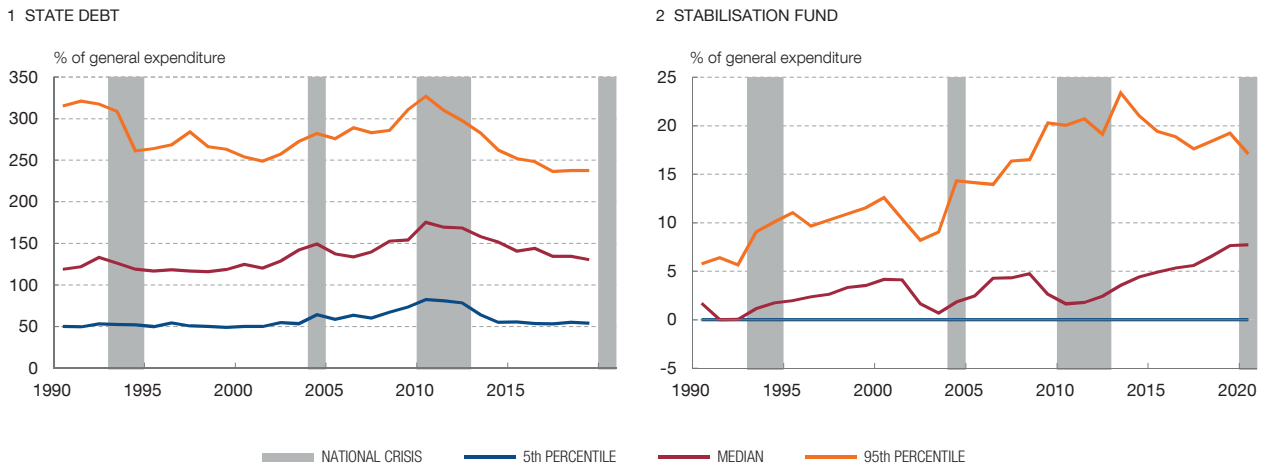
meantime, the debt of the States as of the same dates ranged from 1.7% to 14.9%, with an average of 6.3% of State GDP. In fact, most State rainy-day funds were set up to provide greater room for manoeuvre in emergency situations given funding constraints, which led to cuts in public services or to higher taxes in order to fulfil the balanced budget mandate. Hence, the reserve funds have served as an additional instrument given the States' limits on borrowing.

From this standpoint, it is worth noting that a rainy-day fund is one more instrument available to governments to cushion the impact of shocks to public finances, along with other more classic instruments such as the resort to debt (when possible), tax increases and spending cuts. Each government's preference determines at each point in time the policy mix, with no uniform pattern being observable on the basis of the international experience. The case of the United States provides, once again, the possibility of illustrating this facet of the funds.

By way of example, compared with the State of California, which tended to use all instruments available to it to expand its fiscal capacity, other states such as Michigan have shown a greater preference for austerity, having spending cuts accommodate revenue declines without scarcely resorting to debt or to rainy-day funds (see Chart 6). As can be seen, the strong budget imbalance during the 2007-09 crisis reared up forcefully in some States, such as California, which was obliged to cut spending across the board, raise taxes and issue notes and commercial paper (with a fairly tight limit since banks rapidly refused to accept them), raising its debt to the permitted ceiling (from 6.1% in 2005 to 7.6% in 2010). In parallel, it made intensive use of its rainy-day fund: in 2005 it had an outstanding balance of 11.4% of general expenditures (0.5% of GDP), which was exhausted by 2008. California's case is in contrast to Michigan's management in the 10 years running from 2003 to 2012.

Chart 7

CHANGES IN INDEBTEDNESS AND IN STATE RESERVE FUNDS IN THE UNITED STATES



SOURCES: National Association of State Budget Officers and National Bureau of Economic Research.
NOTE: The latest state debt figure is for 2019.

In 1997, Michigan's rainy-day fund accounted for 13.9% of expenses, which the State had exhausted by 2003 following the 2001 crisis. It did not endow the fund again until 2012 and applied austerity policies to hold its debt at moderate rates. Since 2012, however, it has once again set aside provisions for the fund, accumulating 11.1% of the State's general expenditures according to 2020 forecasts. Maine is another of the States that has resumed the use of its rainy-day fund following the financial crisis. Like Michigan, it depleted its fund in the wake of the 2001 crisis and did not build it up again until 2011. Unlike Michigan, it opted to resort more intensively to debt (10-11% of GDP). Nonetheless, from 2011 until 2018, it reduced its debt to 7.4% of GDP and it has boosted its reserve fund to 8.2% of the State's general expenditures.

The resort to debt and to reserve funds in crisis situations also shows wide dispersion (see Chart 7). Once again in the case of the United States, in the 1990s median State debt was around 5% of GDP (120% of the State's general expenditures) (red line in Chart 7.1), with this figure increasing particularly sharply during the 2007-09 crisis to 7.6% of GDP in 2010 (175% of expenditures). Since then it has eased slightly to 6.3% in 2018. At the same time, the median State rainy-day fund scarcely amounted to 5% of State expenditures (red line in Chart 7.2) in the 2000-01 and 2007-09 crises, in line with the consensus belief at that time that 5% of general expenditures was sufficient to cushion the impact of a crisis on the budget. Developments in 2007-09 reopened the debate over the optimal size of rainy-day funds, which were swiftly depleted in this crisis, with the general 5% rule becoming obsolete.

