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Co-Creation for the Reduction of Uncertainty in Financial Governance: The Case of Monetary Authority of Singapore

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Abstract

Traditionally financial governance has been perceived and studied as a closed system. Yet, increasing sophistication of technology facilitates the emergence of new organizational forms of collaboration between the state and corporate actors. The study argues that co-creation becomes the way for public sector to mitigate new types of uncertainties, coming from increasing technological sophistication of the financial sector. Thus, new insights can be gained from looking at co-creation in financial governance, which is a unique setting for co-creation as state's partners are large and capable corporate organizations, especially in regards to financial innovation. Such an approach also brings new insight into co-production literature. To exemplify the argument, a closer look at how co-creation has been effectively applied by the Monetary Authority of Singapore in financial regulation and supervision as well as in policies related to promotion of the financial sector is provided.

Keywords: financial governance, co-creation, uncertainty, financial innovation, Singapore

1. Introduction

Governance is increasingly recognized as an evolving and dynamic set of multi-level structures which goes beyond a set of institutionalized relationships: "actors themselves influence the development of governance arrangements and the workings of governance" (Capano et al. 2015, 11-12). Financial governance, as a distinct policy domain, can be characterized by simultaneously relevant capacities to restrain (risks, systemic vulnerability) and to enable (competition, economic growth)[1], thereby operationalizing the so-called "finance-growth" nexus (Woo et al. 2016). Unlike most other policy areas, financial policy-making is dominated by closed communities as well as a close alliance between state and non-government actors (Underhill and Zhang 2008; Underhill 2007; Kregel and Tonveronachi 2014) and is contingent upon the existence of a "politically sustainable balance of power between public authorities and private interests" (Zhang 2006, 169). The latter are usually represented by internationally active financial institutions that increasingly influence financial architecture (Underhill 2015). These institutions are typically large and capable organizations with their own R&D departments, innovation labs and substantial investments in ICT.

[1] Regulatory choices shape the speed and variety of transactions, types of business models and the pace of technology-driven financial innovations (Cainey 2014).

The need for a dynamic governance of the financial sector comes from the inherent fragility and cyclical uncertainty which characterize financial systems (Minsky 1985, 1993, 1994, 2008). Financial governance has to continuously evolve to be effective as there is "a pervasive nature of incentives to circumvent regulations" in financial systems (Kregel and Tonveronachi 2014, 6; also Hubbard and O'Brien 2012). Avoidance of regulation in the sector – be it simple evasion, engaging in activities that do not technically violate existing regulation, or something more sinister – is part of how the sector evolves, innovates. Hence, financial governance can be characterized as rather reactive and incremental (Anheier and Fliegauf 2013), with uneven balance of powers and a non-reciprocal relationship among policy actors (Woo and Howlett 2015). Besides avoidance of regulations, another distinct driver of novel financial instruments is fast technological advancements, which have substantially increased with the digital revolution and resulted in ever growing investments in FinTech (Financial Technology) (Mackenzie 2015). Technological and market innovations have made national (international and supranational) regulatory actors heavily rely on industry expertise, which can be portrayed as a "closely-knit transnational policy community [that] constitutes a typical case of Michael Moran's 'esoteric politics' (Moran 1984), wherein an elite group works out the management of its own vital interests without wider public involvement" (Underhill 2015, 479). In other words, there are two major incentives for financial innovation identified as relevant in the context of this study: avoidance of regulations and technological advancement, which are interrelated but can also occur irrespective of each other and both contribute to the evolution of the financial sector.[2] In the aftermath of the recent Global Financial Crisis, public authorities are increasingly becoming aware of the discrepancy of technological power as a result of the surge of computational complexity in the financial sector. Technology-aided financial innovation is one of the strong drivers of complexity that financial regulators face (Cerny 1994a, 1994b), but this particular problem did not receive relevant attention in the financial governance literature. Economics and, more recently, legal scholarship have conceptualized "knightian" uncertainty of financial innovations and the reactive nature of financial regulations (Minksy 2008; also Pistor 2013) but literature on financial governance makes no mention of such characteristics of financial systems. Technological capacities have been analyzed in regard to the administrative capacity of public-sector organizations (e.g. Lember et al. 2016) or economic policy makers (Hallerberg and Wehner 2013), yet very few studies have analyzed capabilities of financial regulators in dealing with technology-driven innovations. While Karo and Kattel (2014) discuss the co-evolution of public- and private-sector capabilities in light of technological change, they do not differentiate between the sectors or policy domains.

Consequently, this article brings together concepts of financial innovation, fragility and uncertainty articulated mainly in economics literature and notions of technological capacities and modes of policy-making discussed in public administration and policy studies. References to economics and theories of financial instability provide an important *conceptual starting point* – namely, that innovation-related uncertainty is endogenous to any financial system and, as a result, to the governance thereof. Therefore the main focus of current study deals with capacities of policy actors to deal with such inherent uncertainty. While looking at how various

[2] In addition, a broader notion of financial innovation exists, which is related to the process of economic development and financing of innovative productive activities. A synthesis of Schumpeter's theory of innovation and Minsky's financial fragility hypothesis investigates how uncertainty of any innovative activity translates into related uncertainties in the financial sector, which finances it, thereby identifying a distinct source of financial instability as well as a particular type of uncertainty (Burlamaqui and Kregel 2005).

strains of public-policy literature discuss policy actors, the article aims to empirically show that public-sector organizations can demonstrate organizational dynamics and particular modes of policy-making – e.g. co-creation – as a response to uncertainty of financial innovations and in order to facilitate the development of technological competences. The paper emphasizes that the increasing sophistication of technology is one of the main forces behind such dynamics among financial policy actors. More precisely, the study builds on Woo and Howlett's (2015) assertion that dynamics in financial policy-making are not necessarily contingent on policy change and argues that *policy-making dynamics can also be characterized by changes in organizational forms of governance rather than changes in processes of policy-making only*. Further, such organizational change can be related to the evolution of particular competences on the part of government actors, such as expertise in financial technologies. In the context of this article, co-creation is understood as an active and often proactive relationship between both state and non-state actors who organizationally or individually contribute to the creation or implementation of public policy. While usually in co-creation the relationship between citizens and government is studied (Brandsen and Honingh 2015), we extend the perspective to include also corporate citizens and private, non-profit organizations, as in most cases also citizens are "organized" to some extent.

