



# MAKING A MARKET:

ON THE DIFFUSION, BENEFITS,  
AND RISKS OF THE PRIMARY  
DEALER MODEL

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## **ABSTRACT**

In today's sovereign bond markets, primary dealers take on a key role in financing government debt. Primary dealership reforms which originated in the US in the early 1960s, had far reaching implications for not only debt sustainability and interest rates, but also for the relationship of governments and their agencies with financial and non-financial institutions. This paper examines the diffusion of the primary dealer model across 32 rich economies. In so doing, it provides a cross-national political-economy analysis of primary dealership creation and of its consequences. The results suggest that the costs of public debt have been a central driver of reform. Turning to the consequences of primary dealer introduction, there is strong evidence that primary dealer systems reduced governments' borrowing costs substantially. At the same time, the growing role of repo finance within the primary dealer model, points to inherent risks emerging from cyclical effects and systemic fragilities.

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## **1. EXECUTIVE SUMMARY**

By the turn of this century the majority of OECD countries have introduced a primary dealership model, where a select group of primary dealer banks are given privileged access to debt auctions in exchange for a commitment to ‘make’ a secondary market in sovereign debt. Although the primary dealership model has swept the board, we know relatively little about a system that acts as a cornerstone of today’s financial markets. This study examines the origins, causes and consequences of the primary dealer model (PDM) across the OECD. Ultimately, this paper seeks to contribute to an informed dialogue on the macro-financial merits and risks of the current primary dealer system. This study proceeds in 4 main sections:

### **1) A SHORT HISTORY OF THE PRIMARY DEALER MODEL**

Sovereign bond markets used to be a slow and predominantly domestic affair. The financial market liberalization of the post-Bretton Woods period set off the starter gun for the transformation of public debt management. Governments formalised and institutionalized market structures introducing new debt management practices, with most countries converging on a financialised model of debt management. This model typically relies on the issuance of marketable debt through a primary dealer system. The specific design of the primary dealer system differs from country to country; indeed a few rich countries have no PD system or have never formalized PD obligations. This section presents a short history of the primary dealer model and sketches its evolution and diffusion across OECD economies.

### **2) DRIVERS OF PDM ADOPTION**

This section examines the spread of the PDM using hazard models. An empirical analysis of PD creation in 32 advanced economies from 1970 to 2012 suggests that high interest payment burdens were a key driver of reform. This finding sits neatly within the broader narrative around the appeal of the PD model as generating liquidity, diversifying the investor base, introducing competition and ultimately bringing down the costs of borrowing. The quantitative evidence is supplemented with brief discussions of the PDM in the US, the UK, Italy and Germany.

### **3) CONSEQUENCES OF PDM ADOPTION**

This section examines the impact of adopting a primary dealer model using pooled cross-sectional time-series analysis with a generalized least squares estimator for a panel of 32 countries during the 1970-2012 period. Findings suggest that a) countries with a primary dealer model have experienced lower interest rates on long-term bonds, and b) although the interest burden decreased, PDM adoption does not seem to be directly associated with an improvement in sovereign credit ratings (although an indirect positive effect is likely via lower bond yields and interest costs). PD reforms took place in a period of broad macrofinancial reforms. When controlling for debt management agency reform as well as central banking reform, the PD effect persists as a key determinant of bringing down the costs of borrowing.

### **4) DE-RISKING THE PRIMARY DEALER SYSTEM**

The final section examines the future of the PDM system. With bond yields across advanced economies declining continuously and debt issuance favouring auctions, the primary dealer business has become increasingly unprofitable. Debt management offices and central banks have supported the market-making ability of their primary dealers by setting up repo lending/support facilities. This support is not just important for debt management but also for monetary policy given primary dealers' key role in repo finance. Primary dealers' access to repo finance means that their market making and dealings, if not hugely profitable will at least not turn (too) risky

## **POLICY IMPLICATIONS**

The historical track record of the primary dealer system in rich countries is largely positive. Despite its scandal-ridden origins in the US as well as more recent evidence that the system is not immune to abuse, the initial bargain of PD creation has paid off: PD systems are linked with a reduction in borrowing costs. Indeed, it seems unlikely that the PDM will fall out of fashion anytime soon. The pandemic has confronted many poor and middle-income countries with a liquidity crisis. Debt management reforms that are geared towards the provision of liquidity (with PD adoption being a prominent key building block) are thus likely to continue to feature prominently in market microstructure reforms. And yet the largely positive experience of rich countries, is no guarantor that PD reforms will continue to deliver across time and place. Here it should also be noted that although the majority of OECD countries

has adopted a PD system, few have decided not to do so without apparent detriment. Although the evidence suggests that the PD system has been a success in bringing down governments' borrowing costs, the key role of repo finance within the PD system, points to inherent risks emerging from cyclical effects and systemic fragilities that will continue to require careful monitoring and management, especially where effective central bank support is not available.

## 2. INTRODUCTION

Over the past years, the transformation of public debt management has started to draw increasing interest, and for good reason. Even before the ongoing Covid-19 pandemic triggered a surge of debt levels unprecedented in peace times, questions around public debt and its management spoke to wider macro-finance themes within economics and political economy. With governments issuing trillions of debt instruments to foot the pandemic bill, central bankers were hailed as the main life support. Central banks across advanced economies have facilitated the fiscal response by directly or indirectly financing large portions public debt. In so doing, central banks were keen to respect existing bond market boundaries distinguishing between the primary market (largely off limits) and the secondary market. This means that before central banks bought government bonds, these had to be placed in the primary market, a market that is dominated by so-called primary dealers (PD). By the turn of this century the majority of OECD countries have introduced the primary dealership model (PDM). Yet we know relatively little about a system that acts as cornerstone of today's financial markets. This study examines the origins, determinants and consequences of the primary dealer model across the OECD. Ultimately, this paper seeks to contribute to an informed dialogue on the macro-financial merits and risks of the current primary dealer system. This study proceeds in 4 main sections. The first section presents a broad overview of the origins of the primary dealer system starting in the 19<sup>th</sup> century and focusing on the wave of post-Bretton Woods reforms. The second section analyses the drivers of PD reform using hazard models. Findings suggest that above all the cost of servicing debt and the debt burden of a country were key factors in introducing the PDM. These findings are further contextualised with brief country case studies on the US, the UK, Italy and Germany. The third section turns to the impact of PD adoption. Results from a pooled cross-sectional time-series analysis suggest that countries with a PD system in place saw a decline in sovereign bond yields (though not an improvement in their sovereign credit rating). Primary dealership introduction seems to have been a more important factor in this decline than central bank independence or the creation of 'modern' debt management agencies. The fourth section, discusses the role of repo finance in de-risking the PD system. The paper closes by considering the implications and future of the primary dealer model.

### 3. A SHORT HISTORY OF THE PRIMARY DEALER MODEL

By the 19<sup>th</sup> century, the bond market of advanced economies was dominated by large investment houses in charge of underwriting and issuance, while market makers (also called jobbers) provided secondary market liquidity. Between the end of the Gold Standard in 1914 and the end of the Bretton Woods era in the 1970s, sovereign bond markets were a predominantly domestic affair. Domestic investor, frequently portrayed as ‘financially repressed’ formed the core of bond holders who in turn ‘typically received compensation through protective regulation and implicit lender-of-last-resort or deposit insurance subsidies’ (Kroszner 1998: 88). What is more, there are instances where ‘captive’ financiers were able to profit from the closed system notably by demanding (by today’s standards) high interest rates. Most bonds were held to maturity and often not marketable. Financial sector liberalization more broadly, and capital account liberalization specifically, gave rise to the development of a broad range of new financial products that were aimed at managing the growing volatility in interest rates, exchange rates, and commodity prices of the post-Bretton Woods world (Wheeler 2004). These financial market reforms of the post-Bretton Woods period set off the starter gun for the transformation of public debt management. With surging debt levels and funding demands, governments set out to improve their abilities to finance their deficits. In so doing, they formalised and institutionalized market structures introducing new debt management practices (e.g. the use of increasingly complex derivatives), with most countries converging on a financialised model of debt management (Fastenrath et al. 2017). This model typically relies on the issuance of marketable debt through a primary dealer system, where a select number of primary dealer banks are given privileged access to debt auctions in exchange for a commitment to ‘make’ a secondary market in sovereign debt.

The division of the government bond market into primary and secondary segments is not new. An yet the introduction of the primary dealer system is qualitatively different. This system refers to a ‘nexus of designation criteria and performance requirements that stem from the decision to execute open market operations through primary dealers’ (Garbade 2006). This nexus can be described by its obligations on the one hand and its perks on the other. Regarding the first, primary dealer institutions obtain the exclusive right to submit (competitive) bids in auctions for government bonds and are required to do so in ‘substantial’, predefined ways. Furthermore, dealers usually need to contribute to market liquidity by quoting executable two-way prices for government bonds on secondary markets



according to set rules about the maximum spread or turnover requirements. Regarding the perks of the system, primary dealers enjoy the right to participate in (usually profit generating) syndications, often have access to special (repo) financing facilities, and may benefit from any reputational gain stemming from their PD status as well as from informational advantages due as a result of the ongoing dialogue between primary dealers and public bodies, notably Debt Management Agencies, Central Banks or Treasuries.

The introduction of the PD system enabled the financialization of debt management. Primary dealers made the switch from direct issuance and syndication to competitive auctions possible. Auctions mean that prices of government securities are determined through arm's length, competitive bidding by (international) investors. This shift is widely credited with bringing debt servicing costs down. By the turn of the century, syndicated bond issuance was the exception rather than the rule in advanced economies. According to Bröker (1993: 17), the use of auction techniques is 'perhaps the most typical indication of market governance in public debt management'. It is arguably their activity in the secondary market, however where primary dealers had the biggest impact on the government bond market. Primary dealers are market makers. This obligation to quote prices two-ways transformed sovereign bond markets from illiquid, slow and domestic markets to liquid, international markets with both high speed and high turnover.

As so often with (financial) market innovation, technological advanced played a crucial role in this transformation. The wave of PD reforms (see Figure 1) needs to be appraised not just in the context of accelerated internationalisation of capital markets, but also in the context of tremendous developments in telecommunications and information networks. In the UK, for instance, the Big Bang, London's switch in 1986 from traditional face-to-face share dealing to electronic trading, is unthinkable without the concomitant IT revolution.

Since the advent of state borrowing, sovereign debt managers (be it personal offices of rulers or later treasuries and central banks) have sought to access capital markets at home and abroad with the help of (often foreign) underwriting banks (Flandreau and Flores 2009). The role of today's primary dealers is not primarily to signal the 'sound reputation' of a sovereign government – although reputational gains continue to work both ways both for the sovereign and for the primary dealer banks. Already prior to the wave of PD reforms, sovereign bond underwriters have lost this role to rating agencies, and at times happily so. Compared to bond

underwriters in the 19<sup>th</sup> century, the risks of primary dealers continue to fall. In modern bond markets, bonds are to be cleared and settled through a clearing system. This takes away the clearing risk of a counterparty in the secondary market missing their payment. What remains, is the underwriting risk of disposing of the purchased bonds at uncertain prices in the secondary market. In principle, any bond acquisition could turn loss making due to a lack of demand at a certain price point. The rise of repo finance demand, with sovereign bonds the main asset, as well as the increased willingness of central bankers to act not only as lenders of last resort, but also market maker of last resort, has substantially de-risked primary dealer activity in rich economies.