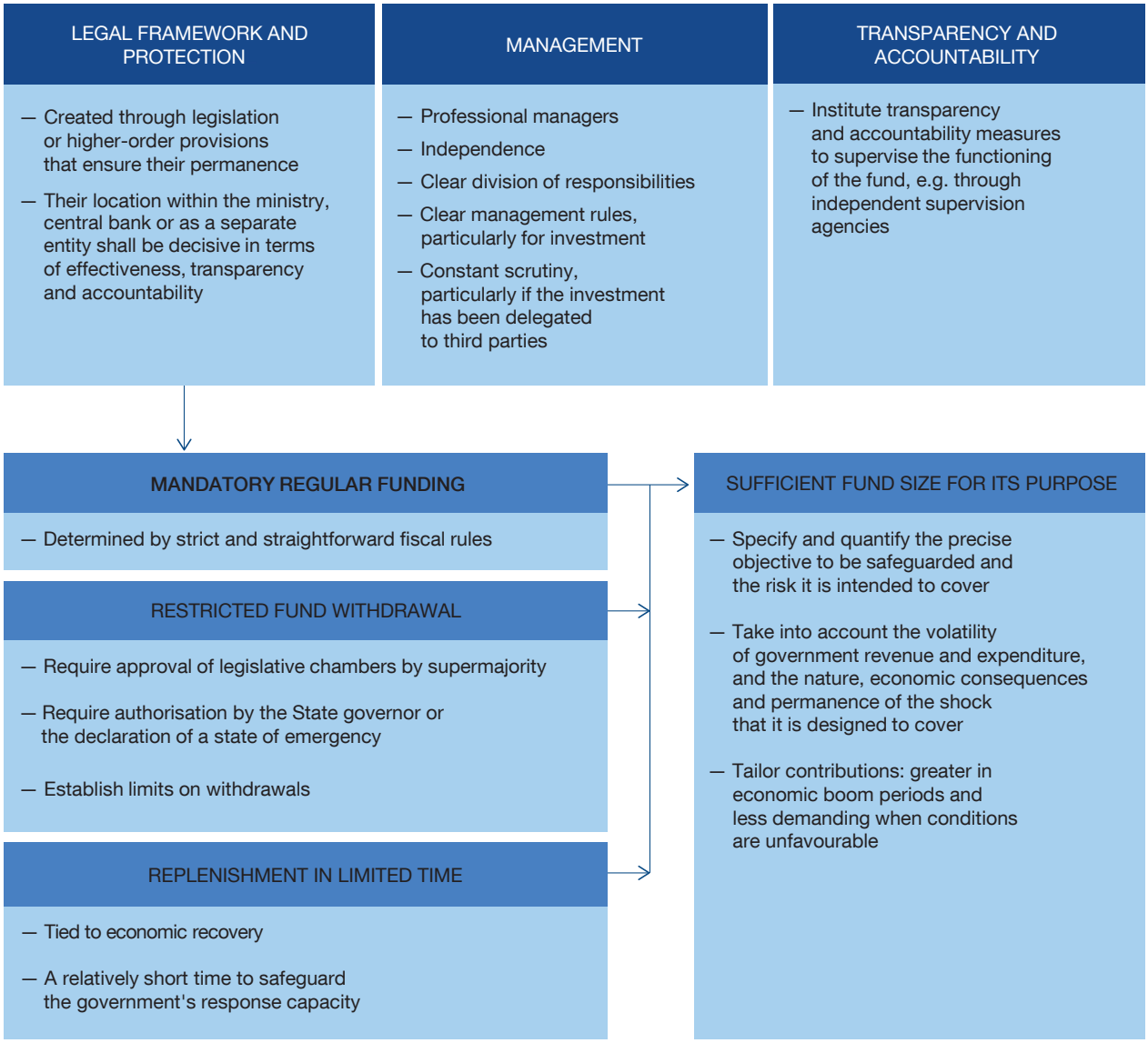
3 Fund design and management

Decisions on the legal protection of rainy-day funds, on management and on transparency and accountability rules are essential to the success of this type of fiscal instrument and contribute to reinforcing the good use of public funds. Proper management is important not only for the country in which the fund is located, but also, in some cases, for those countries in which such fund invests, when its size so allows. By way of example, the funds of Norway, Kuwait and Qatar more than triple their GDP. Accordingly, further to the 2007 financial crisis,

Figure 2

RECOMMENDATIONS IN THE LITERATURE ON CREATING AND MANAGING RAINY-DAY FUNDS

The stabilisation capacity of these funds increases under the following conditions:



SOURCE: Banco de España.

what were known as the "Santiago Principles" were signed. These were a set of 24 voluntary guidelines that determine best practices for the management of sovereign funds. They are generally accepted principles and practices. In the United States, moreover, there is a highly developed body of literature on the desirable characteristics for the sound functioning of State rainy-day funds.

This section sets out the main recommendations in the literature for the optimal functioning of a rainy-day fund. Detailed under legal protection are aspects relating to management, such as mandatory funding, restricted withdrawal and replenishment in limited time, which enables sufficient resources to be built up in the rainy-day fund (see Figure 2).

3.1 Legal framework, management and transparency

Recommendations on the legal framework and protection

Reserve funds are usually set up by parliaments, either by legislative regulation, executive decree or amendments to the State's own constitution. Set against the perdurability and long-term vision of the fund that the constitution can provide, regulations and executive decrees are more flexible and, frequently, more detailed.[37] Among NRFs, the creation of the funds is most frequently by means of legislation (Norway, Alberta (Canada), Chile and Russia) or by executive decree (Kuwait and Azerbaijan). There are however some cases, such as Nigeria or some US States (Alaska, North Dakota and Wyoming), where the funds were created through constitutional amendments. Legally, these reserve funds take the form of a sovereign investment fund.