Literature on financial governance and regulation, especially post-crisis, highlights various aspects of policy design and formulation, and the importance of expert advice. Yet it remains policy-biased, that is, the actual skills, competences of policy actors as well as processes and forms of policy-making remain largely understudied, despite explicit recognition of the relevance thereof (see, for example, Bakir and Woo 2016). The main objective of the paper is to bring concepts of uncertainty and financial innovation into discussion of financial governance by looking at technological competences of policy actors and organizational forms involved in the policy-making process. *Looking at dynamics within organizational structures helps us locate such competences and the role they have in the policy process* as the first step to analyzing their effects. Without dealing with the latter in detail, the article brings forth the notion of technological competences and their relevance to a) incentives actors have to participate in the policy process, and b) organizational forms that exist in financial governance. In line with the growing insistence of scholars to study policy design (Bakir and Woo 2016), the article argues that organizational patterns and their evolution contribute to the understanding of competences of actors. Consequently, due to rapid technological advancements within financial industry, co-creation is increasingly applied in (previously more closed) financial policy communities by regulators to mitigate uncertainty and to maintain or further develop respective technological skills and competences in the public sector. This introduces a new dimension to the incentives to co-create and also puts co-creation into the new sectoral dimension, namely financial governance. This line of argument also expands financial-governance literature by extending the notion of actors' capacities and by introducing an additional, technological (technology-driven) logic thereto.

To exemplify the emergence of co-creation as a new form of organizational dynamics within a policy process in the financial sector, the case of the Monetary Authority of Singapore (MAS) is analyzed. More precisely, the case of the recently established FinTech and Innovation Group (FTIG), which includes the FinTech Innovation Lab, launched by MAS in August 2015, is presented.[3]

[3] Consisting of three divisions, FTIG is responsible for "regulatory policies and development strategies to facilitate the use of technology and innovation, to better manage risks, enhance efficiency, and strengthen competitiveness in the financial sector" while its FinTech Lab "scans the horizon for cutting-edge technologies with potential application to the financial industry and works with the industry and relevant parties to test-bed innovative new solutions" (http://www.mas.gov.sg/About-MAS/Overview/Groups-and-Departments.aspx).

One of the main rationales for launching a collaborative facility was to leverage on the private sector's technological competences in order to better address risks and legal aspects of financial innovations, which would both further facilitate the promotion of the financial sector (developmental policy goals) and feedback into policy-making (regulatory and supervisory policy goals).

The study is based on qualitative exploratory research and traces the evolution of interaction between state regulators and non-government actors within a given policy domain: financial governance and financial regulation in particular. Given its dynamic nature and the emphasis on novel aspects of financial governance – technology-driven innovation and related uncertainty – exploratory case-study methodology (Yin 2003) is employed to gain new insights into how policy actors interact on a national level. The case study relies on both primary and secondary sources: extensive review of archival materials, such as MAS annual reports since the year of

inception onwards (1971-2015), press releases and media records (non-systematic search in major national media archives from the 1970s-1980s based on keywords related to MAS and financial governance), as well as contemporary statements and reports. Secondary sources for empirical data collection consisted of accounts of financial history of Malaya and Singapore.

The article is organized as follows: after having introduced the literature analyzing financial governance, the following section examines theoretical discussions of policy actors and related capacities in co-creation, followed by the empirical part. The article gives a contextual account of how financial governance evolved in independent Singapore (that is, from 1965 onwards), discusses the dynamic relations between state and non-government actors therein and organizational forms thereof. The final section concludes by summarizing empirical findings and listing suggestions for future research.

2. Theoretical background

Changing nature of financial governance

Despite a small consensus in financial-governance literature (e.g. Underhill and Zhang 2008; Underhill 2007; Kregel and Tonveronachi 2014) that a close alliance exists between private and state actors in the financial domain, how financial governance structures are organized is discussed largely in regard to financial architecture (Goodhart 2002, 2007; Sheng 2009), the role of Central Banks (McNamara 2002; Montanaro 2016; Goodhart 2011), and financial bureaucracy (Nee and Opper 2006; Juuse et al. 2018). Nevertheless, such a close alliance or "public-private partnership" nature of financial regulation and supervision – as an essential part of financial governance – has been implicitly reflected in studies of financial history (e.g. Cameron 1961; Cassis 1992, 2006), in literature on International Financial Centers (e.g. Lee and Schmidt-Marwede 1993; Budd 1995), and in more recent studies focusing on socio-political elements of financial policy and governance. Literature on the regulatory state refers to various non-state actors involved in policy-making (Majone 1997), how such relations are becoming increasingly formalized (Levi-Faur 2005) and how international regulatory standards such as Basel Accords explicitly promote cooperation between public and private financial actors (Lütz 2004), but rarely are capacities of actors examined. Further, literature on policy sub-systems incorporates both state and non-state actors (Woo 2015a; Woo and Howlett 2015). However, it does not delineate between the types of actors and subsequent capacities involved in the way(s) actors collaborate. Hence, policy studies tend to highlight the multiplicity of actors – state, non-state, individual, corporate, networked etc. – involved in policy making, but the agency and capacity of these actors have not been well outlined, particularly in the context of financial policies.

Globally, regulatory authority is getting more dispersed with formal rules superseded by informal norms that emerge not from legislation but rather from everyday conduct: power is now more dispersed between state and societal actors (Cohen 2008; Tsingou 2015). While more traditional field-scoping practices exist, OECD (2010) refers to collaborative national practices (both formal and informal) as a recommended approach to financial governance in order to enable better coordination, oversight and control over financial institutions. At the same time, interaction with corporate financial actors varies greatly, and a multitude of mechanisms are usually at work: from strictly top-down and formal (e.g. monetary policy, exchange rate regimes) to more collaborative and formal/informal mixes (e.g. prudential regulation and supervision) to more inclusive practices through direct collaboration with either organized groups (associations) or selected actors. In addition, the dynamic nature of the regulatory process is reflected in the changing organizational forms involved therein: the recently growing formalization of collaborative initiatives.