The creation of primary dealership systems, as the country-cases below illustrate, is closely link with monetary policy at large and independent central banking specifically. On the fiscal policy side, the main motive for the establishment of the PD system provided in the economics literature is to bring down government's financing costs (e.g. Breuer 1999 ). Primary dealers would be responsible for raising stable, low-cost funding and for maintaining a well-functioning secondary market. This makes intuitively sense, but does not get us very far. After all, why would governments introduce reforms that would increase the costs of borrowing? The question is rather *why* some governments identified the PD system as the best way to achieve this aim *when* they did, and indeed *why* some did *not*. The appeal of debt management reform, of which the PD system is a key and usually the first component, can be understood as a shift in thinking about debt (Fastenrath et al. 2017). Namely, public officials, as well as influential international bodies (notably the World Bank, the IMF, UNCTAD and the IMF) began considering debt as a portfolio in line with financial economics. Debt management thus became focused on portfolio optimisation which relied on a heightened role for liquidity and diversity of bond investors. A prominent assumption in finance theory is that liquid securities markets realise economic gains. Liquidity in debt management was to be boosted by primary dealers acting as ready market makers willing to continuously quote prices at which they will trade on demand. As financial deregulation brought down the costs of trading, changes to the microstructure of the government securities markets have contributed to the increase in liquidity (Kroszner 1998: 89). Diversity was to be increased by explicitly inviting foreign banks to participate in the PD system. So doing, would not only increase the number of players and introduce competition in primary debt auctions between primary dealers, but also open up channels to tap into diverse pools of foreign buyers in the secondary bond market. In the UK is representative in this regard, where 'the more the

merrier was broadly the attitude of the Bank, which felt the depth and liquidity of the market - its capacity to be active and smooth-working - could only benefit from new competition and capital' (Reid 1988: 64). Sylvain de Forges (interviewed in Lemoine 2013), director of the French debt agency between 2000 and 2003, considers the globalization of bond investors thus: 'We are internationalizing the market, with non-residents, Japanese, American, or whatever pension funds. People who would never have imagined, for a quarter of a second, buying a paper issued by a socialist government. And French to boot! One of the worst possible references in this field!' The introduction of the PD system was thought to also support financial market development more broadly by both inviting foreign financial institutions and by assigning a 'special' status<sup>1</sup>. Deepening the capitalization of the bond market and widening the networks of possible bond buyers, would ideally be beneficially for financial markets at large.

In a 2001 survey on debt management practices (Arnone and Iden 2003), debt managers discussed better links with market participants as a notable plus. Specifically, the PD system would help to tap into 'skilful advisory support in building and following the debt management policy' or the 'availability of a competent support in designing market-tailored securities'. In the best-case scenario, this market knowhow or wish-list could compensate for the loss of access to expertise from central bankers in the wake of central bank independence and the separation of monetary policy and debt management. It should be noted that advice on debt managers from bankers is historically not a novelty.<sup>2</sup> Primary dealers serve as an 'ear on the ground' providing governments with valuable market information. One example is information to approximate the makeup of government investors in the secondary market. Although information has continually improved over the past decade, detailed knowledge over the precise composition of bond holders has become harder to collect in the wake of post-Bretton Woods debt marketisation.

The arrival of the primary dealer model marks the 'shift from relationship financing to market-based techniques in the issuance of debt instruments' (Fastenrath et al. 2017: 282, see

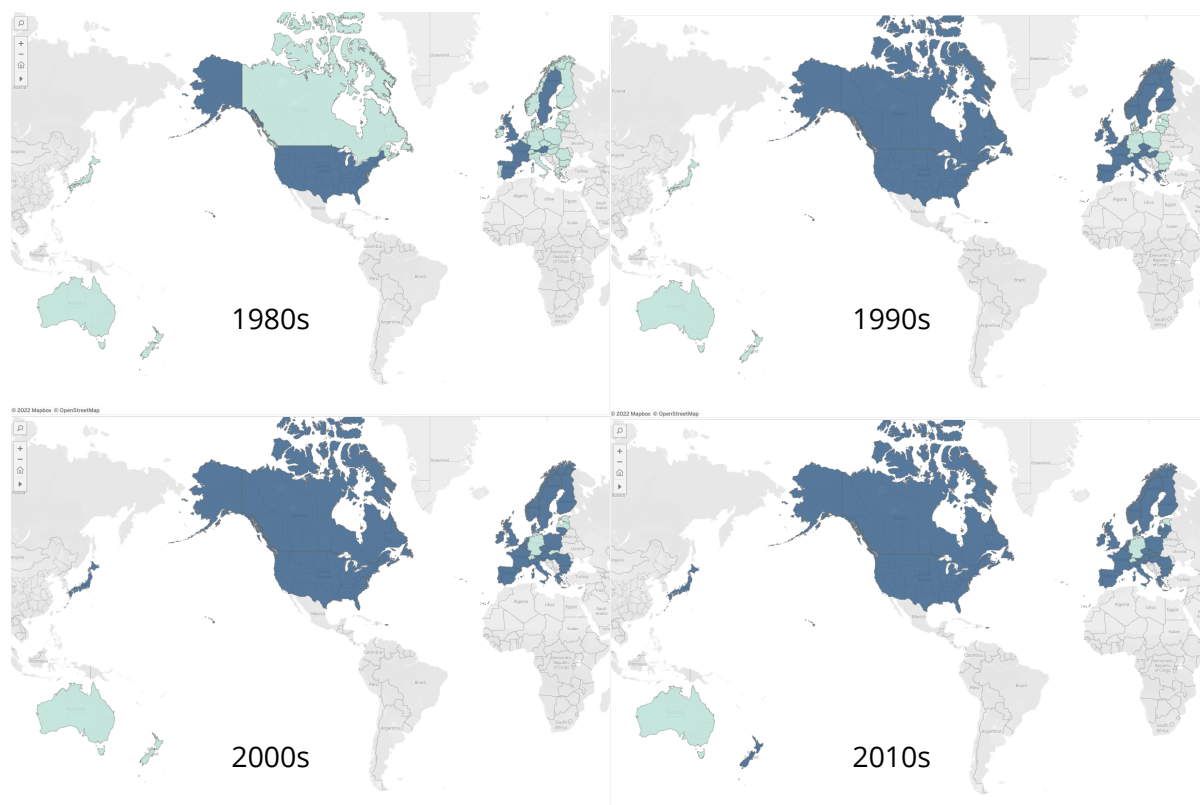
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<sup>1</sup> Here especially the direct dealings with the central bank are worth mentioning with special facilities which can be transformed into monetary equivalents.

<sup>2</sup> Throughout the 19<sup>th</sup> century for instance, leading investment banks, for example Rothschild, played prominent advisory roles on issuance policies. Yet, clearly the advisory role of PD is substantially different in terms of scope, transparency (with some consultation documents or minutes publicly available) and formalisation.

also Badurina and Svaljek 2012: 76). By the turn of the century, the consensus was that the primary dealer system was in most cases ‘highly recommended’ (Arnone and Ugolini 2005). Figure 1 shows the trend of PD model adoption. The rate at which governments adopted a PD model increase remarkably in the late 1990s. In most instances, primary dealerships preceded debt management office reforms. This is because ‘modern’ debt management required a liquid, well capitalized bond market which the PD model successfully enabled.

Figure 1. The spread of the primary dealer model



This is not to say that the PD system cannot be abused. As Yadev (2016) argues: ‘To be sure, tight-knit, cohesive, and similarly situated control by privileged dealers invites the risk of collusion, price-rigging, or a tolerance for risk-taking within the “ingroup.”’. US primary dealers, for example have, on a number of occasions, incurred sanctions for attempting to manipulate the market in their favour (see for instance the Mozer scheme, the Salomon Brothers scandal, and the Steinhardt and Caxton Corp. settlements). Indeed, abuse of the primary dealer position is not confined to US. A prominent example involved EuroMTS in 2004, when Citigroup took large positions against market-makers. Citi sold EUR 11 bn worth

of government bonds (thus reducing prices) and bought some back later at a hefty profit (Gabor 2016 ). Specifically, the combination of PD special access and the adoption of auction systems has been linked to the opportunity for primary dealers to acquire a large fraction of new issues by aggressive bids. Cornering the market, dealer could then make profits by selling them on at a hefty margin to other primary dealers who have already sold ‘when issued’ securities to their customers and are now in want of said assets.

#### 4. DRIVERS OF PDM ADOPTION

Fohlin (2011) concludes that there is *no* ‘one size fits all’ solution for the design of financial systems; this statement applies to public debt management too. The specific design of the primary dealer system differs from country to country; indeed a few rich countries have no PD system or have never formalized PD obligations. How to explain individual countries’ decisions to adopt the PD model and account for the possible variation in PD adoption? The following section reviews 3 domestic political-economy propositions about the drivers of reform.

##### **Domestic economic factors**

*Proposition 1: PD reforms were determined by countries economic profiles. Particularly countries experiencing high debt costs would be more inclined to implement change that was thought to bring about a funding environment with stable and lower costs.*

Macroeconomic explanations of policy change generally include variables such as debt levels, inflation, and per capita gross domestic product. The thinking behind their inclusion in models of economic policy decision is straightforward: economic policies address a particular policy challenge. Independent central banks were to enable a low inflation regime, fiscal rules were to tame runaway deficits, etc. Given that these target economic outcomes, the existing domestic macroeconomic background should matter. Suleiman and Waterbury (2019) for example find that external debt levels and current account balance deficits matter for the adoption of structural reforms. Simmons and Elkin (2005), although their work overall emphasizes the role of peer diffusion effects, present evidence that the domestic economic climate matters for capital account, exchange rate and current account liberalization. In particular, higher economic growth increases the likelihood of reforms. Garriga (2010) shows that domestic macroeconomic factors are important determinants of central bank reform. The findings of Calderón and Schmidt-Hebbel (2008) suggest that a larger budget balance raises the likelihood of having a fiscal rule in place. This is only a small snapshot of a rich literature that has established the macroeconomic determinants of economic policy making. In the context of this study, three variables are of particular interest:

- 1) the debt per capita to GDP ratio to measure the overall debt burden of a country
- 2) the interest payments that governments need to shoulder

3) the wealth of a country which is likely to also capture macroeconomic developments (incl. financial market development/maturity) more broadly

### **Domestic financial market factors**

*Proposition 2: Domestic financial markets mattered for the adoption of the PD model. In particular, more open and less concentrated financial markets should increase the likelihood of reform.*

Ingoing financial market conditions should matter for financial market reform. Market conditions here not only link to the power of financial market actors in influencing a reform that has largely been viewed as market-friendly, but they should also speak to the prevailing winds of change within a given political economy. Capital account openness for instance denotes not only the competitive environment in a market with new entrants being able to exit and enter with relative ease, but should also be a broader indicator for market liberalization that might spill over to other financial market domains and would open the possibility for changes in public debt management. Open financial systems are also likely to be playing grounds where global investment banks like Baring, Merrill Lynch, J.P. Morgan, Salomon Brothers and UBS operated. These were US key players (and thus familiar with the primary dealer model pioneered in the US) at the turn of the century and have advanced financial sector innovation as they ventured abroad and arrived at newly liberalized markets. Some authors have indeed argued that PD reforms, and here notably the choice of auction technique, has been driven by the private interests of large financial institutions rather than cost-reducing public officials. These rent-providing reforms, so the argument, were evidence of 'regulatory capture' of the US Treasury by the dealers. The scandal ridden primary dealership history of the US further hints at such capture, as do accounts of well-documented close ties and revolving doors in international finance. The biography of William Simon is an example in point: sworn in as Secretary of the US Treasury in 1974, Simon was previously a senior partner at Salomon Brothers in charge of the government bond department and the first president of the Association of Primary Dealers. Measurements of banking concentration have been linked to the power of finance in steering government policy either via intentional lobbying or implicit pressure. Studies of banking concentration have so far focused on questions related to financial stability and other performance measures (e.g. Calice and Leonida 2018). Given that the PD reforms aimed at opening up and diversifying the sovereign bond market, we can expect that lower banking concentration would improve the

likelihood of reform. Alternatively, lower banking concentration might speak to the ability of concentrated domestic interest to put up resistance against PD reforms.