In the United States, State funds were developed on the basis of the regular saving funds of certain States. Their stabilising capacity was boosted through legal protection which ensures a specific endowment and restricts the availability of the funds to the situations and conditions for which they have been designed, either through legislation or through higher-order provisions, such as the State's own constitution.[38] By way of example, the proposal for a rainy-day fund in the State of Virginia, in 1991, envisaged establishing the fund by way of a constitutional amendment, in order to ensure its permanence in the fiscal process, given that it would be more complicated to annul it through subsequent legislation.[39]

Such legal protection means that once the money is immobilised in a rainy-day fund, it can only be drawn down in certain situations and meeting very specific conditions. That would serve to insulate its management from discretionary decisions that have traditionally undermined the potential of regular saving funds as budgetary stabilisation instruments. Indeed, while there is evidence in the United States that rainy-day funds are

37 Bauer and Rietveld (2014).

38 Mohsin et al. (2016).

39 Report of the Joint Legislative Audit and Review Commission on the Proposal for a Revenue Stabilization Fund in Virginia, January 1991.

largely substitutes for the so-called "general fund", it is crucial to ensure their availability at the necessary time. This cannot be guaranteed if the State's saving remains in the general fund.

Legally, there are very notable differences between these two types of funds. NRFs are government-owned sovereign investment funds, funded by the revenue arising on the exploitation of the natural resources in question, which is invested in real and/or financial assets. As previously detailed, these funds usually have a defined long-term goal related to economic development, the intergenerational distribution of resources and the stabilisation of the economy. Conversely, State reserve funds funded by the United States budget[40] (or general funds) are saving accounts under the State's general budget, meaning they are not legal entities per se. Hence, whereas in the case of US State funds the reserve fund accounts are consolidated in the State budget, as an account thereof, in the case of sovereign funds the consolidation of accounts is not guaranteed in instances in which the fund is established as a legal entity separate from the government.[41]

Another essential decision when setting up the fund is its institutional location. It can be located as a unit within the central bank or the finance ministry, or as a legally separate entity that reports the government, which is the owner of the fund. The decision has consequences in terms of effectiveness, transparency and accountability. By way of example, when the central bank is a professional public institution with high operational capacity, locating the rainy-day fund as one of its units may contribute to enhancing management. Norway and Russia are two examples in this respect. Locating the fund in a separate entity that reports directly to the executive branch (Alberta, Abu Dhabi and Azerbaijan) offers the advantage of creating knowledge units capable of managing complex financial instruments. However, that could also give rise to strategic behaviour potentially aimed at circumventing the strictest reporting and supervisory requirements associated with government activities and with those of a central bank.[42]

Recommendations on fund management

The possibilities of a rainy-day fund being successful are greater when it is managed by professionals able to direct the fund's risk profile and management is independent of discretionary judgements.[43] The importance of establishing a clear division of responsibilities at all levels is also highlighted. The powers across the different hierarchical levels should also be clearly defined among those holding ultimate authority (whether legislative or executive), the formal manager, the operational manager (ministry of economy, central bank or special agency) and also potential external managers if the safekeeping and management of the assets is fully or partly delegated in third parties. Further, a clear definition of powers and

40 We refer here to funds not linked to natural resources, of which there are also examples at the State level in the United States, such as in Alaska, Wyoming and North Dakota.

41 Hammer et al. (2008).

42 Bauer and Rietveld (2014).

43 See Bauer and Rietveld (2014) for a detailed description of the aspects discussed in this section.

responsibilities among the different operational areas of the fund (governing board of the fund, executive committee, front office, middle office and back office) is also required.

The legislature normally has ultimate control over the fund's activities, although the executive branch can also accept this control (Chile and Russia report to the minister for the economy; Kazakhstan and Azerbaijan, to the president), as may the central bank (Botswana). Legislators also play an important role in the management and functioning of the funds and can play a key role in ensuring appropriate levels of supervision, transparency and accountability.

As regards management and functioning, the legislature, as part of its control task, can and should question in an informed manner the management of the fund, especially as regards inflows and outflows of funds, the results of investments, risk management and decision-making processes. In this exercise of ultimate control, it is also recommended that the fund managers inform the legislative power when the legal framework and legal provisions of the fund should be changed in order to make prudent investment decisions.

By way of example, it may be necessary to invest in new, safe asset classes, in specific derivatives to develop risk hedging strategies, or to improve long-term returns. The fund manager may thus better respond to the fund's objective. Hence, while a rainy-day fund should be invested in low-risk liquid assets, a saving fund for future generations should be invested in more profitable and possibly less liquid and higher-risk assets.

The formal fund manager sets the asset investment guidelines, and deposits and withdraws money in and from the fund. The manager is usually part of the executive, but may also belong to the central bank. In some cases, such as in the United States, legislation establishes the conditions under which fund deposits and withdrawals may be made, restricting the manager's discretion. In other cases, such as in Norway, parliament controls deposits and withdrawals even though there is no legislation.

Day-to-day management of the fund yields better results when it is in the hands of a politically independent body, with technical capacity and strong internal controls, which will contribute to investment objectives being met and will mitigate the possibility of mismanagement. In the case of Norway, which is considered a good model for governance, the parliament establishes the fund's legal framework and the finance ministry is formally responsible for the fund, whose management is delegated to the central bank. The central bank's executive board, in turn, delegates management to a unit of the entity dedicated to the fund.

It is also essential that clear rules are in place about the assets in which the fund may or may not invest and about the fees payable. Many funds employ an entity for securities safekeeping, and to perform additional financial services related to the fund's management. These entities are usually fully independent of the government. However, the fund is exposed

to the payment of major fees if strict rules are not established regarding the mandate and structure of fees for the entity exercising custody of the fund's assets.

In this situation, the fund manager should subject delegated management to constant scrutiny, with particular monitoring of the fees on operations. Establishing regulations and resolutions as to the securities in which investment may be made is vital, as is agreeing on fees and establishing the most effective means for proper control by the formal manager and the day-to-day manager of the fund.

In the main, fund managers have extensive discretion and are subject not only to the body exercising ultimate control over the fund's activities but also to independent monitoring groups. Also, fund managers usually have formal consultancy bodies whose members are drawn from academia or from politics. Chile has an extensive range of advisory committees, including the Trend GDP Consultative Committee and the Copper Reference Price Consultative Committee, whose forecasts are binding for the government ahead of deciding on which revenues are set aside and which are earmarked for expenditure in each fiscal year.