This brings forth the notion of co-creation in the financial sector. In the private-sector literature co-creation in financial systems has been analyzed from the perspective of marketing and customer loyalty (e.g. Eisingerich and Bell 2006; Auh et al. 2007), while in the context of public sector, co-creation has been previously examined from the perspective of social innovation and direct input into service delivery to citizens. The latter – softer forms of coordination and provision of policy inputs by non-state actors – are entering the financial policy domain as financial supervisors have to draw upon external partners to stay on top of financial innovations. Consequently, given that financial regulatory governance is characterized by a close public-private alliance, co-creation appears as a valuable conceptual tool to "unpack" collaborative practices between the actors – incentives, agency, organizational structures – to assess them critically and to inquire about capacities from a collaborative perspective. As a form of collaborative governance, which is more loosely defined than other dominant theories of the policy process (e.g. advocacy coalition framework, policy subsystems, epistemic communities), and given a variety of applications in public policy and administration studies, co-creation allows for a wider approach by bringing new elements into public-private collaboration in financial governance: to capture the role of technology and uncertainty, which forces regulators and innovators to interact in new ways.

Co-creation: explaining new forms of policy collaboration

Traditional publica dministration literature puts an emphasis on a clear distinction between private and public interests and accountability settings. However, in the previous decades, the new governance research has increased, including a growing significance of "governance-beyond-the-state" (Swyngedouw 2005), "indirect government" or "government by proxy" (Brudney 1990), "collaborative governance" (e.g. Ansell and Gash 2008) and more recently co-production/co-creation (Bovaird 2007). While collaborative governance refers to a broader notion of increasingly interactive governance mechanisms, more narrow concepts of co-creation and co-production[4] refer to the engagement of citizens in the policy-making process (Voorberg et al. 2015). These complex governance mechanisms blur the distinction between public and private sectors in order to enable transformative changes (Joshi and Moore 2004). While the aforementioned approaches can be slightly different from one another (being more or less market-oriented, bureaucratic (expert-based) or collaborative (involvement of autonomous stakeholders) (Künzel 2012; Hartley et al. 2013), they all rely on the idea of interdependence between sectors (e.g. Lecy and Van Slyke 2013, 197) and resource integration (Vargo and Lusch 2004; 2008), meaning that policy outcomes cannot be reached without the direct involvement of the intended target group.

Public sector's motivation to coordinate and to co-create with non-government actors has been connected to both cost efficiency and the need for better quality services (Vangen and Huxham 2003, 61-62) but also with increasing the legitimacy of government (Pestoff 2006).[5] The basic assumption is that without the involvement of private partners it is difficult to reach the desired policy/service outcomes (Bovaird 2007). Typically this is associated with gains from combining resources, capabilities and also shared risks between different sectors (Gazley 2010, 53; Park and Rethemeyer 2014, 351-352; Calanni et al. 2015, 905) to "carry out a public purpose that could not otherwise be accomplished" (Emerson et al. 2012, 2). Co-creation, therefore, relies on the idea of interdependence between sectors (e.g. Lecy and Van Slyke 2013, 197) and resource integration (Vargo and Lusch 2004, 2008).

Similarly, following financial governance logic, which is traditionally somewhat advisory, regulatory authorities can no longer be effective without the ever growing input from the private sector due to substantial changes in financial industry and the role of technology therein. At the same time, academic attention to co-creation has usually involved studies of welfare services, social innovation and citizen participation (e.g. Callahan 2007), and thus, the emergence of co-creative practices in other sectors has received very limited attention. The participatory feedback loop to promote co-creation policies has also started to emerge in other sectors (e.g. in informatics and e-government – see Mergel 2015). Thus, the input of citizens in developing ICT solutions – and hence limiting uncertainties connected to the latter – has entered the topic of co-creation (Lember 2017).[6]

Co-creation is mostly studied from an actor-based approach (Voorberg et al. 2015) discussing both organizational factors (risk-averse/legalistic public-sector culture; attitudes of civil servants (professionalism); incentives; compatibility of the public sector) and citizen-relevant factors (willingness; feeling of ownership; social capital). The organizational capabilities on the citizens' side – also when they participate through non-profit organizations – are usually left unexamined. At the same time, the need to manage relationships in the collaborative governance setting is very important when incentives to collaborate – resources and power – are not equally divided between partners (Ansell and Gash 2008, 555). For collaboration

[4] In the context of this article, the concepts 'co-creation' and 'co-production' are treated as synonymous. Meanwhile, co-production is more relevant to policy areas where public service delivery takes places and end-users are identified (usually citizens) whereas in such broad domains as financial policy there is neither a service nor could end-users be defined with the same clarity, and therefore "co-creation" seems to be a more appropriate term.
[5] Government tries to increase participatory legitimacy when confronted with dissatisfaction with traditional governance methods.
[6] Similarly, experimental policy-making involves methods of dealing with uncertainty faced by policy-makers. Literature on experimental policy is rich and includes various domains. Among them are regulatory experiments including regulatory sandboxes and adaptive regulation (Guihot et al. 2017).

to effectively take place between state and non-state actors several conditions have to be fulfilled (see, for example, Sørensen and Torfing 2016). Among these, state and non-state actors need the capabilities to interact and process information. This is, however, a relatively underdeveloped area of study in the field of co-creation. Usually the assumption is that state actors are in a better position in terms of capabilities (if not knowledge), compared to their non-state counterparts. This might not be the case in financial governance and financial regulation. Hence, other theoretical streams need to be utilized to expand our understanding. For example, literature on policy capacities provides a useful toolkit for assessing policy actors, which are viewed as strategically behaving, since the analysis of such behaviors (micro-perspective) enables a better understanding of what practical governance actually is (Capano et al. 2015, 12).