### **Domestic political factors**

*Proposition 3: Ultimately, PD reforms are political decisions and should be influenced by the political landscape of a country, chief among them the ability of governments to push through reforms.*

Within political-economy scholarship on economic reform and liberalization, there are few who would dispute political factors frequently matter. Gourevitch's dictum (1986) 'policy needs politics' applies. The field of political sources of influence is wide. In this study, two of the most frequent political factors are considered. First, drawing on veto player theory (Tsebelis 2011), we can test how political factors influence the ability to push reform through. Specifically, is a strong executive in a better position to enact PD reforms? What is more, the partisan outlook of the executive, so the assumption in the literature, can under certain circumstances have an impact on macroeconomic policy making. Although few studies have considered partisan effects in debt management (e.g. Trampusch 2019, Rommerskirchen and van der Heide 2021), the diverse evidence on fiscal policy or monetary policy in line with Douglas Hibbs' seminal thesis (1977) on a causal relationship between political variables and policy outputs, warrants investigation.

### **Empirical evidence**

#### **SAMPLING, ESTIMATION AND VARIABLES**

The sample includes 32 rich economies with yearly observations from 1970 to 2012 using hazard models to analyse the determinants of PD system adoption. These models examine the risk, or hazard, that an event will occur. The 'hazard' here, is whether a state decides to adopt a PD system or not. Once a state has adopted a PD system, it exits the data since it has already 'succumbed to the hazard' and should be considered no longer at risk. The language of hazard models is closely linked to their original application in medical contexts. No normative stance is however implied. The main advantage of using hazard models is their explicit modelling of time effects — that is to say how the diffusion of a policy has swept the board over time. The main model presented in Table 1 uses a Weibull distribution to



characterise the baseline hazard. Results are robust to different specifications, including Cox's Proportional Hazard (PH) event history model and logistic models that control for time dependence.

*Dependent variable/censoring event:* The dependent variable takes on 1 when a country introduced the primary dealer system. If a country introduced the PD model in a year between 1970 and 2013 the country was thereafter excluded from the study beginning the following year. A dichotomous measure is warranted. Although there may well be nuances in the primary dealer model, its adoption is still a categorical event. The purpose of this investigation is to model a major shift in debt management practice and not to capture the nuances of organising the primary dealer market.

*Independent variables:*

- a. *Domestic economic variables:* To capture a government's debt burden, we include both a measure of total debt (*debt*), Gross portfolio debt liabilities to GDP (%) as well as the interest payments as % of GDP (*interest*). In addition, we control for the wealth of a country by including the logged GDP per capita (*GDP*). These variables are taken from the Global Financial Development Database and Eurostat. The time lag (t-1) is used to avoid simultaneity.
- b. *Political domestic variables:* I take the variable *majority* which measures the margin of majority enjoyed by the government. This is the fraction of seats held by the government. It is calculated by dividing the number of government seats by total (government plus opposition plus non-aligned) seats and is based on the Database of Political Institutions (Clarke et al. 1999, updated 2020). The variable 'left' takes on the value 1 if a left-leaning government is in power and 0 otherwise, and is also taken from the Database of Political Institutions.
- c. *Financial market variables:* The variable *concentration*, taken from Bankscope, measures the total of the 3 largest banks' share of assets in total assets of all banks in a country as concentration ratio. The variables *openness* is the index of capital account openness, or KAOPEN, by Chinn and Ito (2008). This de jure index is based on information regarding restrictions in the International Monetary Fund's Annual Report on Exchange Arrangements and Exchange Restrictions.

## RESULTS

What conditions lead to change in the microstructure of the government securities market? Table 1 presents the results from 3 different models with robust standard errors clustered by country. Model 1 presents the economic baseline. Model 2 includes financial market variables. Model 3 adds the political domestic variables. To ease interpretation, hazard ratios instead of coefficient estimates are reported. Hazard ratios are interpreted relative to 1, where hazard rates greater than 1 imply that a variable increases the risk of PD adoption and hazard ratios less than 1 suggest that a variable decreases the risk of PD adoption.

In the first model, the debt to GDP ratio is not found to be statistically significant. One explanation would be that it is the costs of debt, rather than their size which motivates reform. However, we find that both high interest payments and higher GDP to capita ratios increase the hazard of PD adoption. In other words, rich countries with costly debt burdens are more likely to implement the primary dealer system. This finding makes intuitively sense: PD reforms were a way to manage the costs of debt. This finding echoes Krippner 's argument (2011) that financial liberalization is fundamentally linked to the need for government funding in a changing international political and economic environment. Writing on France, Feiertag (2021) argues that public debt was the major motive behind French financial deregulation, and that the state, and not 'the market', had the leading role in this process. PD reform in France needs then to be appreciated against the backdrop of a ballooning debt service burden. Liberalization of the financial sector at large, and the introduction of a PD model specifically, aimed at reducing the cost of debt. For example, Brazil's early introduction of the PD system in 1974 under the Geisel government was driven by a harsh economic climate and concerns over raising governments debt. Specifically, the PD reform was part of a broader economic development strategy that relied on external debt as both a way to facilitate balance of payments adjustment and to finance industrialization investment.

Table 1. Survival Analysis of Primary Dealership Adoption

	(1) Model 1	(2) Model 2	(3) Model 3
Interest payments <sub>t-1</sub>	1.276*** (0.0681)	1.272*** (0.0673)	1.231*** (0.0704)
GDP per capita <sub>t-1</sub>	1.413*** (0.185)	1.429*** (0.193)	1.499*** (0.220)
Debt <sub>t-1</sub>	0.984 (0.0122)	0.982 (0.0125)	0.987 (0.0108)
Capital Account Openness		0.190 (0.198)	
Banking Concentration		0.624 (0.787)	
Right			0.419* (0.203)
Majority			1.033 (0.0282)
Observations	653	646	579
<i>AIC</i>	-121.6	-119.4	-122.9
<i>BIC</i>	-99.18	-88.12	-92.36

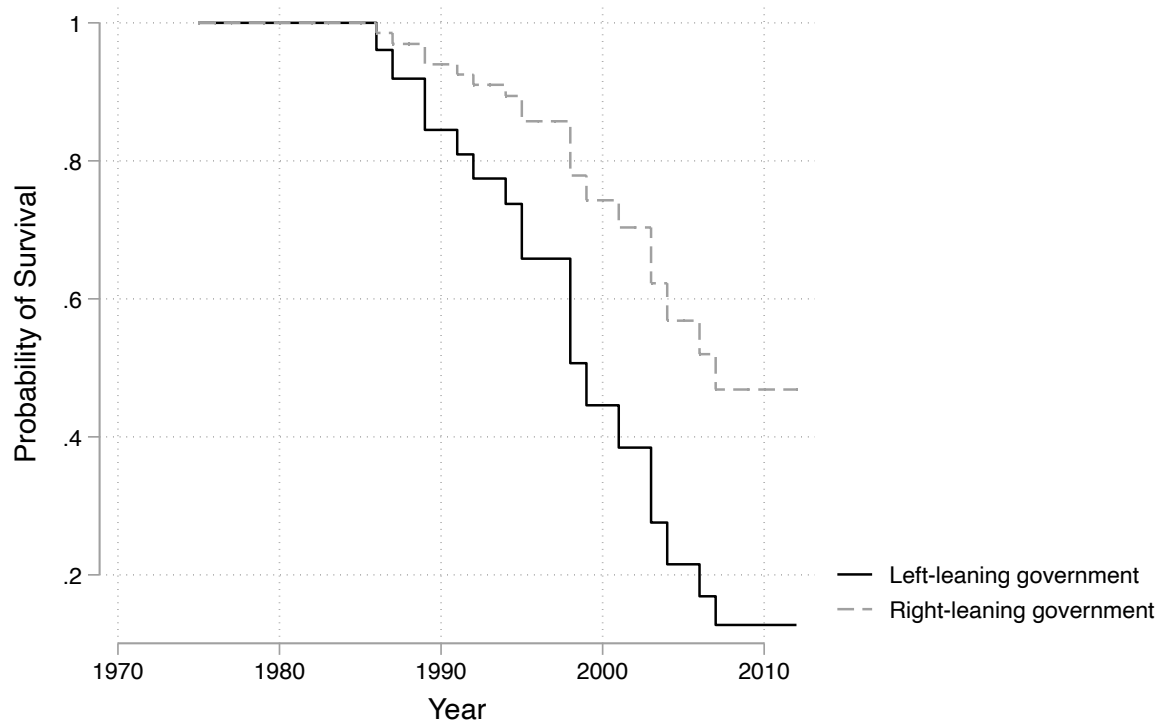
Notes: Standard errors clustered by country in parentheses. \*p<.10; \*\*p<.05; \*\*\*p<0.01

We find no evidence in favour of proposition number 2. Neither capital account openness nor banking concentration seem to matter for the introduction of the PD model. It is widely assumed that countries pitted against each other in the competition for capital and investors face incentives to converge upon market preferred behaviour such as capital account liberalization. It is however not conclusively settled whether financial markets *actually welcomed* the PD reforms and if so, whether they did so uniformly. Arguably, domestic banks who acted as main primary market investors for government bonds might well have preferred the old system where business was often more profitable (particularly in syndicated deals). In the UK, two jobbers, Akroyd and Wedd Durlacher Mordaunt, dominated nearly 80% of the market (Kerr 1986 ). More broadly, the re-regulation of the Big Bang drastically cut back on the protectionism and self-regulation that the predominantly domestic City elite had enjoyed for decades (Vogel 1997). This finding fits the diagnosis of Moran (1991) who argues that the UK's Big Bang was shepherded by the belief that liberalization would shake up the system. These reforms however, were driven not by industry or banking interest, but by government, and in particular the Department of Trade and Industry and the Bank of

England. It is not far-fetched to speculate that existing market makers were not too keen on the Big Bang reforms. For Jean-François Pons, chief clerk at the French Treasury in 1988, the state ‘has its own interest in this reform, which enables him to turn regularly and at a cheaper cost to the market’ (quoted in Feiertag 2021: 125). Along this line of thinking then, the concentration or power of banks as well as the openness of the financial system more broadly are not homogeneously related to PD reform.