Recommendations on transparency and accountability

Transparency in a reserve fund can help shore up appropriate governance and management. The most transparent funds are successful in aligning the government's objectives with those of the public at large, ensuring, for instance, that fund withdrawals are in response to the application of a specific rule. The evidence available shows a clear correlation between the fund's degree of transparency and the fulfilment of a medium and long-term fiscal objective.

A reserve fund can be considered to be transparent when it fulfils the following conditions:[44] (i) it has clearly defined functions and responsibilities; (ii) information is publicly accessible, in particular that relating to management activities (fund deposits and withdrawals; assets; returns on investments made); (iii) decision-making and reporting processes are public, which entails the regular issue of periodic reports, providing accountability; (iv) the integrity of the information reported is ensured through high-quality external and independent oversight mechanisms.

3.2 Functioning and capacity

Functioning hinges on four elements which largely determine the capacity of rainy-day funds to mitigate a shock: the criteria for the funding, withdrawal, replenishment and determination of the size of the fund.[45]

As regards funding, in the United States approximately half of all State funds stipulate that rainy-day funds shall accumulate the total surplus for the year ending, while

44 For further details of the aspects discussed in this section, see Toledano and Bauer (2014).

45 National Conference of State Legislatures (2018).

other States demand a smaller proportion (Utah, 25%; New Jersey and Virginia, 50%), or have specific thresholds (Indiana requires the paying in of the surplus when personal income growth exceeds 2% per annum). A second group of States sets specific funding periodically, while a third group links funding to the results of natural resources exploitation, as in Alaska and North Dakota (oil extraction) or Wyoming (coal). It is further worth noting that almost all States have ceilings on funding. In countries with natural resource funds, the criteria are also very diverse. Generally, the fund receives revenues obtained on the exploitation of natural resources, deducting a portion thereof, which is used to finance a proportion of the public expenditure for the ongoing fiscal year. In Norway, the fund's revenues stem from all the revenue arising on oil extraction, revenue on net financial transactions pertaining to oil-related activities, and returns on the fund's investments. Chile's two funds – to protect pensions and for economic and social stabilisation – receive the surplus for the fiscal year, which must be between 0.2% and 0.5% for the pension fund, and the surplus of that amount is added to the rainy-day fund.

As to the rules for fund withdrawals, in the United States authorisation from the legislative chambers is required, frequently in the form of supermajorities. The authorisation of the State governor may also be required and, in some States, there are ceilings on the amounts that may be withdrawn, as in Hawaii, which does not allow more than 50% of the fund to be withdrawn in a single fiscal year. There is also a flip-side to these criteria. Set against the position in favour of supermajorities,[46] the literature indicates that the requirement of a sufficiently extensive majority in the chambers may allow minorities to block the use of rainy-day funds, restricting the government's responsiveness in the face of a crisis. Likewise, restricting the amount that may be drawn down stymies responsiveness in the face of unexpected events. In Chile, withdrawals are only allowed for those purposes foreseen in each of the two funds' objectives, subject to ministerial decree. In Norway, the government is allowed to use an amount equivalent to the real return on the fund's annual expenditure. Such a return is estimated at 3%, which is equivalent to almost one-fifth of the fiscal budget.[47] Further, as cited, exceptional withdrawals may be made in crisis situations such as the current exceptional COVID-19 circumstances.

In this respect, the literature indicates that one of the keys to the effectiveness of rainy-day funds is that the criteria for both capital deposits and withdrawals should be clearly defined and shielded from discretionary judgements, such that the funds are sufficiently capitalised when they need to be.[48] As to the evidence, States with stricter deposit and withdrawal rules save more than States in which these rules are dependent on discretionary judgements.[49] There is also evidence that States with stricter rules have lower financing costs.[50]

---

46 Rose (2008).

47 See Norges Bank Investment Management. Government Pension Fund Global. About the Fund. As at 25 August 2020.

48 Mattoon (2003).

49 Sobel and Holcombe (1996), Knight and Levinson (1999), and Wagner (2003).

50 Wagner (2004).

Clauses covering the replenishment of withdrawn funds differ as to the periods in which such replenishment should take place. In the United States, some States, such as Iowa and Mississippi, demand a very rapid replacement, before the end of the fiscal year in which the funds have been withdrawn. Florida, meantime, considers uniform payment replacement between the third and fifth year from withdrawal, and Minnesota requires replenishment only once the State economy has recovered. However, the literature also points out that these highly demanding fund-replenishment rules force States to earmark the resources that would be needed for other programmes at particularly delicate junctures, suggesting that replacement should be tied to improvement in the economy.[51]

The last element relating to the functioning and capacity of funds to withstand shocks is their (optimal) size. In the United States, institutional practice and the related literature has tended to use as a reference a size of around 5% of the State's general expenditures, an amount habitually benchmarked as a prudent amount for a State's fiscal health and one acceptable to the external parties involved, such as credit rating agencies. Indeed, at end-2018, most States had established ceilings on the total size of funds that ranged between 5% and 15% of general fund revenue, although the historical experience is mixed.[52]

Among other reasons, the literature points out that the limits on the amount that rainy-day funds can amass have stood below the size needed to maintain government expenditure programmes without raising taxes during the following recession. Accordingly, countering the belief that 5% of general expenditures is a sufficient size for the rainy-day fund, the literature argues that one measure cannot fit all needs.[53]

Three significant aspects are suggested for appropriately determining the size of a rainy-day fund:[54] (i) precise definition of the objective to be safeguarded, such as guaranteeing debt service or health or education services, so that the size fits the purpose; (ii) specification of the risk it is intended to cover, since the amounts to be maintained will be far higher if the aim is to avoid an across-the-board cut in expenditure rather than to avoid cuts only in specific priority headings in the face of a less acute recession; and (iii) the tailoring of contributions so that the capitalisation of the fund is greater in "extraordinary" economic boom periods and less demanding when economic conditions are relatively unfavourable. If, moreover, the aim of the fund is to ensure specific expenditure programmes influenced by the economic cycle, it is worth also bearing in mind the extent to which these spending needs may vary.