Literature on policy capacity in the public sector is advanced and often differentiates between the types thereof (e.g. Painter and Pierre 2005 distinguish between state, policy and administrative capacities). Wu et al. (2015, 166) define policy capacity as a set of skills and resources – competences and capabilities – necessary to perform policy functions, and differentiate between individual, organizational and systemic levels. Various non-government actors possess their own capacities, which affect the government's own capacity to perform, that is, "the skills and resources of governments have counterparts in policy-oriented non-governmental organizations and need to exist or be built up if either of these actors is to be effective in their policy roles" (ibid., 167). Howlett (2009, 2015) refers to analytical capacity as the ability of governments to analytically process information, apply research methods and advanced modeling techniques while Hsu (2015) notes varying abilities among governments to do so. When coping with complexity and uncertainties, policy-makers appeal to analytical capacities prevalent in domestic regimes: referring to the Asian Financial Crisis, Woo et al. (2016, 275) observe "low analytical capacity in domestic regimes, given the inability of policy-makers to accurately perceive financial risks and at best, the presence of only moderate operational capacity." In other words, policy-makers should aim for close-to-optimal analytical skills and competences but those are also defined by broader national (regional, supranational) regimes. Meanwhile, uncertainty is inherent in financial activities, and financial systems are characterized by inherent instability or "stability that destabilizes" (Minsky 2008). Therefore operational or analytical capacity of financial policy-makers can never be optimal while the potential to learn in co-creation, especially if co-creation aims to minimize uncertainty, becomes essential to effective policy process. This, in turn, can be reflected in organizational dynamics and potentially results in novel organizational forms through which policy actors interact.

Learning has been an essential part of the policy subsystems approach and coalition framework (Sabatier 1988; Weible et al. 2011; Henry 2011; Montpetit 2011), while Ostrom (2005) claims that learning occurs more easily when opportunities for repeated interaction exist even when contrasting beliefs are present. In other words, "if collaboration is causally prior, then over time networked actors will learn and arrive at consensus in their policy-relevant beliefs" (Henry 2011, 380). Meanwhile, collaboration may take various organizational forms, which, as the article aims to demonstrate, are also non-static and evolve along with dynamic capabilities of policy actors. In existing literature learning is discussed through the prism of scientific information available to policy-makers and supplied by epistemic communities (Haas 2004; King 2005; Marier 2008; also Pahl-Wostl 2009). Yet it contains a constructivist approach, that is, the assumption that science should be "translated" into usable knowledge that, in turn, would be politically feasible, in order for scientific insights to make their way into the policy process. This is also discussed in studies dealing with analytical capacity of government actors (Howlett 2009), but technology-driven innovations represent expert knowledge and can be better categorized as technical capabilities, which regulatory bureaucrats need to comprehend. With the increasing use of financial technologies – described above – the need for soft coordination and strategic partnership with corporate actors increased. In certain areas, such as regulation and supervision, this has been "framed" as co-creation. This gets reflected in new organizational forms established within "conventional" public authorities such as Central Banks, as the case of Monetary Authority of Singapore (MAS) demonstrates.

3. Financial governance in Singapore

Singapore, where the financial sector currently contributes 13.1% of nominal gross value added (Statistics Singapore 2016), has had long-standing aspirations to become one of the International Financial Centers. Financial industry at large has been regarded as one of the national development priorities since the 1970s, and this is explicitly stated in the Monetary Authority Act (1970). Moreover, Singapore's financial system contains a clear "dichotomy", for the demarcation line between foreign (offshore) and domestic financial activities has been long maintained through a set of effective policy measures.

In terms of governance structures, MAS has been the sole regulator, maintaining a reputation of a pro-active and highly competent public agency, thereby reflecting the general tradition of competent national civil service as well as a peculiar practice of rotation among top officials between public and private organizations[7], which (in addition to continuous emphasis on human capital development) contributed to the development of capable and effective bureaucracy in the government. Larger formal consultation mechanisms with corporate actors at the national level have been present since the 1990s, when the Economic Review Committee was established (during the post-Asian Financial Crisis recession) and more recently through the Committee on the Future Economy.[8] Policy-wise, MAS has been actively consulting corporate actors both on formal and informal grounds, and recent studies claim that the corporate sector provides a real policy input, including the possibility to exercise a veto-power (Woo 2015a, 2015b, 2016). Among the most recent organizational innovations within MAS is a FinTech Lab, imitating already existing labs in large commercial banks, recently launched as part of the MAS FinTech and Innovation Group, in order to directly collaborate with financial industry. Among the policy initiatives designed and implemented by the Group are the "regulatory sandbox", which provides temporary flexible regulatory space for testing newly created FinTech solutions; Project Ubin, which aims to explore the viability of distributed ledger technology for interbank payments via multi-phase collaboration between MAS, a blockchain company R3 and a consortium of financial institutions. In addition, MAS is chairing the Payment Council launched in 2017, which

[7] E.g. a formal policy was adopted in the late 1960s when civil servants were seconded to sit on boards of industrial corporations. This was meant as a tool to increase their pay but "the directorship system also had the advantage of giving the top civil servants some experience in industrial management. It is now estimated that about 100 public officers hold directorships on the boards of most Government and DBS-owned companies such as the shipyards, the airlines, and manufacturing industries" (New Nation 23 July 1971). For more recent accounts, see Hamilton-Hart (2002).

[8] https://www.gov.sg/microsites/future-economy/about-us/about-the-future-economy-council.

consists of various financial institutions and representatives of industry associations. The injection of government funds in 2015 through the Financial Sector Technology and Innovation Fund (S$ 225 mln during 2015-2020) was meant to assist the development of FinTech industry and foster such public-private collaboration, which is also reflected in the official rhetoric of acting officials (as well as former MAS top executives) who refer to "policy co-creation" in both the regulation and the promotion of financial sector. These developments make Singapore a somewhat extreme yet rich case study, which altogether provides a valuable opportunity to look closer into new and dynamic ways of organizing national financial governance.

To better understand the empirical context, the section first briefly outlines some of the key historical developments in Singapore's financial sector and the role MAS has played therein; second, it refers to ways of interaction between MAS and corporate actors throughout the years; and finally it looks into the most recent organizational change, that is, the newly created FinTech and Innovation Group. Given the exploratory nature of the case study, historical accounts help better understand capabilities dynamics among both state and corporate actors, as well as evolving organizational structures embedded in the process of governance and policy-making that leads to co-creation.