Turning to proposition number 3, we find no evidence that an increase in the margin of majority enjoyed by governments also increases the likelihood of PD reform. However, results suggest that partisanship matters. With a hazard ratio close to .5, the variable right more than halves the risk of PD adoption — in other words left-leaning governments were more likely to implement primary dealer systems. As a graphical illustration of the effect of partisanship, Figure 2. plots the survival curve for the adoption of PD systems. The y-axis represents the probability of survival (i.e. not adopting a primary dealer system) past year  $t$ , conditional on survival until year  $t$ . Figure 2 illustrates that left-leaning governments were at greater risk of PD adoption than right-leaning governments. Looking at descriptive statistics, we see that in our sample PD systems were established by 13 left-leaning and only 6 right-leaning governments. Possibly, left-leaning governments were more likely to champion debt management reform that was perceived to provide cheaper funding for an expansion in government spending. Relatedly, left-leaning governments may stand to win more in terms of market reputation for ‘market-friendly’ reforms (Shepsle 1991 ). At the same time, calendars of macroeconomic reforms seldom map onto electoral calendars. That is to say, policy-makers and bureaucrats may be working on reform proposals whose implementation covers different cabinets. This makes blame or credit attribution murky and results should be interpreted with this caveat in mind.

Figure 2. Primary Dealership Adoption



## COUNTRY CASES

The results of the survival model are able to offer insight into broader patterns of PD adoption. A closer look at the countries who adopted PD models suggests however that there are limits to a broad-brush analysis of the decision to adopt a PD system or not. This is perhaps most notable with respect to the outlier group: that is countries in our sample who decided to not go down the PD route: Australia, Germany, Switzerland, Estonia, Malta. Clearer there is more to the story than a rich-poor divide. Another interesting case would be New Zealand which introduces the PD system online in 2019 despite being considered a trailblazer in debt management reform at large. The following section, discusses 4 country cases in order to paint a more detailed picture on the drivers of PD (non)-adoption.

### **a. US: Pioneering the PDM**

The pre-history of the US primary dealer system can be traced back to the 1920s and, like in many other countries, is best understood in monetary policy terms. This monetary policy link persists to this day (the US Fed, for example, states on his web presence ‘Primary dealers are trading counterparties of the New York Fed in its implementation of monetary policy’.) In the 1920s, the Federal Reserve System itself was still in flux, marked by a power struggle between Washington (Board) and New York, the later becoming quickly the market arm of the Fed due to Wall Street’s presence. The NY Fed under Benjamin Strong set up an alternative monetary coordinating committee through which the NY bank started transacting with specific private sector counterparties - the early open market operations. By 1939, Fed officials realised that these dealer relationships existed but were not yet properly formalised. This led to the creation of ‘recognised dealers’, the precursor of today’s primary dealers. The more contemporary story, chronicled in great detail by Garbade (2021), starts in the 1960s when the Fed and Treasury conducted a set of joint studies pushing for the creation of a Primary Dealer Association. A key motive for the establishment of the association was a concern over a lack of effective regulatory oversight over the US-Treasuries market. A PD Association that would set common trading standards and could discourage undesirable practices. In short, this would offer a private sector solution to lack of regulatory rigour. The formation of such a group finally came to pass in the wake of adverse publicity about dealer behaviour. The PD charter stipulates dealers would aim ‘To foster high standards of commercial honor and business conduct among its members and to promote just and equitable principles of trade’. Concerns over primary dealer behaviours and fragmented oversight continue to this day (Yadev 2016). At the same time, the Primary Dealer Association has been a crucial and effective partner from the beginning, notably during the 1970s when despite soaring government debt levels, the Treasury was able to finance its deficit at relatively favourable terms. Alongside a more predictable issuance calendar, a change in the auction format and the issuance types, the primary dealer model gained a positive reputation abroad for facilitating debt management.

### **b. The UK: the Big Bang and the PDM**

The introduction of the primary dealer system in the UK in 1986 (the Gilt-edged market-makers, GEMMs) was explicitly modelled after the US — although the title ‘Gilt-edged Market-makers’ was chosen by the Bank of England ‘in preference to the American term’

(Phillips 1987: 15). Reforms were not driven by a cash-strapped Treasury, but spearheaded by the then executive director of the Bank of England, Eddie George (Reid 1988 ). The PD system was not only meant to raise finance on better terms, but to improve the Bank's capacity of conduct monetary policy. Dutta's excellent study on the UK Big Bang (2019) explains the PD reform thus: The 1986 reforms radically altered the division of labour between bond market participants due to the change from single- to dual-capacity trading. Under the old system, a stock exchange firm acted either in a jobbing or a brokering role, yet was not allowed to take on both. This division created a clear demarcation of interests, with jobbers trading their 'book' for profit and quoting two-way prices and brokers acting as agents for secondary-market investors. Prior to the Big Bang, jobbing firms were in short supply as few had the capital resources to provide the market with sufficient liquidity. By 1985, only eight jobbing firm traded in gilts, contrasted to 29 firms who were aware the primary dealer franchise in 1986. Reforming this division of labour was meant to address problems in managing the pace of gilt sales which were hampered by jobbers limited market-making power. Specifically, during the UK's post-war period it had proved difficult to fund the debt at long maturities on the scale desired whereas short-maturity financing was thought to risk loosen monetary conditions (Goodhart 1998 : 56-61). The reforms united both jobber and broker roles with the creation of the Gilt-Edged Market Makers. This select group of primary dealers commits to a pre-defined share of primary auctions as well as secondary market activity in exchange for privileged access to auctions in the primary market. After the Big Bang, if the Bank of England wanted to reduce liquidity in the financial system, it could sell gilts much more broadly to non-banks, and in this way gain control on broad money growth. The UK Treasury did welcome the introduction of GEMMs: Similar to France, the introduction of the PD system took place at a time when the national debt was rising.

### **c. Italy: the Euro and the PDM**

The precursor of a primary dealer system in Italy can be traced back to broad reforms of 1981 (incl. central bank independence) after which sales of government bonds were done via a private banking consortium that had to sell at market prices. These reforms also put an end to the Banca d'Italia large scale bond purchases. As a result, interest payments increased. Especially in light of tight Maastricht targets for entry into monetary union, the new primary dealership model promised to bring funding costs down. The Italian primary dealership

model was then established in 1994 and created an influential solution to the problem of PD monitoring. Although primary dealer models in the EU were first introduced in France and UK, reforms in Italy were among the technological most influential for Europe (van der Heide 2021 ). In Italy the PD system is intrinsically linked with the Mercato dei Titoli di Stato, the so-called MTS platform. Set up in 1988, and thus predating the establishment of primary dealers, to improve the ‘transparency’ of the ‘price discovery’ process, MTS provided a platform where dealers (call Specialists) could stream prices to each other, and Treasury officials could monitor dealers’ commitment to market making. The Italian Treasury periodically started publishing ranking of specialists’ market making, as MTS allowed for a ‘objectified’ measure of performance. Today, league tables that rank the best performing PDs is widespread practice. MTS became ‘almost part of the European *acquis*’ (MacKenzie et al. 2020). The introduction of the common currency, which would strengthen the marketisation and transnationalisation of Europe’s public debt markets proved to be an important catalyst for debt management reform. By removing currency risk and thus weakening the ties between governments and their domestic investor-base, Europe would see the rise of a ‘pan-European government bond market’, forcing member states to compete for investment capital. Within this context, liquidity was increasingly seen as an important policy objective to secure a steady and diversified demand for domestically issued securities. The primary dealer system was a key reform to boost liquidity. Eurozone governments, facing increased competition over investor demand, have come to rely on the interdealer trading platform MTS to improve their hold over large dealer banks and to foster competition among them.

#### **d. Germany: *Marktpflege* as PD substitute**

How come Germany has so far not embraced the PD system? Germany experimented with more formal primary dealership system at the turn of the century, but came to take ‘the view that it is the cheaper option for the German taxpayer no to’ (Gerhard Schleif then managing director of the Finanzagentur, quoted in Chambers 2006). The German *Finanzagentur* operates a quasi-primary dealer system, revolving around a group of dealer banks that face little to no hard commitments in exchange for access to auctions. All banks, that is currently 36, accepting a number of basic requirements may become a member of the *Bund Bietergruppe*. With the benefit of hindsight, it may seem unsurprising that Germany with a deep bond market, benchmark status and an extremely liquid bund futures market (which



among other things facilitates price discovery of German bunds), could eschew the adoption of a PDM. Yet writing in 2022 with bond yields turning negative from time to time and Germany's status as prime bond haven cemented, it would be wrong to suggest that the conditions we find today did make reforms less attractive at the time. In 1987, the year that France introduced its PD system (one year after the UK), debt servicing costs as % of GDP stood at 2.5 in France compared to 2.8 in Germany. By the time the common currency was introduced in 1999, both countries faced an identical interest payment ratio at 3.3 % of GDP. What is more, Germany's benchmark status was not assured for the majority of the period under investigation in this paper.

Instead, it is useful to consider first, that Germany has been relatively conservative in adopting debt management innovation compared to its immediate peers. Prior to the 1990 reforms, the main long term funding instrument, ten-year 'bunds,' were sold directly to a syndicate of banks, and before 1986, no foreign-owned banks were permitted to participate in the syndicate. The Bundesbank and Ministry of Finance typically would decide the maturity and size of the debt they wished to issue and negotiate with the syndicate members to determine the coupon and issue price. Once agreed upon, the terms would be announced and each member of the syndicate would receive a fixed portion of the issue, with the shares determined by the Bundesbank. Impeding secondary market liquidity, the government used to give the syndicate members and primary market investors a strong incentive to hold their bonds for at least a year. The initial bond purchasers received a 'reallowance' - similar to a special selling commission - for committing not to sell the security for a year. What is more, the bund issues were in relatively small amounts, thereby leaving little room for an active secondary market to develop. Introducing a primary dealership model was discussed in the wake of EMU, but notably the Bundesbank in its role as 'fiscal advisor' spoke out against the PD model. Essentially, the Bundesbank's reading of the origins of the primary dealer system was that this model was specific to the challenges of a splintered US banking system and thus not needed in the German context (Finanzagentur Newsletter 4/2004). This opposition is in line with the Bundesbank's negative view of US sovereign debt management more broadly (Trampusch 2015).

Secondly, Germany has identified another way to ensure and manage liquidity via *Marktpflege* (which roughly translates into 'care of the market'), a practice that predates the creation of the Finanzagentur. *Marktpflege* refers to a practice where the finance agency routinely keeps a share of the emission in its own books for the purpose of market making.

This means that the Bundesbank (later on behalf of the German finance agency) continuously sells reserves or uses them for the repo market in consideration of secondary market condition averaging around 20% since 2006.<sup>4</sup> In its online presentation to private investors the Finanzagentur (2021, author's translation) explains under the rubric 'liquidity risk': 'The risk of not being able to sell Bunds at any time before maturity is extremely low, as Bunds are the most heavily traded government bonds in the eurozone and the Finance Agency and the Bundesbank carry out *Marktpflege*.' The Bundesbank (2007) puts it thus: 'Through their trading activities, the Finance Agency and the Bundesbank are permanently present on the market and thus make an important contribution to securing liquidity in the market for German Government securities.' *Marktpflege* is a liquidity machine and enables the debt management agency to act as market maker if need be, without committing primary dealer banks.