---

51 Mattoon (2003).

52 More recently, some papers have shown that in the past 25 years at least 21 US States never saved enough in their rainy-day funds to compensate for the revenue shortfall in recessions (Zhao, 2016). This result had already come to light in the late 1990s, when it was estimated that around 40 States did not have sufficient budgetary reserves (in rainy-day or other funds) to maintain services if a recession similar in duration and intensity to that at the onset of that decade were to come about (Lav and Berube, 1999).

53 Joyce (2002), Kriz (2002) and Lav and Berube (1999).

54 The Pew Charitable Trusts (2014 and 2015).

4 Main lessons from the international experience

The international experience shows many examples in which national or regional governments build up resources in contingency or rainy-day funds at times of economic plenty and protect them legally. The objective is to have greater fiscal room for manoeuvre to tackle extraordinary costs arising from extreme events linked to natural or biological catastrophes, or, more generally, from economic crises.

In this paper, we show that the evidence on their use is highly heterogeneous, since there is no single approach to using rainy-day funds set against the combination of increased debt, spending cuts and/or tax increases. However, past experience shows that when these funds are appropriately structured and sufficiently large they contribute to mitigating the impact of shocks and improving fiscal discipline. In an emergency situation, these funds may be used instead of debt, thus limiting the government's funding costs under potentially difficult market conditions. This paper underscores the importance of attending to aspects such as the legal framework governing the inflows and outflows of resources, investment criteria, transparency and accountability, to ensure the fund's smooth functioning. Further, it reviews the recommendations included in the literature regarding the optimal size of the fund based on the risk it is intended to cover and the volatility of government revenue and expenditure. Thus, when called upon, the contingency or rainy-day fund will have the capacity to help cover the extraordinary costs stemming from the emergency or crisis situation for which it has been designed.

The current COVID-19 crisis has brought into sharper relief the usefulness of such tools, insofar as the authorities that have such funds available have been able to use them as part of their response to a very severe economic crisis. Against this backdrop, the question has been raised as to whether national or supranational funds should be built up for this kind of specific contingency, given the greater observed frequency in recent decades of both natural disasters (partly linked to global climate risks) and epidemics that could potentially become systemic risks (associated with serious viral diseases such as Ebola, Zika, MERS, SARS and some haemorrhagic fevers).[55, 56] Some recent papers likewise emphasise the need for tools not only geared to mitigate the severe economic damages caused by these events, but also to allow their early detection. One example is to equip international institutions with adequate resources, most prominently the World Health Organization. The development of these tools necessarily requires an interdisciplinary approach and close international cooperation.

55 See: Ten threats to global health in 2019. World Health Organization. Viewed: 4 November 2020.

56 Nadimpalli and Pickering (2020).

References

Acemoglu, D., S. Johnson and J. A. Robinson (2003). "An African Success Story: Botswana", in D. Rodrik (ed.), *In Search of Prosperity: Analytic Narratives on Economic Growth,* Princeton, Princeton University Press, pp. 80-119.

Addison, T., and A. Roe (eds.) (2018). *Extractive Industries. The Management of Resources as a Driver of Sustainable Development,* United Nations University World Institute for Development Economics Research (UNU-WIDER), Oxford University Press.

Alesina, A., and A. Passalacqua (2016). "The Political Economy of Government Debt", in J. Taylor and H. Uhlig (eds.), *Handbook of Macroeconomics.*

Alloza, M., J. Andrés, J. J. Pérez and J. A. Rojas (2020). "Implicit public debt thresholds: an operational proposal", *Journal of Policy Modeling* (forthcoming).

Al-Sheikh, H., and S. N. Erbas (2012). *The oil curse and labor markets: the case of Saudi Arabia,* Working Paper No 697, The Economic Research Forum (ERF).

Auty, R. M. (1993). *Sustaining Development in Mineral Economies: The Resource Curse Thesis,* London, Routledge.

Bauer, A. (2014). *Managing the public trust: How to make natural resource funds work for citizens,* Natural Resource Governance Institute.

Bauer, A., U. Gankhuyag, S. Halling, D. Manley and V. Venugopal (2016). *Natural Resource Revenue Sharing,* Natural Resource Governance Institute and United Nations.

Bauer, A., and M. Rietvel (2014). *Institutional Structure of Natural Resource Funds,* Natural Resource Governance Institute Policy Brief, August.

Blanchard, O., and D. Leigh (2013). *Fiscal Consolidation: At what speed?,* Vox EU & CEPR, 13 May.

Cammenga, J. (2019). *How Are Your State's Roads Funded?,* US Tax Foundation, September.

Cardarelli, R., S. Elekdag and A. Kose (2009). *Capital Inflows: Macroeconomic Implications and Policy Responses*, IMF Working Paper WP/09/04.

Cavallo, E., and I. Noy (2011), "Natural Disasters and the Economy — A Survey", *International Review of Environmental and Resource Economics:* Vol. 5: No. 1, pp. 63-102.

Cuadro-Sáez, L., F. S. López-Vicente, S. Párraga and F. Viani (2020). *Fiscal policy measures in response to the health crisis in the main euro area economies, the United States and the United Kingdom,* Occasional Paper No 2019, Banco de España.

Douglas, J., and R. Gaddie (2002). "State rainy day funds and fiscal crises: rainy day funds and the 1990–1991 recession revised", *Public Budgeting & Finance,* 22 (1), pp. 19-30.

European Commission (2020). Annual Macro-Economic (AMECO) Database. Gross Domestic Product at current prices (database).