Overview of financial policies and financial-sector development

Financial policies in Singapore should be viewed in the following context: a city-state with no rural areas; higher standards of living already in the 1950s as compared to the rest of the region (Hicks 1960); prioritized economic growth with no explicit distribution policies attached; emphasis on human-capital development; no explicit political opposition to foreign financial and commercial interests and historical "interconnectedness" between foreign and local banking communities[9]; long presence of foreign banks; and peculiar culture of the governing elite, which comprises the pool of top officials rotating between private, public and quasi-public organizations, such as statutory boards (Hamilton-Hart 2002).

It is from this context that the long-standing commitment of Singapore comes to become a regional financial hub and one of the International Financial Centers, which is reflected in MAS's formal mandate to "foster a sound and reputable financial centre and to promote financial stability" and "to grow Singapore as an internationally competitive financial centre" (MAS Act 1970). To achieve this, Singapore has been maintaining a "dual" financial system "intended to be world-class competitive for offshore transactions yet heavily *dirigiste* domestically" (Walter 1993, 109; see also Giap and Kang 1999). Indeed, foreign banks were encouraged to set up offshore operations[10] through a set of incentives (e.g. concessionary tax rates for a 20-year period; tax exemption for certain financing activities, such as syndicated lending, non-resident securities transactions) and by 1993 the foreign banking sector accounted for 45% of local-currency nonbank customer deposits, 57% of local-currency nonbank customer loans and 73% of local-currency trade financing, thereby contributing to the development of the domestic banking sector – the highest rates in the world (Walter 1993, 94-95). A turn towards liberalization

[9] The then economic advisor, Albert Winsemius (in office 1961-1984) advocated for non-hostility to existing foreign businesses owned by a former colonial power and Goh King Swee, the Deputy Prime Minister (in office 1974-1984), refers to "*the quiet manner in which European business has merged into the political and economic landscapes of Singapore*" and that "*the manner in which European financial and commercial interests have continued their roles from the colonial era to the stage of independence, is surely a remarkable phenomenon*" (Swee 1972, 112-116, emphasis added). This course held true even during the most politically turbulent times of 1960-1963, when despite fierce political disagreements no political party had the abolition of European business on its agenda. For more on colonial banking, see recent collections of historical cases in Bonin and Valério (2015) and Bonin et al. (2016), also Mackenzie (1954), Drake (1969).

[10] Offshore banking is generally characterized by such restrictive measures as inability to raise interest-bearing deposits from residents and certain restrictions on domestic lending.

and recognition of the need to "go regional" followed the first serious recession in 1985-1986 and was reinforced by the consequences of the Asian Financial Crisis (Lai 2013; MAS 2003). To facilitate the regional expansion of domestic financial institutions the government encouraged industry consolidation, and the number of banks was reduced from 10 in 1998 to 5 in 2003 (Tan 2005).

In parallel to this, Singapore has been maintaining non-internationalization of the dollar until the present day; although in 1998 the official non-internationalization policy has been substituted for lending restrictions in local currency, which apply both to resident and non-resident financial institutions. The policy has its rationale in the use of the exchange rate as the principal tool of monetary policy used by MAS[11] (MAS circular*, 20 December 2000*[12]). Despite continuous and gradual liberalization measures, the regulation of domestic institutions continued to be more stringent: in the 2000s domestic banks were subject to greater capital adequacy requirements than foreign ones (MAS 2003), while nowadays MAS keeps capital adequacy ratios for locally incorporated banks at a level that is 2% higher than recommended under Basel III[13].

Value-added created in financial industry is often considered highly policy-elastic, that is, it can be strongly influenced by policy measures (Walter 1993). Singaporean government has been effectively proactive and capable of utilizing various policy measures, both in regulating and promoting the financial sector, and its Central Bank (MAS) has been the single authority responsible for both. In terms of policy design, representatives from industry have been consulted on a continuous basis, while formal consultation was broadened when MAS introduced consultation papers in 1998. Woo (2015b) reports upon interviewing the currently acting MAS Managing Director, Ravi Menon, that almost all new policy issues now go through the process of public consultation. The most recent study concludes that the influence of industry actors on policy-making is substantial (including the possibility of exercising veto power), and both MAS and the private sector can initiate consultations (Woo 2015a, 2015b, 2015c). Apart from consultation papers available through the MAS website, another mode of interaction in a collaborative manner with the industry takes place through Nominating Committees. As stipulated by MAS during another round of liberalization measures in 1999, to strengthen corporate governance, local banks now had to appoint five-member Nominating Committees within their board with members appointed by the board, and subject to MAS approval. The aim of the committee is to ensure that only competent and qualified persons are appointed to the board and to important management positions, while MAS may ask the committee to submit record of its discussion so as to verify that it has tried to find the best person for an appointment (Tan 2005). Among the most recent policy initiatives is the FinTech Lab, launched as part of the FinTech and Innovation Group (FTIG) enabling MAS to tap further into the competences of financial industry. In a few formal talks and commentaries surrounding the initiative, MAS officials referred to the rationale of the new approach to legal and technological aspects of finance within the overall reference to the "Smart Financial Center", as follows from MAS Managing Director's keynote address at the Global Technology Law Conference in June 2015.[14]

[11] Despite a clear demarcation between dealings in foreign and domestic currency, deposits were freely convertible between the two, and therefore capital could be mobilized through arbitrage; hence domestic interest rates were largely determined by both foreign rates and expectations of future strength of the Singapore dollar (Giap and Kang 1999).
[12] http://www.mas.gov.sg/regulations-and-financial-stability/regulations-guidance-and-licensing/commercial-banks/circulars/2000/internationalisation-of-the-singapore-dollar.aspx.
[13] http://www.mas.gov.sg/news-and-publications/media-releases/2011/mas-strengthens-capital-requirements-for-singapore-incorporated-banks.aspx
[14] http://www.mas.gov.sg/news-and-publications/speeches-and-monetary-policy-statements/speeches/2015/a-smart-financial-centre.aspx.