## 5. ON THE BENEFITS OF PDM ADOPTION

Having discussed the origins and drivers of PD adoption, the following section examines the consequences of having a PD in place. In particular, did the PDM help to bring down the costs of debt? Our estimation strategy relies on a pooled cross-sectional time-series analysis. We employ a generalized least squares estimator and include country fixed effects and a linear time trend to control for country and temporal dynamics not explicitly modelled in the data. We also correct for first-order serial correlation and heteroskedasticity in the errors. The main aim here is to examine whether this particular aspect of government securities markets mattered for the changes in long-term (10-year) interest rates on government bonds. In addition to a dummy (PD) that takes the value 1 if a primary dealership is in place and 0 otherwise, we also include a dummy for a newly reformed debt management office (DMO) and a measurement for central bank independence (CBI). These two dummies aim to capture far-reaching macroeconomic policy reforms regarding monetary policy and debt management, which are likely to matter for the costs of debt. Controlling for key economic variables, we find that long-term interest rates are sticky, that is high interest rates in the previous year led to an increase in interest rates in the following year. Higher interest burdens are found to reduce long-term interest rates, possible as the countries in the sample with (very) high debt levels also have the more ‘mature’ economies. Financial market liberalization in the form of capital account openness is found to reduce long-term interest rates, while inflation and global interest rates are found to lead to an increase. Turning to Table 2’s main results, we see that in contrast to ‘modern’ debt management offices or central bank independence (coefficients here are statistically not significant), primary dealership systems contributed to a decrease in long-term interest rates. We also consider whether PDM adoption improved a country’s sovereign credit rating. Further tests suggest that there is no direct association (although an indirect positive effect is likely as is a more favourable outlook due to a diversified investor base brought about by the PDM).

Table 2. Explaining Annual Changes in Long-term Interest Rates

	(1) Model 1	(2) Model 2	(3) Model 3
$\Delta$ Interest	-0.266*** (0.0251)	-0.271*** (0.0255)	-0.262*** (0.0254)
Debt <sub>t-1</sub>	-0.00348* (0.00208)	-0.00409** (0.00205)	-0.00473** (0.00222)
$\Delta$ Debt	0.00157 (0.00623)	0.000783 (0.00619)	0.000327 (0.00633)
Openness <sub>t-1</sub>	-0.885*** (0.241)	-0.919*** (0.235)	-1.003*** (0.235)
Inflation <sub>t-1</sub>	0.0971*** (0.0134)	0.101*** (0.0134)	0.0998*** (0.0135)
Global Interest Rates <sub>t-1</sub>	0.110*** (0.0356)	0.117*** (0.0359)	0.116*** (0.0357)
<b>PD<sub>t-1</sub></b>	<b>-0.249*</b> <b>(0.140)</b>		
<b>DMO<sub>t-1</sub></b>		<b>-0.197</b> <b>(0.149)</b>	
<b>CBI<sub>t-1</sub></b>			<b>0.0176</b> <b>(0.161)</b>
Constant	1.879*** (0.366)	1.846*** (0.377)	1.682*** (0.353)
Observations	866	866	866

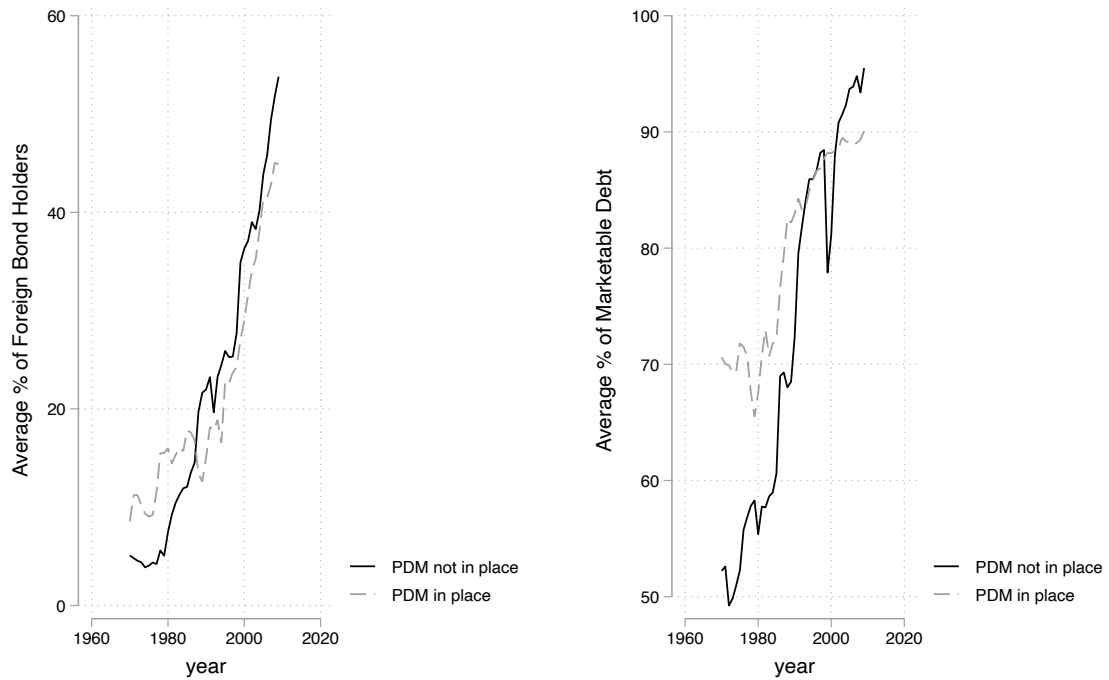
Notes: \*p<0.10; \*\*p<0.05; \*\*\*p<0.01, FGLS error correction model of annual change in long-term interest rates. Estimates of country fixed effects not shown in table for ease of presentation.

As discussed above, the primary dealership system was thought to broaden the investor base, notably with investors from abroad. To consider this point, we take data on bond structure from Abbas et al. (2011). This reduces our sample to 14 countries from 1970 to 2009.<sup>3</sup> Looking at the average percentage of foreign bond holders in the group of PD countries vs. non-PD countries, we can see that it was only in the early years of PD adoption, that the primary dealer system went hand in hand with an internationalisation of bond holders. A similar trend is visible for the average share of marketable debt, where non-PD countries caught up and overtook PD countries, see Figure 3. Still, the difference during the early years, suggests that the PD system likely contributed to an internationalisation of the investor base, and there is a statistically significant relationship between having a PD system in place

<sup>3</sup> Australia (.), Belgium (1991), Canada (1998), France (1987), Germany (.), Greece (1998), Ireland (1995), Italy (1994), Japan (2004), Netherlands (1999), Sweden (1989), Switzerland (.), UK (1986), USA (1960).

and the share of foreign investors (Pearson's correlation coefficient is .36., N= 402). This association is not necessarily a causal one. That is to say, it could well be that countries who adopted a PDM already had a higher share of foreign investors and of marketable debt due to financial market liberalisation prior to PD adoption.

Figure 3. Primary Dealership Creation and Debt Structure



## 6. THE FUTURE OF THE PDM

Comparing the number of PD banks between 2021 and 2019 for a select number of European countries, it is striking that the Covid pandemic has not led to a collapse of PD numbers.

Looking at a slightly larger period, we can see a slight decline from an average of 16 primary dealers in 2021 compared to an average of 19 PD banks per country in 2012.

Table 3. Number of primary dealer banks in Europe

Country	2021	2019	2017	2015	2012
Austria	21	21	21	22	24
Belgium	13	11	19	22	19
Denmark	9	11	11	13	12
Spain	20	22	22	22	22
Finland	15	14	14	14	14
France	15	15	16	19	20
Greece	18	20	21	21	22
Ireland	17	15	16	18	16
Italy	16	16	18	20	20
Netherlands	13	13	16	21	16
Portugal	17	20	20	20	18
Sweden	7	7	7	6	8
Slovenia	15	14	14	15	14
Slovakia	12	11	11	10	22
UK	18	24	19	21	19

Source: AFME European Primary Dealers Handbook, various editions

In the past decades the primary dealer model has come under strain given historically low yields on government bonds and a more challenging regulatory environment. As one Head of Debt Capital Markets puts it bluntly: ‘There is an awful lot of bullshit from the sovereign issuers about the value of their business. In reality it's really slim pickings’ (Global Capital 2013). Recent regulatory changes have reduced primary dealers’ opportunities to turn a profit. The new post-2008 regulation ‘designed to curtail banks’ leverage [...] had the unintended

consequence of also sharply reducing their ability and willingness to make markets in corporate and even government debt' (Lee , 2013). Moreover, targeted regulatory interventions made earning money from market making more difficult. MiFID II, for instance, also targeted 'front running', or dealers' opportunistic propositioning against incoming client orders to benefit from changes in price making the trade more expensive for clients.

This is not to say that there is no money to be made in being a primary dealer. The evidence presented above, suggests that the PD system has been beneficial for debt management purposes. What is more, existing studies suggest that the PD status is a valuable label for primary dealer banks, where relationship and reputational gains are harder to quantify (cf. Rato 2020 ). Carpinetti (2017) examines 147 primary dealer banks between 1988 and 2015 and finds that they enjoyed a boost to their stock price in the weeks following PD appointment.

The introduction of an incentive system dates back to the US origins of the primary dealerships. An incentive system, so the thinking, would reward 'good performance' and make it more profitable for PDs to compete with one another (and thus bring prices down) than to collude. In a less lucrative franchise, so the concern, primary dealers would have higher incentives to take risks and shirk self-discipline. The creation of MTS (see above) made the surveillance of 'good performance' both easier and more precise. In the wake of the 2008 crisis, post-auction non-competitive subscriptions are becoming more important as compensation mechanisms, and in particular as compensation of best performing PDs. Furthermore, syndications have been a key incentive for primary dealers.

In the UK for example, the DMO rewards its high-performing dealers by inviting them to participate in debt syndications that typically come with non-negligible fees (on average £1.8 million per £1 billion syndicated debt). The official reasoning of these syndications is to secure continued support from primary dealers. Critics may see the fees associated with debt syndication as a form of 'corporate welfare'. In December 2020 the Conservative MP Mel Stride raised questions about the system. Between 2011 and 2020, the DMO had conducted 58 debt syndications, each priced at the 'tight end' of an 'indicative range', the DMO claimed. In a letter to the DMO, Stride wondered: 'Is it surprising that you have achieved "the tight end" in such a consistent manner? Could this be a sign that sometimes you have potentially not priced keenly enough, to the taxpayers' detriment, especially given the seeming high levels of demand?' Stheeman replied that 'whilst the outcome of each

individual operation must clearly be judged in terms of value for money for the taxpayer, the programme as a whole must also be resilient to exogenous shocks'<sup>4</sup>. Syndications should be placed in the context of the issuance operations as a whole. The syndication fees, Stheeman, suggested, were 'an important factor for primary dealers in their decisions to support the programme more generally and to invest in their gilt franchises'. It is difficult to say, in other words, how much is too much because pricing considerations need to be weighed against the willingness of primary dealers to continue to perform their infrastructural role as intermediaries in the government bond market and as part of the transmission mechanism for monetary policy. The opaque calculations of 'the right price' also mean that syndication fees have, with few exceptions, flew under the radar of public or parliamentary scrutiny. Questions around debt issuance strategies will however remain an important issue, not least given that the majority of OECD primary dealers reported a higher reliance on syndication in response to the pandemic (OECD 2020).

### *De-risking the PD system*

In addition to often discussed material (e.g. fixed fees or access to syndication and non-competitive auctions) and immaterial (e.g. reputational and relationship gains) incentives, the primary dealer system is supported by debt managers and central bankers. We will not discuss the key role of central banking in supporting sovereign debt markets here. Instead, this section will consider the role of debt management offices which now routinely act as de-risking partners.