Fasano, U. (2002). "With open economy and sound policies, U.A.E. has turned oil 'curse' into a blessing", *IMF Survey,* 21, October, pp. 330-332.

Frankel, J. (2012). *The Natural Resource Curse: A Survey of Diagnoses and Some Prescriptions,* Harvard KS Faculty Research Working Paper Series (RWP12-014).

Gold, S. (1984). "Contingency measures and fiscal limitations: the real world significance of some recent state budget innovations", *National Tax Journal,* 37 (3), pp. 421-432.

Grizzle, C. (2010). "The impact of budget stabilization funds on state general obligation bond ratings", *Public Budgeting & Finance,* 30 (2), pp. 95-111.

Grizzle, C., L. Stewart and J. Phillips (2015). "Rainy day fund adoption in U.S. states: a case of learning or emulation", *International Review of Public Administration,* 20 (1), pp. 17-33.

Hammer, C., P. Kunzel and I. Petrova (2008). *Sovereign Wealth Funds: Current Institutional and Operational Practices,* IMF Working Paper WP/08/254.

Hernández de Cos, P., D. López Rodríguez and J. J. Pérez (2018). *The challenges of public deleveraging,* Occasional Paper No 1803, Banco de España.

Hou, Y. (2003). "What Stabilizes State General Fund Spending during Downturns: Budget Stabilization Fund, General Fund Unreserved Undesignated Balance", *Public Budgeting and Finance,* 23(3), pp. 64-91.

— (2004). "Budget Stabilization Fund: Structural Features of the Enabling Legislation and Balance Levels", *Public Budgeting & Finance,* 26, pp. 38-64.

Hou, Y. and W. Duncombe (2008). "State Saving Behavior: Effects of Two Fiscal and Budgetary Institutions", *Public Budgeting & Finance,* 28, pp. 48-67.

International Monetary Fund (2020a). Fiscal Monitor April 2020 (database).

— (2020b). Historical Public Debt Database (database).

— (2019). World Economic Outlook October 2019 (database).

Johnson (2012). *Iran's influence on the Americas,* Center for Strategic & International Studies Report. February.

Joyce, P. (2002). "What's so magical about five percent? A nationwide look at factors that influence the optimal size of state rainy day funds", *Public Budgeting & Finance,* 21 (2), pp. 62-87.
Knight, B., and A. Levinson (1999). *Rainy Day Funds and State Government Savings, National Tax Journal,* 52(3), pp. 459-72.
Kriz, K. (2002). "The optimal level of local government fund balances: a simulation approach", *Proceedings of the National Tax Association Annual Conference on Taxation,* 95, pp. 78-84
Lav, I., and A. Berube (1999). *When it rains it pours: A look at the adequacy of state rainy day funds and budget reserves,* State Tax Notes No 1639-51.
Levinson, A. (1998). "Balanced budgets and business cycles: Evidence from US States", *National Tax Journal,* 51 (1), pp. 715-732.
Lewin, M. (2011). "Botswana's Success: Good Governance, Good Policies, and Good Luck", *Yes Africa Can: Success Stories from a Dynamic Continent,* World Bank.
Loppnow, D. (2009). "The Budget Stabilization Fund and the General Fund Reserve Requirement", *Wisconsin Legislative Fiscal Bureau Informational Paper 72.*
Marlowe, J. (2005). "Fiscal Slack and Counter-cyclical Expenditure Stabilization: A First Look at the Local Level", *Public Budgeting & Finance,* 25 (3), pp. 48-72.
Mattoon, R. (2003). *Creating a National State Rainy Day Fund: A Modest Proposal to Improve Future State Fiscal Performance,* Working Paper No 2003-20, Federal Reserve Bank of Chicago.
Mohsin, M., M. Murray and S. Pradham (2016). *Output multipliers and State Rainy Day Funds,* University of Tennessee, mimeo.
Nadimpalli, M. L., and A. J. Pickering (2020). "A call for global monitoring of WASH in wet markets", *The Lancet,* Vol. 4, No 10, pp. 439-440.
National Conference of State Legislatures (2018). Rainy Day Fund Structures, Fiscal Policy Brief, November.
National Association of State Budget Officers (2020). *The Fiscal Survey of States. Historical Database.*
Natural Resource Governance Institute (2014). *Natural Resource Fund Governance: The Essentials,* Policy Overview.
OECD (2017). *Revenue spending and natural resource funds. Resource revenue earmarking: Comparative analysis and lessons learned,* Policy Dialogue on Natural Resource-Based Development Work Stream.
Rose, S. (2008). "The political manipulation of US State Rainy Day Funds Under Rules vs. Discretion", *State Politics and Policy Quarterly,* 8.
Sachs, J., and A. Warner (1995). *Natural Resource Abundance and Economic Growth,* NBER Working Paper No 5398.
Schmidt-Hebbel, K. (2012). *Fiscal Institutions in Resource-Rich Economies: Lessons from Chile and Norway,* Working Paper No 416, Instituto de Economia. Pontificia Universidad Católica de Chile.
Schunk, D., and D. Woodward (2005). "Spending stabilization rules: A solution to recurring state budget crisis?", *Public Budgeting & Finance,* 25 (4), pp. 105-124.
Sobel, R., and R. Holcombe (1996). "The impact of state rainy day funds in easing state fiscal crises during the 1990–1991 recession", *Public Budgeting & Finance,* 16 (3), pp. 28-48.
Thatcher, D. (2008). *State Budget Stabilization Funds,* National Conference of State Legislatures Fiscal Brief. Spring.
The Pew Charitable Trusts (2014). *Building State Rainy Day Funds.*
— (2015). *Why States Save: Using Evidence to inform How Large Rainy Day Funds Should Grow.*
— (2017). *When to Use State Rainy Day Funds.*
Toledano, P., and A. Bauer (2014). "Natural Resource Fund Transparency", in A. Bauer (ed.) *Managing the public trust: How to make natural resource funds work for citizens,* Natural Resource Governance Institute.
United States Census Bureau (2020). Annual Survey of State Government Finances (database).
United States Bureau of Economic Analysis (2020). Regional Data. GDP and Personal Income (database).
Wagner, G. (2003). "Are State Budget Stabilization Funds only the Illusion of Savings? Evidence from Stationary Panel Data", *The Quarterly Review of Economics and Finance,* 43 (2), pp. 213-238.
Wagner, G. (2004). "The Bond Market and Fiscal Institutions: Have Budget Stabilization Funds Reduced State Borrowing Costs?", *National Tax Journal,* 57 (4), pp. 785-804.
Wagner, G., and E. Elder (2005). "The Role of Budget Stabilization Funds in Smoothing Government Expenditures over the Business Cycle", *Public Finance Review,* 33 (4), pp. 439-465.
Wagner, G. and R. Sobel (2006). "State budget stabilization fund adoption: preparing for the next recession or circumventing fiscal constraints?", *Public Choice,* 126 (1–2), pp. 177-199.
Walsgard, C. J., and L. E. Taralsen (2020). Norway Reveals Record Withdrawals From $1.1 Trillion Fund, Bloomberg, 7 October.
White, K. (2019). *States Saving for a Rainy Day,* blog entry, National Association of State Budget Officers.
Zhao, B. (2016). "Saving for a rainy day: Estimating the needed size of U.S. state budget stabilization funds", *Regional Science and Urban Economics,* 61, pp. 130-152.