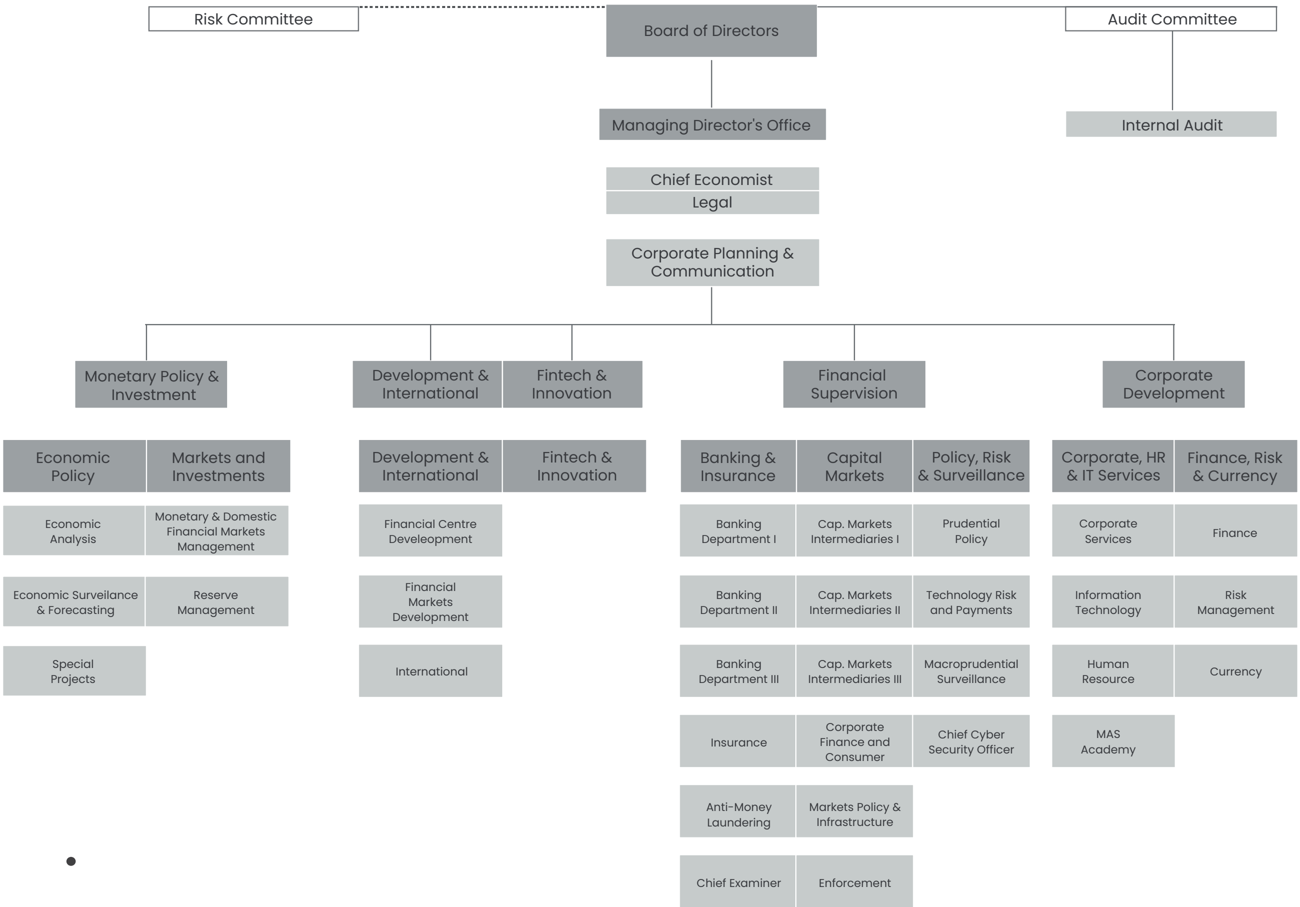
MAS as the sole regulator and promoter of the financial sector

MAS has never been independent from the government and in its own turn has been in charge of the developmental agenda in the form of providing various incentives to develop the financial sector. Yet, with its current 25 departments and one more additional Group officially working since May 2016 (FinTech and Innovation), it is a *de facto* Central Bank by any standard. Besides incentives to attract foreign banks and encourage them to set offshore operating centers in Singapore, MAS was proactive in identifying niche markets as a source of new competitive advantages. This strategic approach required more collaborative relations with the banking community – both domestic and foreign – in order to stay responsive towards industry needs

and changing the economic environment (Woo 2016). Quoting both acting and former MAS officers, Woo (2015a) refers to the official rhetoric of "policy co-creation" to emphasize a distinctly strategic and proactive way of effective engagement with the corporate sector in regulation, supervision and financial-sector promotion.

Currently, the overarching organization structure of MAS is as follows: the three Deputy Managing Directors are responsible for: 1) Financial Supervision; 2) Corporate Development; and 3) Monetary Policy, Development, and FinTech and Innovation. As Figure 1 illustrates, the following groups: Economic Policy, Markets and Investment; Development and International; and FinTech and Innovation report to the same Deputy Director. The supervision function is carried out by separate departments operating in accordance with different acts (e.g. Banking Act, Finance Companies Act, Securities Industry Act, Futures Trading Act), thereby resembling a multiple-agency system, as argued by Walter (1993, 107), while housing all the "agencies" in MAS ensures better co-ordination and allows supervision to be conducted on a consolidated basis more effectively while keeping up with changes in the financial market structure. Given the long history of effective coordination and regulatory practice of MAS, a new collaborative facility – Fin Tech Group and Fin Tech Lab – serves as an extension of existing competences of MAS, which has simultaneously performed both regulatory and promotion functions in regard to domestic financial industry.

Figure 1. Organizational structure of MAS (as of 2018)



Source: *http://www.mas.gov.sg/About-MAS/Overview/Organisation-Chart.aspx*

As becomes evident from earlier annual reports (1970s-1980s), various consultation initiatives were implemented through surveys, committees and working groups with financial industry actors, whenever specific guidelines, new products or market niche segments were to be identified and set up.[15] With domestic financial industry becoming more mature, regulators' collaborative efforts have been moving towards even greater responsiveness. Despite co-creation being the official rhetoric, which might carry a certain "promotional" connotation, the most recent FinTech and Innovation Group is explicitly meant for direct collaboration with the industry. At the same time, MAS continues to attract new private FinTech ventures through "conventional" incentive measures: currently there are 7 different types of grants offered by MAS, National Research Foundation, IMDA and SPRING agencies.