The repo<sup>5</sup> pitch in debt management appeared at the turn of the century: developing a repo market, so the argument, would increase the demand for government debt and thereby

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<sup>4</sup> <https://committees.parliament.uk/publications/3565/documents/34443/default/>

<sup>5</sup> The repurchase agreement, or repo, is a financial agreement in which the borrower agrees to buy back the security sold to the lender at a later date, usually for a higher price. If the counterparty is unable to meet the repurchasing obligation, the lender can liquidate (or simply keep) the assets serving as collateral. Repos are therefore considered 'secured'. This makes them attractive for the short-term funding needs of particularly institutional investors and market makers (usually banks) with short-term term liquidity requirements. Put differently, a repo is a short-term loan backed by high quality collateral (sovereign bonds).



bringing yields down. Repos enable banks without otherwise sufficient liquidity to engage in arbitrage and thus ensure that primary dealers' 'lack of money' does not reduce demand for bonds. Even where counterparties do not have the necessary reserves available, the repo trade helps debt agencies find buyers for their assets. Market makers ability to quote immediately-executable selling prices often requires them to hold a considerable bond inventory (the warehousing risk). This is where the repo market comes in for primary dealers: repo offers a way to finance and hedge this inventory. For example, interest rate risks on inventory are frequently hedged by taking and off-setting short position in another security borrower in the repo market. Repo financing allows investors to take short positions and thus contributes to 'price discovery'. The repo market also plays a role where market-makers don't currently possess the bond issue demanded by an investor. Here market makers borrow that issue in the repo market. This repo hedging is meant to reduce the cost of borrowing for governments because it reduces risk for primary dealers. DMOs are well aware of the mutual interest with primary dealers in a functioning repo market. In the UK, for example, the gilt dealer sector is the largest net borrower in the overnight gilt repo market (Bank of England 2020).

However, despite repos appeal in de-risking market making, stability in repo finance cannot be taken for granted. Indeed, since the 2007 crisis the repo market has been increasingly recognised as a potential source of financial instability (cf. Gabor 2020). Sissoko (2020) highlights a tension within the repo liquidity system: The safety of repos depends on the premise that markets are reliable sources of liquidity. Yet past decade of repo trading provides ample evidence of 'collateral calls, collateral sales, liquidity events, and liquidity-driven losses for repo-borrowing funds and their end investors' (*ibid.* 315).

Across rich countries, DMOs have supported the market-making ability of their primary dealers by setting up repo lending facility. It is worth highlighting, that PD de-risking from the side of debt managers or central banks predates the ongoing Covid pandemic. In 2000, the UK DMO started an automatic non-discretionary standing repo facility. If the DMO considers that there is sufficient evidence of severe market dislocation or disruption, it may offer gilt(s) for repo-ing to GEMM member. Similarly, primary dealers in the Netherlands and Belgium have access to a repo facility to be used to facilitate market making. Repo support for primary dealers has been increased and adjusted ever since, most recently during the early months of the Covid pandemic (see Appendix for a full overview). A prominent example here is the US Federal Reserve's new Primary Dealer Credit Facility established in

March 2020 to allow primary dealers to support smooth market functioning and facilitate the availability of credit, in the face of deteriorating conditions in the market for triparty repo financing. Other central banks followed with similar arrangements, such as the Banks of Canada's now suspended Term Repos and Contingent Term Repo Facilities or the Danmarks Nationalbank Extraordinary Lending Facility. Following recent bond purchasing programs, liquidity and cost motives aligned: central bank purchases of sovereign debt meant that there was a higher demand for government bonds than was supplied by the market and debt managers stepped in to supply collateral in what debt managers considered a win-win situation. As Tammo Diemer (quoted in Orchard 2020), head of the German Finanzagentur put it: 'We are not only supporting the security market, but also taking advantage of the funding.'

## 7. CONCLUSION

The creation of primary dealership was motivated by the rising costs of servicing sovereign debt. Indeed, as one of the key findings of this paper suggests, the PDM is associated with a subsequent reduction in long-term interest rates. For OECD countries, having a primary dealer system has become the way to go, with a few notable exceptions. Already in a 2001 survey (Arnone and Iden 2003), among advanced economies, 16 out of 19 "recommend" or "strongly recommend" the adoption of a primary dealer system, while the remaining 3 are "uncertain" or give no answer (Australia and New Zealand) or give a negative answer (Germany). Indeed, the PD model is not only widespread at the national level, but has arrived at the EU-level too. As part of the NextGenerationEU funding strategy, the European Commission has set up a Primary Dealer Network made up of currently 41 financial institutions 'to facilitate the efficient execution of auctions and syndicated transactions, support liquidity in the secondary markets, and ensure the placement of our debt with the widest possible investor base' (EU 2021). Primary dealer banks need to already be an active member of an EU primary dealer arrangement and thus be supervised by an EU authority. The EU primary dealer system also avails itself of a carrot system of syndication rewards. In addition to offering syndication deals on the basis of a market-making ranking system, banks who were found guilty of breaching anti-trust rules (including Barclays and Deutsche Bank) were not admitted to a recent tender for syndicated transactions.

The primary dealer model has been embraced by emerging market economies too. Brazil was the first non-OECD country to adopt PD system in 1974, that is before the wave of reforms swept OECD countries starting in the late 1980s. The backstory to Brazil's early adoption is the 1973 oil price shock which pushed Ernesto Geisel's government to rely on further deepening of public indebtedness through external debt to support its industrialization program. China, to give another example, established a primary dealer system in 1993 and by 1996 all tradable governments bonds were issued via auction (Bai et al. 2013). At the time of writing Argentina, India, Chile, South Africa, Singapore, Thailand and Turkey all have primary dealer systems with an increasing number of developing countries in the process of adopting PD models. PD systems in emerging markets are similar to those in rich economies. The main difference is that the two-way quoting obligations for primary dealers in emerging markets is often less firm depending on trading conditions. Indeed, insufficient market liquidity (be it because of the size of the debt market or because of the composition and

behaviour of the investor base) is a key reason why emerging market economies decide not to adopt a PD system. What is more, as particularly the early years of the US system with numerous episodes of abuse suggest, a primary dealer system can prove detrimental in a country with a small or budding financial sector given the greater risk of collusion. Indeed, studies (notably Arnone and Iden (2003) and Arnone and Ugolini (2005)) cautioned against a blanket adoption of PDMs arguing that any adoption need to be considered vis-à-vis a country's development strategy, market size, and market microstructure.

If the current trend of PD adoption were to continue, it seems likely that the number of countries with PD systems is to rise. This is not to say that the primary dealer model has not come under strains over the years. Yet, as this paper has discussed, public officials have responded to these challenges by de-risking and incentivising primary dealership roles. In this regard, rich countries, with a capable central banks and favourable credit ratings, are clearly in a more advantageous position than most emerging or developing countries. And yet, peers from the Global South are taking note supported by the international debt management community and international organizations. The pandemic has confronted many poor and middle-income countries with a liquidity crisis that exceeded the low liquidity of illiquidity common across many emerging markets. Debt management reforms that are geared towards the provision of liquidity are thus unlikely to fall out of fashion soon.

## ABOUT THE AUTHOR

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## ROBUSTNESS CHECKS

A battery of further robustness checks was performed, which are not presented here to conserve space but are available upon request. 1) I consider external financial conditions. To do so, I include the interest rate of the US 10-year treasury bill. This interest rate is a key rate for financial market activity at large. Specifically, for sovereign borrowing, higher US interest rates make it usually more expensive for other states to borrow. Higher US rates would thus impact positively on PD introduction likelihoods. This variable is neither statistically significant, nor does it change this article's main findings. 2) I also control for the size of a country, measured by the log population. Currently, only five EU governments do not have primary dealer systems: Croatia, Estonia, Luxembourg, Malta and Germany. With the exception of Germany, they are all small, so it is possible they fear that their debts are not liquid enough to enjoy widespread demand on the global financial market. This variable is neither statistically significant, nor does it change this article's main findings. Perhaps this is not surprising, given that other small(er) countries have opted for the PD system. 3) I also test different specifications for an EU/Eurozone effect, with current members or 5-year runup dummy variables. These are all statistically not significant. I further assess if Eurozone countries' PD adoption reacts to the total number of PD reforms weighted by its peer group. This variable takes the value 0 for all countries that are not to adopt the Eurozone at some point during the sample period. Put differently, does the likelihood of PD introduction by a current and future Eurozone country increase with the number of PD reforms already undertaken in the Eurozone peer group? Evidence is inconclusive and no strong evidence can be found for a cumulative peer effect. Along similar lines, a OECD membership dummy was not statistically significant. 4) I consider whether central bank independence matters for the adoption of a PD model, using Garriga's measurement of central bank independence (2018). In many countries, central bank independence has been pursued with the aim of attracting external capital. It may therefore underpin a government's confidence in liberalizing the flow of capital and by implication impact on the propensity to enact a pro-market reform in the bond market sector. This variable is neither statistically significant, nor does it change this article's main findings. 5) Results are unaltered when the analysis commences in 1986 and not 1970. Furthermore, results are robust to different specifications, including Cox's Proportional Hazard (PH) event history model, logistic models that control of time dependence. A number of diagnostic tests were used to assess the appropriateness of using a PH model. Schoenfeld residuals were used to test whether or not there is a relationship

between the model residuals and time which was rejected at all significance levels for all models.

## APPENDIX

Table A1. PD Adoption

<b>United States of America</b>	<b>1960</b>
<b>United Kingdom</b>	<b>1986</b>
<b>France</b>	<b>1987</b>
<b>Spain</b>	<b>1988</b>
<b>Austria</b>	<b>1989</b>
<b>Sweden</b>	<b>1989</b>
<b>Belgium</b>	<b>1991</b>
<b>Finland</b>	<b>1992</b>
<b>Italy/Sardinia</b>	<b>1994</b>
<b>Ireland</b>	<b>1995</b>
<b>Norway</b>	<b>1995</b>
<b>Canada</b>	<b>1998</b>
<b>Portugal</b>	<b>1998</b>
<b>Greece</b>	<b>1998</b>
<b>Netherlands</b>	<b>1999</b>
<b>Lithuania</b>	<b>2001</b>
<b>Poland</b>	<b>2003</b>
<b>Denmark</b>	<b>2003</b>
<b>Japan</b>	<b>2004</b>
<b>Slovenia</b>	<b>2006</b>
<b>Bulgaria</b>	<b>2007</b>
<b>Slovakia</b>	<b>2013</b>
<b>Latvia</b>	<b>2013</b>

The following countries are included in the analysis, but have no official PD system: Australia, Germany, Switzerland, Estonia, Malta. New Zealand and Cyprus introduced a PD model in 2019, which is outside the timeframe of this paper's empirical analysis.



## OVERVIEW OF PANDEMIC AND PRE-PANDEMIC PRIMARY DEALER SUPPORT AND REPO MARKET SUPPORT

### AUSTRALIA

#### **Repo market (pre-2020)**

**Committed Liquidity Facility** introduced in 2015 by Reserve Bank of Australia. CLF offers cash against repo (collateral: residential MBS and other asset-backed securities). CLF was created due to low volume of sovereign debt in Australia, which created shortage of HQLA under Basel III rules (implemented in 2015). The facility essentially allows banks to access additional HQLA (RBA 2019).