BANCO DE ESPAÑA PUBLICATIONS

OCCASIONAL PAPERS

1810 DAVID LÓPEZ-RODRÍGUEZ and CRISTINA GARCÍA CIRIA: Estructura impositiva de España en el contexto de la Unión Europea.

1811 JORGE MARTÍNEZ: Previsión de la carga de intereses de las Administraciones Públicas.

1901 CARLOS CONESA: Bitcoin: a solution for payment systems or a solution in search of a problem? (There is a Spanish version of this edition with the same number).

1902 AITOR LACUESTA, MARIO IZQUIERDO and SERGIO PUENTE: An analysis of the impact of the rise in the national minimum wage in 2017 on the probability of job loss. (There is a Spanish version of this edition with the same number).

1903 EDUARDO GUTIÉRREZ CHACÓN and CÉSAR MARTÍN MACHUCA: Exporting Spanish firms. Stylized facts and trends.

1904 MARÍA GIL, DANILO LEIVA-LEON, JAVIER J. PÉREZ and ALBERTO URTASUN: An application of dynamic factor models to nowcast regional economic activity in Spain.

1905 JUAN LUIS VEGA (COORD.): Brexit: current situation and outlook. (There is a Spanish version of this edition with the same number).

1906 JORGE E. GALÁN: Measuring credit-to-GDP gaps. The Hodrick-Prescott filter revisited.

1907 VÍCTOR GONZÁLEZ-DÍEZ and ENRIQUE MORAL-BENITO: The process of structural change in the Spanish economy from a historical standpoint. (There is a Spanish version of this edition with the same number).

1908 PANA ALVES, DANIEL DEJUÁN and LAURENT MAURIN: Can survey-based information help assess investment gaps in the EU?

1909 OLYMPIA BOVER, LAURA HOSPIDO and ERNESTO VILLANUEVA: The Survey of Financial Competences (ECF): description and methods of the 2016 wave.

1910 LUIS JULIÁN ÁLVAREZ: El índice de precios de consumo: usos y posibles vías de mejora.

1911 ANTOINE BERTHOU, ÁNGEL ESTRADA, SOPHIE HAINCOURT, ALEXANDER KADOW, MORITZ A. ROTH and MARIE-ELISABETH DE LA SERVE: Assessing the macroeconomic impact of Brexit through trade and migration channels.

1912 RODOLFO CAMPOS and JACOPO TIMINI: An estimation of the effects of Brexit on trade and migration.

1913 ANA DE ALMEIDA, TERESA SASTRE, DUNCAN VAN LIMBERGEN and MARCO HOEBERICHTS: A tentative exploration of the effects of Brexit on foreign direct investment vis-à-vis the United Kingdom.

1914 MARÍA DOLORES GADEA-RIVAS, ANA GÓMEZ-LOSCOS and EDUARDO BANDRÉS: Ciclos económicos y *clusters* regionales en Europa.

1915 MARIO ALLOZA and PABLO BURRIEL: La mejora de la situación de las finanzas públicas de las Corporaciones Locales en la última década.

1916 ANDRÉS ALONSO and JOSÉ MANUEL MARQUÉS: Financial innovation for a sustainable economy. (There is a Spanish version of this edition with the same number).

2001 ÁNGEL ESTRADA, LUIS GUIROLA, IVÁN KATARYNIUK and JAIME MARTÍNEZ-MARTÍN: The use of BVARs in the analysis of emerging economies.

2002 DAVID LÓPEZ-RODRÍGUEZ and M.ª DE LOS LLANOS MATEA: Public intervention in the rental housing market: a review of international experience. (There is a Spanish version of this edition with the same number).

2003 OMAR RACHEDI: Structural transformation in the Spanish economy.

2004 MIGUEL GARCÍA-POSADA, ÁLVARO MENÉNDEZ and MARISTELA MULINO: Determinants of investment in tangible and intangible fixed assets.

2005 JUAN AYUSO and CARLOS CONESA: An introduction to the current debate on central bank digital currency (CBDC). (There is a Spanish version of this edition with the same number).

2006 PILAR CUADRADO, ENRIQUE MORAL-BENITO and IRUNE SOLERA: A sectoral anatomy of the Spanish productivity puzzle.

2007 SONSOLES GALLEGO, PILAR L'HOTELLERIE-FALLOIS and XAVIER SERRA: La efectividad de los programas del FMI en la última década.