From a supervisory perspective, MAS relies on financial institutions and their boards of directors to demonstrate ownership of decisions. At the end of the 1990s MAS adopted a similar approach in its "disclosure-based" framework, which moved away from an institutional focus towards systemic supervision: to encourage innovation and to facilitate the development of a more sophisticated body of consumers (MAS 2004, 14), which also reflects the reformulation of financial citizenship triggered by increasing financialization (Lai and Tan 2015).

[15] E.g. Guide to Conduct and Market Practice in Foreign Exchange and Currency Deposit Transactions (1978/1979); development of an automated cheque clearing system for Singapore (1979); a survey to assess the interest in a financial futures market in Singapore and a working group performing feasibility studies (1981) (MAS annual reports, various years).

MAS FinTech and Innovation Office

A series of initiatives was announced in Summer 2015 signifying Singapore's public commitment to working on financial innovation jointly with the private sector:

the newly launched FinTech and Innovation Group included three sub-units:

- Payments and Technology Solutions Office (formulates regulatory policies and develops strategies for simple, swift and secure payments and other technology solutions for financial services);
- Technology Infrastructure Office (responsible for regulatory policies and strategies for developing safe and efficient technology-enabled infrastructures for the financial sector, in areas such as cloud computing, big data, and distributed ledgers);
- Technology Innovation Lab (scans the horizon for cutting-edge technologies with potential application to the financial industry and work with the industry and relevant parties to test-bed innovative new solutions).[16]

Financial Sector Technology and Innovation Fund of $225 mln (for the next 5 years) was set up by MAS to finance strategic initiatives with industry while further developing Singapore into a Smart Financial Center.[17]

These measures were part of a broader Smart Nation initiative[18] launched in 2014 where digitization of finance was named as one of the elements of digital society and economy (Infocomm Media Development Authority 2018; Ministry of Communication and Information 2018) which Singapore should strive to achieve. Recently, the Smart Nation and Digital Government Office was formed, and together with the Government Technology Agency (a former statutory body under the Ministry of Communications) the Smart Nation and Digital Government Group was placed

under the Prime Minister's Office in 2017. Therefore in the context of "cashless society" and "smart financial center" MAS has been working in close coordination with the above-mentioned agencies.

The new FinTech Office was designed to serve as a one-stop platform for all FinTech-related activities, including the promotion of Singapore as the regional FinTech hub. The office is co-led by the MAS Chief FinTech Officer, a former corporate executive, and a CEO of newly established agency SG-Innovate[19], a former deputy chairman of Singapore's Infocomm Development Authority[20] (IDA). Other members of the Office include representatives of MAS, Economic Development Board (EDB), IMDA, Infocomm Investments Pte Ltd (an investment arm of IMDA), National Research Foundation and SPRING agency. Meanwhile, the Fund targets start-up and tech companies with projects aiming to build industry-wide infrastructure, which are supported by financial industry. Non-financial institutions can also apply, although their eligibility is assessed on a case-by-case basis by MAS.

The first policy output of the MAS FinTech Office were the "FinTech regulatory sandbox" guidelines, issued in November 2016 after a round of public consultation. Following recommendations of the

[16] http://www.mas.gov.sg/News-and-Publications/Media-Releases/2015/MAS-sets-up-new-FinTech-and-Innovation-Group.aspx.
[17] http://www.mas.gov.sg/news-and-publications/speeches-and-monetary-policy-statements/speeches/2015/a-smart-financial-centre.aspx.
[18] https://www.smartnation.sg/why-Smart-Nation/pillars-of-smart-nation.
[19] A new agency established as part of the 2016 budget that operates under the National Research Foundation, and aims at bringing entrepreneurs, industry leaders, venture capitalists and researchers together to help build companies in the three key sectors: finance, energy and healthcare. Within partnership with MAS, its first acting partner, SG-Innovate is tasked with advising the Authority on FinTech funding.
[20] IDA has been recently succeeded by Infocomm and Media Development Authority (IMDA).

Financial Center Advisory Panel[21] and emulating an initiative launched by the British Financial Conduct Authority together with Project Innovate in 2015, the MAS FinTech Regulatory Sandbox allows FinTech solutions to be tested after sufficient laboratory tests within a limited customer base, following a limited timeframe and given lighter legal and regulatory requirements valid during the specified timeframe – all subject to formal agreement with MAS. The regulatory sandbox is displayed and implemented by an applicant company and operates in the production environment – where actual products and services are delivered to customers. All stages of the regulatory sandbox, including the exit stage, are closely monitored and assessed by MAS while upon additional request, the sandbox timeline can be extended.

The regulatory sandbox aims to encourage firms and extend their willingness to further develop FinTech solutions. Following the current supervisory approach outlined above, financial institutions are free to launch new ideas without first seeking MAS's approval, as long as they are satisfied with their own due diligence, since the concept "time to market" comes into play, which is crucial to competition. MAS puts an explicit emphasis on "*innovation through co-creation*":

> … co-creation is particularly relevant for developing rules or guidance on new technologies whose benefits and risks are not fully known and where a more flexible approach may be desired. A further possibility in co-creation might be MAS and the industry working together to develop common technology infrastructure that meets regulatory requirements. The aim is to clarify and address issues and uncertainties upfront during the course of development (Ravi Menon, June 2015).[22]

4. Discussion

One of the conclusions of systematic literature review on policy co-creation and co-production was related to the need for more empirical studies "to find out to what extent the policy field in which co-creation is implemented is influential with respect to the type and effects of these processes" (Voorberg et al. 2015, 18). In its attempt to bring the concept of co-creation to the domain of financial regulation, the current study reviewed developments in Singapore's financial policies and governance and argued that co-creative practices resulted in the emergence of organizational dynamics and new organizational forms, which should be regarded as an integral part of the policy process. The study is based on theoretical premises that for informed and evidence-based policy-making there is a growing need to conceptualize competences of public sector, especially when technical expertise is essential to the effectiveness of policies and to the very understanding of how the regulated sector works, as in the case of the financial sector, which at times invests in ICT on par with national governments.[23]

The study relied on historical-empirical material in order to demonstrate that collaborative practices in financial governance are not entirely new, but they have been increasingly