### BELGIUM

#### **Primary Dealer support (pre-pandemic)**

In the event of an abnormal development in the secondary market ... caused by an imbalance in the distribution of the securities auctioned, the Belgian Debt Agency may offer to all PDs the possibility to acquire these securities during an additional non- competitive tour. (BDA 2020: 6)

#### **Repo market (pre-pandemic)**

The National Bank of Belgium will lend the securities purchased under PSPP [the ECB's public sector purchase programme] via bilateral repos (cash collateral) or bilateral repos combined with bilateral reverse repos (securities collateral) with counterparties that have a contract with NBB for repos in euro. (NBB 2020)

#### **Repo market (pandemic)**

The same as pre-pandemic, only expanded to securities purchased under the ECB's pandemic emergency purchase programme (PEPP). Lending is to "Counterparties who are eligible for regular repo business in euro (and therefore with whom NBB has an existing contract) are eligible for bilateral lending under PSPP/PEPP." (NBB 2020)

### CANADA

#### **Repo market (pre-pandemic)**

Bank of Canada, Standing Overnight Repo Facility (since April 2009): o/n cash against government securities, counterparties: Primary Dealers (Bank of Canada, 2021)

#### **Repo market (pandemic)**

In addition: **Term Repos** (17/03/2020-04/05/2021), term: up to 2years, for Primary Dealers, against state-guaranteed securities (most sovereign or provincial debt), conducted bi-weekly; **Contingent Term Repo Facility** (suspended 6 April 2021) offers Canadian dollar funding for 1-month to eligible counterparties [category broader than PD] on a standing, bilateral basis against securities issued or guaranteed by the Government of Canada or a provincial government (Bank of Canada, 2021)

### CZECHIA

#### **Primary Dealer support (pre-pandemic)**

Primary Dealers have the right to participate in lending facilities, repurchase transactions or buy and sell back (the Primary Dealer with whom the Ministry of Finance may enter into an Global Master Repurchase Agreement, Global Master Securities Lending Agreement or Master Agreement for Financial Transactions (MFCR 2021)

#### **Repo market (pre-pandemic)**

In autumn 2008, the CNB introduced extraordinary liquidity-providing repo operations with two-week and three-month maturities aimed at supporting the functioning of the government

bond market. Only liquidity-providing repo operations with two-week maturity have remained in place since January 2011. (CNB 2021)

#### **Repo market (pandemic)**

In reaction to the onset of the coronavirus pandemic, the frequency of liquidity-providing repo operations was increased to three times a week in March 2020. Liquidity-providing repo operations with three-month maturity were re-introduced and the range of collateral accepted was broadened in May 2020. In reaction to the coronavirus pandemic, two-week liquidity-providing operations were also made available to some non-bank entities – insurance companies, pension management companies and management companies. In response to the fading of the pandemic, liquidity-providing repo operations with three-month maturity were abolished in May 2021 and the frequency of two-week liquidity-providing repo operations was reduced to once a week. (CNB 2021)

### DENMARK

#### **Primary Dealer support (pre-pandemic)**

Primary Dealer in Government Bonds have **access to the securities lending facilities of the central government and the Social Pension Fund**; PDs in T-Bills have access to the **Central-Government's Lending Facilities for T-bills**. Purpose of both facilities is to supplement and strengthen market efficiency, especially with regard to repo market. Participants borrow in one buy-/sell-back transaction and lend (provide collateral) in another buy-/sell-back transaction (cf. Danmarks Nationalbanken 2021a, b).

#### **Repo market (pre-pandemic)**

Securities Lending Facility: securities may be borrowed for 1-5 days (Danmarks Nationalbanken 2021b).

#### **Repo market (pandemic)**

Danmarks Nationalbank introduced an extraordinary lending facility in March to ensure sufficient liquidity to the money market. [The other (non-extraordinary) Securities Lending Facility refers to the facility for Primary Dealers in government bonds]. The lending facility enables monetary policy counterparties to borrow liquidity for 7 days and 3 months, respectively, against collateral at a variable interest rate of currently -0.35 per cent, i.e. 40 basis points lower than the rate of interest on the existing lending facility ... Danmarks Nationalbank also entered into agreements on swap lines with the ECB and the Fed in March to ensure access to liquidity in euro and dollar (Danmarks Nationalbank, 2020:5-6)

### EUROZONE

#### **Repo market (pre-pandemic)**

The standing facilities consist of the marginal lending facility (MLF) and the deposit facility (DF). Eligible counterparties may use the MLF to obtain overnight liquidity from the Eurosystem through a reverse transaction with their home NCB using eligible assets as collateral. There is no limit on the amount of liquidity that may be provided under the MLF, subject to eligible collateral availability. (BIS 2021e)

### FRANCE

#### **Primary Dealer support (pre-pandemic)**

The repo (repurchase agreement) facility enables a public body, the Public Debt Fund (Caisse de la dette publique - CDP) to lend Primary Dealers French government securities that are difficult to obtain on the market in exchange for other French securities of equivalent value. These loans are temporary and yield interest. The French government provides securities to the Fund. Under terms of the Budget Act, the government may issue securities directly to the Fund. Primary Dealers apply to Agence France Trésor to use the repo facility. (AFT 2021)

## GREECE

### **Primary Dealer support (pre-pandemic)**

Primary Dealers are granted: Exclusive access to short-term securities lending mechanisms that may be created in order to facilitate hedging (short selling) // Privileged access to liabilities management (Bank of Greece 2020: 6)

### **Repo market (pre-pandemic)**

Marginal lending facility: counterparties can use the marginal lending facility to obtain liquidity from the national central banks at a pre-specified interest rate against eligible assets, in order to meet temporary liquidity needs. The interest rate on the marginal lending facility normally provides a ceiling for the overnight market interest rate. (Bank of Greece 2021)

## HUNGARY

### **Repo market (pre-pandemic)**

At the top of the interest rate corridor the central bank meets without quantity limits the temporary liquidity needs of the commercial banks with its overnight collateralised loan. As a result of this the interbank interest rates can not rise above the interest rate ceiling. (MNB 2021)

### **Repo market (pandemic)**

To ease liquidity provisions, the central bank expanded the eligible collateral scope; added Expansion of the counterparties scope with investment funds, and Long-term collateralized loans (cf MNB 2020)

## ICELAND

### **Primary Dealer support (pre-pandemic)**

Primary dealers have exclusive access to securities lending facility offered by the Central Bank on behalf of the Treasury [... ] Primary dealers with government securities are offered money market loans. Money market loans are part of the Treasury's liquidity management and are in line with the long-term policy of the Ministry of Finance and Economic Affairs in debt management. (Iceland GDM 2021b)

### **Primary Dealer support (pandemic)**

Increased securities lending facilities to primary dealers (23 March 2020)

The Government Debt Management offers the Primary Dealers repurchase agreement (repo) Facility to improve market functionality and to maintain liquidity in the market for bond series that the Agency is building up.

### **Repo market (pre-pandemic)**

The interest rate is based on the Central Bank repo rate. The maximum lending contract period is 14 days.

## IRELAND

### **Repo market (pre-pandemic)**

Counterparties can use the marginal lending facility to obtain overnight liquidity from the Central Bank against eligible assets. (CBI 2021b)

### **Repo market (pandemic)**

The securities purchased under the PSPP and PEPP are available for securities lending. The aim of securities lending is to support bond and repo market liquidity without unduly curtailing normal repo market activity (CBI 2021a)

## ITALY

### **Primary Dealer support (pandemic)**

Italian Treasury launched a repo facility in May 2021, which is potentially open to all secondary market participants (though assumption is that most activity will be with primary dealers). The Treasury can borrow or lend temporary liquidity in exchange of Italian government bonds used as collateral. Through the Repo operations, the MEF may also intervene to manage the consequences deriving from any situations of scarcity on the secondary market of specific securities, if this goal is in line with the primary one, i. e. that of cash management. (MEF 2021)

#### **Repo market (pre-pandemic)**

Emergency liquidity assistance (ELA) is a form of exceptional financing granted to solvent financial institutions (as a rule banks) facing temporary liquidity needs.

These operations allow the Bank of Italy to act, on a discretionary basis, as a lender of last resort, providing temporary loans against adequate collateral. The exceptional financing disbursed by the Bank of Italy can take the form of an injection of liquidity or a collateralized securities lending. (Banca d'Italia 2021)

### JAPAN

#### **Primary Dealer support (pre-pandemic)**

Primary Dealer known as "JGB Market Special Participants". They may participate in Auctions for Enhanced-Liquidity conducted for the purpose of maintaining and enhancing the liquidity of the JGB market, etc. from the perspective of avoiding a situation in which a decline in the liquidity of the secondary market of JGBs due to a significant tightening of the demand and supply balance of specific issues and other factors leads to the impairment of the function of the JGB markets. (MOF 2020:7)

#### **Repo market (pre-pandemic)**

BoJ establishes Securities Lending Facility in 2004 to improve liquidity in secondhand government bond market.

#### **Repo market (pandemic)**

In March/April 2020, the BoJ both offers funds-supplying operations against collateral (repo), and expands the terms of the Securities Lending Facility, committing to lending out the entire stock of Japanese Government Bonds in the central bank portfolio. The two actions were designed to provide ample liquidity and maintain stability in the repo market--supplying either cash or collateral as needed (BoJ 2020).

### NETHERLANDS

#### **Primary Dealer support (pre-pandemic)**

Primary Dealers have the exclusive right to participate in DSL-auctions and have access to the repo and strip facility of the Dutch State Treasury Agency (DSTA 2021).

### NEW ZEALAND

#### **Primary Dealer support (pre-pandemic)**

"Registered Tender Counterparties" cf: This Primary Market Access Framework will come into effect from 30 September 2019. Following this date, only institutions that have been approved as a Registered Tender Counterparty under the new Primary Market Access Framework will be eligible to participate in NZGS primary market activities. (NZDM 2019, 2)

#### **Repo market (pre-pandemic)**

Overnight Reverse Repo facility (ORRF): Provides access to liquidity at a penalty rate and against Tier 1, 2 & 3 collateral for liquidity management and monetary policy purposes. Priced at OCR plus 0.25% (RBNZ 2021) - existing time series suggests active since at least 1999

## NORWAY

### **Repo market (pre-pandemic)**

In June 1996, Norges Bank decided to introduce a repo facility. Repos were to replace liquidity supply in the form of unsecured fixed-rate loans, and the changeover was to be gradual. Benchmark government bonds were the only securities permitted in the repurchase agreements with Norges Bank. The first repos were used in February 1997. ... In April 1999, the [repo]scheme was extended to include all securities that are eligible as collateral for loans in Norges Bank. (Kilen 1999: 397)

### **Repo market (pandemic)**

Since 1 January 2020, new "Central Bank Act" determines who can have a central bank account - ie. Be a 'counterparty' to Norges Bank. All counterparties have access to (collateralised) discount window facilities, making repo incredibly central to all emergency loans (cf. Norges Bank 2020: 24)

## POLAND

### **Primary Dealer support (pre-pandemic)**

PDs have exclusive rights or preferences in concluding individual transactions with the Minister concerning: repo and buy-sell back transactions (gov.pl 2021: 4)

### **Repo market (pre-pandemic)**

National Bank of Poland introduced a repo facility during the global financial crisis