2008 RUBÉN ORTUÑO, JOSÉ M. SÁNCHEZ, DIEGO ÁLVAREZ, MIGUEL LÓPEZ and FERNANDO LEÓN: Neurometrics applied to banknote and security features design.

2009 PABLO BURRIEL, PANAGIOTIS CHRONIS, MAXIMILIAN FREIER, SEBASTIAN HAUPTMEIER, LUKAS REISS, DAN STEGARESCU and STEFAN VAN PARYS: A fiscal capacity for the euro area: lessons from existing fiscal-federal systems.

2010 MIGUEL ÁNGEL LÓPEZ and M.ª DE LOS LLANOS MATEA: El sistema de tasación hipotecaria en España. Una comparación internacional.

2011 DIRECTORATE GENERAL ECONOMICS, STATISTICS AND RESEARCH: The Spanish economy in 2019. (There is a Spanish version of this edition with the same number).

2012 MARIO ALLOZA, MARIEN FERDINANDUSSE, PASCAL JACQUINOT and KATJA SCHMIDT: Fiscal expenditure spillovers in the euro area: an empirical and model-based assessment.

2013 DIRECTORATE GENERAL ECONOMICS, STATISTICS AND RESEARCH: The housing market in Spain: 2014-2019. (There is a Spanish version of this edition with the same number).

2014 ÓSCAR ARCE, IVÁN KATARYNIUK, PALOMA MARÍN and JAVIER J. PÉREZ: Thoughts on the design of a european Recovery Fund. (There is a Spanish version of this edition with the same number).

2015 MIGUEL OTERO IGLESIAS and ELENA VIDAL MUÑOZ: Las estrategias de internacionalización de las empresas chinas.

2016 EVA ORTEGA and CHIARA OSBAT: Exchange rate pass-through in the euro area and EU countries.

2017 ALICIA DE QUINTO, LAURA HOSPIDO and CARLOS SANZ: The child penalty in Spain.

2018 LUIS J. ÁLVAREZ and MÓNICA CORREA-LÓPEZ: Inflation expectations in euro area Phillips curves.

2019 LUCÍA CUADRO-SÁEZ, FERNANDO S. LÓPEZ-VICENTE, SUSANA PÁRRAGA RODRÍGUEZ and FRANCESCA VIANI: Fiscal policy measures in response to the health crisis in the main euro area economies, the United States and the United Kingdom. (There is a Spanish version of this edition with the same number).

2020 ROBERTO BLANCO, SERGIO MAYORDOMO, ÁLVARO MENÉNDEZ and MARISTELA MULINO: Spanish non-financial corporations' liquidity needs and solvency after the COVID-19 shock. (There is a Spanish version of this edition with the same number).

2021 MAR DELGADO-TÉLLEZ, IVÁN KATARYNIUK, FERNANDO LÓPEZ-VICENTE and JAVIER J. PÉREZ: Supranational debt and financing needs in the European Union. (There is a Spanish version of this edition with the same number).

2022 EDUARDO GUTIÉRREZ and ENRIQUE MORAL-BENITO: Containment measures, employment and the spread of COVID-19 in Spanish municipalities. (There is a Spanish version of this edition with the same number).

2023 PABLO HERNÁNDEZ DE COS: The Spanish economy and the COVID-19 crisis. Appearance before the Parliamentary Economic Affairs and Digital Transformation Committee – 18 May 2020 (There is a Spanish version of this edition with the same number).

2024 PABLO HERNÁNDEZ DE COS: The main post-pandemic challenges for the Spanish economy. Appearance before the Parliamentary Committee for the Economic and Social Reconstruction of Spain after COVID-19/Congress of Deputies – 23 June 2020 (There is a Spanish version of this edition with the same number).

2025 ENRIQUE ESTEBAN GARCÍA-ESCUDERO and ELISA J. SÁNCHEZ PÉREZ: Central bank currency swap lines (There is a Spanish version of this edition with the same number).

2026 PABLO AGUILAR, ÓSCAR ARCE, SAMUEL HURTADO, JAIME MARTÍNEZ-MARTÍN, GALO NUÑO and CARLOS THOMAS: The ECB monetary policy response to the COVID-19 crisis (There is a Spanish version of this edition with the same number).

2027 EDUARDO GUTIÉRREZ, ENRIQUE MORAL-BENITO and ROBERTO RAMOS: Tendencias recientes de la población en las áreas rurales y urbanas.

2028 ÁNGEL LUIS GÓMEZ: The effects of changes in the composition of employment on euro area wage growth: panel data analysis (There is a Spanish version of this edition with the same number).

2029 MIGUEL GARCÍA-POSADA GÓMEZ: Analysis of insolvency proceedings in Spain against the backdrop of the COVID-19 crisis: insolvency proceedings, pre-insolvency arrangements and the insolvency moratorium (There is a Spanish version of this edition with the same number).

2030 ÁNGEL GÓMEZ-CARREÑO GARCÍA-MORENO: Juan Sebastián de Elcano – 500 años de la Primera vuelta al mundo en los billetes del Banco de España. Historia y tecnología del billete.

2031 OLYMPIA BOVER, NATALIA FABRA, SANDRA GARCÍA-URIBE, AITOR LACUESTA and ROBERTO RAMOS: Firms and households during the pandemic: what do we learn from their electricity consumption?

2032 JÚLIA BRUNET, LUCÍA CUADRO-SÁEZ and JAVIER J. PÉREZ: Contingency public funds for emergencies: the lessons from the international experience. (There is a Spanish version of this edition with the same number).

BANCO DE **ESPAÑA**
Eurosistema

Unidad de Servicios Generales I
Alcalá, 48 - 28014 Madrid
E-mail: publicaciones@bde.es
www.bde.es