[21] Launched in July 2015 to advise MAS on recent and future developments in finance, the Panel consists of 26 executives from financial industry and runs biannual meetings chaired by MAS's Managing Director.
[22] http://www.mas.gov.sg/news-and-publications/speeches-and-monetary-policy-statements/speeches/2015/a-smart-financial-centre.aspx.
[23] The Development Bank of Singapore alone now spends some S$600 million on technology every year as compared with S$2.8 billion that Singapore's government spent on ICT tenders during the fiscal year 2017 (https://www.imda.gov.sg/infocomm-and-media-news/buzz-central/2016/6/investing-in-ict-for-smart-nation-growth).

formalized and manifested in novel organizational forms. The Monetary Authority of Singapore has been an effective regulator and promoter of domestic financial industry. Despite the general notion of financial regulation being rather reactive (Anheier and Fliegauf 2013), MAS has been serving "developmental" goals by proactively implementing policies conducive to growth: maintaining the "dual" financial system that effectively differentiates between domestic and off-shore sub-sectors, thereby making the national financial system more resilient to external shocks; effectively maintaining the non-internationalization of domestic currency despite a lack of capital controls and a small open economy, thereby keeping incentives for currency speculation at bay; initiating industry restructuring (consolidation in early 2000s) in order to encourage the internationalization of domestic financial firms. The prevailing regulatory culture among financial bureaucrats has been also described as "cooperative, less confrontational and antagonistic", which should not be equated with "regulatory capture" but rather related to trust and confidence (Lin 2009, 303). As the industry matures and financial institutions, both domestic and foreign, start competing closer to the technological frontier (FinTech), regulators are challenged by the sophistication and speed of financial innovations and related uncertainty. Recognizing this, MAS shifted from prescriptive merit-based supervision towards a disclosure-based principle at the end of the 1990s (Maysami and Tan 2003). From the governance perspective, however, scholars and practitioners emphasize the general conflict between existing rigid top-down bureaucracies and modern private financial organizations "that must respond quickly and flexibly to multidimensional changes in markets and social needs" (Sheng 2009, 405).

In recent years a growing number of FinTech Labs has been launched by commercial financial institutions worldwide, but it is in Singapore that a similar organization has been recently established within the Central Bank. Strategic collaboration between MAS and financial industry has been evolving since the 1970s but it is becoming increasingly direct and formalized through collaborative facilities such as FinTech Lab, "regulatory sandbox", and the recently inaugurated Payment Council. For public authorities a more collaborative approach provides an opportunity to leverage on corporate sector's knowledge and expertise and potentially speed up the process of intervention, should such a need occur in case of a systemic risk. One may further suggest that by attracting foreign financial institutions MAS would tap into the pool of global financial technological expertise – and the dynamic capabilities it presents – more effectively and at lower costs. Indeed, such an aim is explicitly stated in MAS's response to the Parliamentary question regarding limited knowledge and skills related to digital finance (*6 February 2018*).[24] Following the capabilities approach, corporate actors with the greatest resources and expertise will be probably more active and more preferable as partners, which may raise concerns over which interests get best representation, which, in turn, is directly related to a broader national socio-economic agenda. There is also a delicate balance between nurturing innovative competition and ensuring financial stability (Cainey 2014), and although Singaporean financial bureaucracy has been known for being business-oriented, highly proactive and remarkably effective, to what extent MAS is capable to collaboratively shape brand new business models, products and technological solutions while keeping up with related risk assessment and technological sophistication remains to be seen.

[24] http://www.mas.gov.sg/News-and-Publications/Parliamentary-Replies/2018/Reply-to-Parliamentary-Question-on-talent-and-skills-in-the-financial-sector.aspx.

Meanwhile, increasingly formalized collaborative facilities appearing within financial-governance institutions, as the case of MAS suggests, represent *new organizational forms that become part of the dynamics within a policy process* through enhancing input from (selected) non-government actors and transforming a feedback mechanism into co-creation. Such organizational dynamics, however, have not received relevant attention in scholarly literature, which tends to emphasize either policy change or policy dynamics, i.e. to remain "policy-biased". Yet organizational dynamics, as a response to technological change, should be viewed as part of policy design studies because organizational forms reflect either existing competences or the need to develop new ones, as has been argued in the case of dealing with the uncertainty of financial technologies. In other words, despite the exploratory nature of the study, it contains an explanatory element: new forms of (closer) interaction emerge due to technology-driven complexity. The article further argues that by combining theoretical insights from literature on collaborative governance and co-creation, policy capacity, and by emphasizing the notion of technological capabilities, it would be possible to move further towards unpacking the constraints experienced by local bureaucracies while dealing with global finance, as was problematized by Sheng (2009). Moreover, by introducing the notion of technical capabilities – as complementary to analytical and administrative capacities – into the general discussion on financial regulation and supervision, the article suggests that putting policy design on the research agenda (Bakir and Woo 2016) implies a more deliberate approach to technological skills and competences of policy actors. Accordingly, avenues for future research may be outlined as follows:

- Further research on co-creation initiatives involving corporate actors with a well-established knowledge base (esp. in the financial sector and other sectors where governments are confronted with escalating technological change);
- Additional empirical studies on the engagement with non-government actors in financial policy-making, with specific reference to the issues of technology and the regulation thereof, including particular ways of interaction / co-creation and operational routines;
- Empirical research on modes and mechanisms of industry consultation in other international financial centers with a special focus on bureaucratic capabilities to perform and maintain such policy dialogues;
- Further empirical work, especially through interviewing public regulatory authorities and private actors, would be an important step towards process-tracing collaborative practices and pointing to more defined forms and outcomes of such practices; more rigorous empirical analysis would also make it possible to develop more narrowly defined conceptual frameworks within a wider notion of "co-creation" applied in the current study;
- A broader discussion of capabilities of financial bureaucracy (e.g. Nee and Opper 2009) would benefit scholarship on public administration, especially in regard to development studies.

To conclude, the article has highlighted that through outside pressure – dynamic technological change in the financial sector – even more traditional policy communities have opened up and embraced co-creation as the means to draw in the expertise and knowledge needed to fulfill core policy tasks. However, due to the needed capabilities to participate in this collaboration, there are high barriers to entry within these practices. Consequently, the extent of the influence and power of corporate actors in this collaboration should be analyzed in greater detail.

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