## PORTUGAL

### **Primary Dealer support (pre-pandemic)**

Primary Dealers have access to the OT repo window of last resort. The repo transactions are carried out under a window facility of last resort created in 2000 to support the market-making obligations of the primary-dealers in the secondary market of the OT (IGCP nd)

## SWEDEN

### **Primary Dealer support (pre-pandemic)**

Swedish National Debt Office offers primary dealers short-term loans of government securities through repos... The standing repo facility is governed by demand and is offered irrespective of the borrowing requirement. In order to utilise the repo facility, the primary dealers pay a premium in relation to the Riksbank's policy rate. The Debt Office also uses repo swaps where PDs can borrow a bond against the lending of another government security for one week (Riksgälden 2021)

### **Primary Dealer support (pandemic)**

At the end of 2019, the Debt Office decided to expand the facility for market-supporting repo swaps in nominal government bonds by raising the maximum volume and lowering the price. As of 1 September 2021, the price returns to 30 basis points below the Riksbank's repo rate while the expanded volume of SEK 4 billion will remain until 1 September 2022. (Riksgälden 2021)

### **Repo market (pre pandemic)**

Standing repo and reverse repo facility available to Primary dealers (BIS 2021d)

### **Repo market (pandemic)**

During the Pandemic, the Riksbank provided repo funding to banks to support corporate lending; it also conducted dollar lending, bought CP and municipal debt, etc. (Riksbank 2021)

## UK

### **Primary Dealer support (pre-pandemic)**

The DMO's standing and special gilt repurchase facilities were introduced on 1 June 2000. The DMO operates a Standing Repo Facility, whereby any GEMM who has signed the relevant documentation may request that the DMO lends out any gilt for repo purposes, which may involve temporary creation of the relevant gilt subject to any limits and other requirements set out in the applicable terms and conditions. The Facility exists in order to ensure that GEMMs can be assured of being able to access and deliver any gilt at any time, albeit at a price and subject to any limits and other requirements set out in the applicable terms and conditions, hence maintaining their ability to make two-way prices in the secondary market and avoiding the prospect of delivery failures. [...] Special Repo Facility: If the DMO considers that there is sufficient evidence of severe market dislocation or disruption, it may offer gilt(s) for repo-ing on different terms to those of the Standing Repo Facility to any GEMM (or, at the DMO's sole discretion, another counterparty) that in each case has signed the required legal agreements with the DMO. (DMO 2021:18)

#### **Repo market (pre-pandemic)**

Indexed Long-Term Repo (ILTR) is the BoE's standing, regular market-wide sterling operation and forms part of the Bank's broader liquidity insurance framework. ILTRs allow market participants to borrow central bank reserves (cash) for a six-month period in exchange for other, less liquid assets (collateral). Established in 2014. Contingent Term Repo Facility also established in 2014, usage dependent on BoE activation (BoE 2021)

#### **Repo market (pandemic)**

Activation of Contingent Term Repo Facility (CTRF) on 24 March 2020, available for banks and broker-dealers. CTRF was established in 2014, when it replaced the Extended Collateral Term Repo (ECTR) facility. This change was a part of a broader set of changes to the Bank's liquidity insurance facilities (BoE 2020). The contingent nature of the CTRF allows the Bank to provide liquidity against the full range of eligible collateral at any time, term and price it chooses, in response to actual or prospective exceptional market-wide stress. Its terms will be set by the Bank, and announced via a Market Notice, each time it is deployed, in light of prevailing market conditions (BoE 2021)

USA

#### **Primary Dealer support (pre-pandemic)**

Fed Primary Dealer Credit Facility: estab. Mar 2008, following strains in triparty repo market. Funding only o/n. In September 2008, following the bankruptcy of Lehman Brothers, usage of the original PDCF increased to over \$140 billion. This peak is much higher than the peak use of the 2020 PDCF. However, the range of securities eligible for the PDCF post-Lehman was much broader than the range of securities accepted as collateral at the 2020 PDCF, making comparisons difficult. (Martin and McLaughlin, 2021)

#### **Primary Dealer support (pandemic)**

Fed Primary Dealer Credit Facility: o/n & term funding, maturities up to 90 days, from 20/03/2020-31/03/2021. (longer maturities are LCR compliant under Basel III framework, i.e. needed by dealers). Established due to disruptions in repo market. Eligible assets consisted of a broad range of investment grade debt securities, including commercial paper and municipal bonds, and a broad range of equity securities. Primarily used to refinance corporate and municipal debt. (Martin and McLaughlin, 2021)

#### **Repo market (pre-pandemic)**

**Reverse Repo Facility** (since 2013): offers collateral against cash, eligible counterparties: PDs, MMFs; **Foreign Repo Pool** (since 1970s, expanded 2015): offers collateral against cash

for foreign monetary authorities (o/n investment service for cash balances held at FRBNY) (cf. Murau et al 2021)

**Repo market (pandemic)**

In addition to the two facilities, Fed adds: FIMA Repo Facility (31/03/2020, operational 06/04/2020): offers cash against UST collateral--allows FIMA to liquidate UST portfolio outside of market & avoid disruptions, facility made permanent July 2021; Standing Repo Facility (SRF): Fed conducts repo operations during pandemic, announcing standing facility July 2021. Eligible counterparties: PD & depository institutions, term: o/n, facility provides cash against collateral (U.S. Treasuries, agency debt, and agency MBS) (cf. FRBNY 2021; Murau et al 2021).

## REFERENCES

- Ali Abbas, SM, Nazim Belhocine, Asmaa El-Ganainy, and Mark Horton. 2011. 'Historical patterns and dynamics of public debt—evidence from a new database', *IMF Economic Review*, 59: 717-42.
- Andabaka Badurina, Ana, and Sandra Švaljek. 2012. 'Public debt management before, during and after the crisis', *Financial theory and practice*, 36: 73-100.
- Arnone, Mr Marco, and Mr George Iden. 2003. *Primary dealers in government securities: policy issues and selected countries experience* (International Monetary Fund).
- Arnone, Mr Marco, and Mr Piero Ugolini. 2005. *Primary dealers in government securities* (International Monetary Fund).
- Breuer, Wolfgang. 1999. "The relevance of primary dealers for public bond issues." In.: CFS Working Paper.
- Bröker, G. 1993. 'Government Securities and Debt Management in the 1990s', *OECD, Financial Affairs Division, DAFPE, Paris*.
- Calderón, César, and Klaus Schmidt-Hebbel. 2008. 'The choice of fiscal regimes in the world', *Documentos de Trabajo (Banco Central de Chile)*: 1.
- Calice, Pietro, and Leone Leonida. 2018. 'Concentration in the banking sector and financial stability: new evidence', *World Bank Policy Research Working Paper*.
- Carpinetti, M. 'The impact of Becoming Primary Dealer: A Cross-Country Analysis'.
- Chinn, Menzie D, and Hiro Ito. 2008. 'A new measure of financial openness', *Journal of comparative policy analysis*, 10: 309-22.
- Clarke, George, Thorsten Beck, Philip Keefer, Alberto Groff, and Patrick Walsh. 1999. *New tools and new tests in comparative political economy: The Database of Political Institutions* (The World Bank).
- Elkins, Zachary, Andrew T Guzman, and Beth A Simmons. 2006. 'Competing for capital: The diffusion of bilateral investment treaties, 1960–2000', *International Organization*, 60: 811-46.
- Feiertag, Olivier. 'Financial Deregulation in France: A French 'Big Bang'?(1984–1990).' in, *Financial Deregulation* (Oxford University Press).
- Finanzagentur. 2004. 'Newsletter: Wertpapiere des Bundes', nr. 4.
- Flandreau, Marc, and Juan H Flores. 2009. 'Bonds and brands: foundations of sovereign debt markets, 1820–1830', *The Journal of Economic History*, 69: 646-84.
- Gabor, Daniela. 2016. 'The (impossible) repo trinity: the political economy of repo markets', *Review of International Political Economy*, 23: 967-1000.
- . 2020. 'Critical macro-finance: A theoretical lens', *Finance and society*, 6: 45-55.
- Garriga, Ana Carolina. 2010. 'DETERMINANTS OF CENTRAL BANK INDEPENDENCE IN DEVELOPING COUNTRIES: A TWO-LEVEL THEORY', *PhD thesis, University of Pittsburg*.
- . 2016. 'Central bank independence in the world: A new data set', *International Interactions*, 42: 849-68.
- Goodhart, Charles Albert Eric. 1998. *Central bankers and uncertainty* (London School of Economics).
- Gourevitch, Peter. 1986. *Politics in hard times: Comparative responses to international economic crises* (Cornell University Press).
- Hibbs Jr, Douglas A. 1977. 'Political parties and macroeconomic policy', *The American political science review*: 1467-87.
- I, Kerr. 1986. 'Big Bang. ', *Euromoney Institutional Investor PLC*.



- Krippner, Greta R. 2011. *Capitalizing on crisis: The political origins of the rise of finance* (Harvard University Press).
- Lee, John. 2015. 'Resolving concerns of treaty shopping in international investment arbitration', *Journal of International Dispute Settlement*, 6: 355-79.
- Lemoine, Benjamin. 2013. ' Dette publique, débat confisqué. Pourquoi la France emprunte-t-elle sur les marchés ?', *La Vie des idées*, 12 février.
- MacKenzie, Donald, Iain Hardie, Charlotte Rommerskirchen, and Arjen van der Heide. 2020. 'Why hasn't high-frequency trading swept the board? Shares, sovereign bonds and the politics of market structure', *Review of International Political Economy*: 1-25.
- Orchard, John. 2020. 'Refinancing the German crisis measures', *OMFIF*.
- Rato, João Moreira. 2020. *The European Debt Crisis: How Portugal Navigated the post-2008 Financial Crisis* (Springer Nature).
- Reid, Margaret. 1988. *All-change in the City: the revolution in Britain's financial sector* (Springer).
- Rommerskirchen, C., and A. van der Heide. 2021. 'The Quiet Side of Debt', *mimeo*.
- Shepsle, Kenneth. 1991. 'Discretion, Institutions, and the Problem of Government Commitment.' in P. Bordieu and J. Coleman (eds.), *Social Theory for a Changing Society* (Westview Press: Boulder).
- Sissoko, Carolyn. 2020. 'The Collateral Supply Effect on Central Bank Policy', *Available at SSRN 3545546*.
- Suleiman, Ezra, and John Waterbury. 2019. *The political economy of public sector reform and privatization* (Routledge).
- Trampusch, C. 2019. 'The financialization of the state: Government debt management reforms in New Zealand and Ireland', *Competition & Change*, 23: 3-22.
- Trampusch, Christine. 2015. 'The Financialisation of Sovereign Debt: An Institutional Analysis of the Reforms in German Public Debt Management', *German Politics*, 24: 119-36.
- Tsebelis, George. 2011. 'Veto player theory and policy change: An introduction.' in, *Reform processes and policy change* (Springer).
- van der Heide, A. . 2021. 'Dealing in government bonds: Infrastructural power in European markets for sovereign debt', *mimeo*.
- Vogel, Steven K. 1997. 'International games with national rules: How regulation shapes competition in 'global' markets', *Journal of Public Policy*, 17: 169-93.
- Yadav, Yesha. 2016. 'The failure of liability in modern markets', *Va. L. Rev.*, 102: 1031.

