ธนาคารแห่งประเทศไทย

การสัมมนาวิชาการธนาคารแห่งประเทศไทย : ๒๔ กันยายน ๒๕๕๕

หลักการและบทบาทของธนาคารกลาง

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ความเห็นในบทความนี้เป็นของผู้เขียน
ไม่จำเป็นต้องสะท้อนท่าทีเชิงนโยบายของธนาคารแห่งประเทศไทย

บทคัดย่อ

นับตั้งแต่วิกฤตเศรษฐกิจการเงินในปี 2550 รวมทั้งวิกฤตหนี้สาธารณะในยุโรปที่ยังคงยืดเยื้อมาจนถึงปัจจุบัน คงไม่มีใครปฏิเสธได้ว่าธนาคารกลางในประเทศต่างๆ เข้ามามีบทบาทสำคัญในการแก้ไขปัญหาวิกฤตเศรษฐกิจในครั้งนี้อย่างเห็นได้ชัด ไม่ว่าจะเป็นประเทศเศรษฐกิจที่พัฒนาแล้ว ทั้งธนาคารกลางสหรัฐฯ และธนาคารกลางยุโรป ต่างออกมาตรการเพื่อแก้ไขปัญหา กระตุ้นเศรษฐกิจ ลดดอกเบี้ยและอัดฉีดสภาพคล่องในระบบการเงินมากอย่างไม่เคยมีมาก่อน ในขณะเดียวกันในประเทศเศรษฐกิจเกิดใหม่ (Emerging economies) ธนาคารกลางต่างๆ รวมถึงธนาคารแห่งประเทศไทย นอกจากจะต้องดูแลเสถียรภาพทางด้านราคาอันเป็นเป้าหมายหลักของธนาคารกลางแล้ว ยังต้องดำเนินมาตรการมากเป็นพิเศษเพื่อป้องกัน หรือลดผลกระทบจากวิกฤตดังกล่าว ไม่ว่าจะเป็นบริหารจัดการเงินทุนเคลื่อนย้าย การรักษาเสถียรภาพอัตราแลกเปลี่ยน ตลอดจนเสถียรภาพของระบบการเงินโดยรวม

ผลพวงจากวิกฤตเศรษฐกิจการเงินโลก ทำให้หลายฝ่ายกลับมาให้ความสนใจกับคำถามพื้นฐาน อาทิ บทบาทหน้าที่ของธนาคารกลาง มีขอบเขตที่เหมาะสมแค่ไหน พันธกิจดั้งเดิมยังใช้ได้อยู่หรือไม่ และธนาคารกลางควรมีอิสระเพียงใด เพราะเหตุใด เป็นต้น

บทความนี้ศึกษาตั้งแต่จุดกำเนิดธนาคารกลางในบริบทสากล โดยเริ่มจากเหตุผลและความจำเป็นของการมีธนาคารกลางในระบบเศรษฐกิจ แล้วไล่เรียงวิวัฒนาการของบทบาทหน้าที่จากอดีตจนถึงปัจจุบัน ซึ่งแต่ละบทบาทล้วนมีเหตุผลทางเศรษฐศาสตร์อยู่เบื้องหลังทั้งสิ้น อันจะทำให้สามารถตอบคำถามสำคัญ ๆ ที่หลายคนสงสัย และสังคมสามารถคาดหวังอะไรได้จากธนาคารกลางยุคใหม่ นอกจากนั้น บทความยังศึกษาถึงหลักการเชิงสถาบันที่ธนาคารกลางต่างๆ รวมถึงธนาคารแห่งประเทศไทยจำเป็นต้องมี เพื่อให้สามารถบรรลุเป้าหมายสำคัญเพื่อประโยชน์ของเศรษฐกิจชาติได้

*คณะผู้วิจัยขอขอบคุณ คุณสุชาดา กิระกุล รองผู้ว่าการ ด้านเสถียรภาพการเงิน คุณไพบูลย์ กิตติศรีกังวาน ผู้ช่วยผู้ว่าการ สายนโยบายการเงิน คุณเมธี สุภาพงษ์ ผู้อำนวยการอาวุโส ฝ่ายนโยบายเศรษฐกิจการเงิน คุณจันทวรรณ สุจริตกุล ผู้อำนวยการอาวุโส ฝ่ายเศรษฐกิจระหว่างประเทศ ดร. ปฤษันต์ จันทน์หอม ผู้อำนวยการ ฝ่ายวิจัยเศรษฐกิจ ตลอดจนผู้บริหารและเจ้าหน้าที่ในสายนโยบายการเงินและสายตลาดการเงิน ธนาคารแห่งประเทศไทย สำหรับข้อคิดเห็นและคำแนะนำที่เป็นประโยชน์อย่างยิ่ง และขอขอบคุณ คุณจิราภรณ์ ศิริธร ผู้ชำนาญการอาวุโส หอสมุดจดหมายเหตุและพิพิธภัณฑ์ และเจ้าหน้าที่ห้องสมุดธนาคารแห่งประเทศไทย ทุกท่านที่ให้ความอนุเคราะห์ข้อมูลและเอกสารอ้างอิงเป็นอย่างดี หากมีข้อผิดพลาดประการใดคณะผู้วิจัยขอน้อมรับไว้ ณ ที่นี้

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Economic Rationales for Central Banking: Historical Evolution, Policy Space, Institutional Integrity, and Paradigm Challenges

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Abstract

The late-2000s global financial crisis saw increased public profiles *and* balance sheets of both the US and European central banks, their combined series of financial rescue measures in effect pushing the envelope of central banking *modus operandi*. And in general, somewhat anecdotally amongst non-crisis Asia-Pacific/emerging economies, central banks are under increased pressure to pursue growth agenda, or at least being publicly called to task as to whether strict inflation regime is *all that* necessary. All the while, orthodox economics appear to be bursting at the seams, as the world witnesses extreme financial-capital market events increasingly becoming the 'new normal', globalised banking system portending knife-edged stability dynamics consistent with high degree of epidemic, network-like systemic interconnectivities, and global catastrophe phenomena reflecting energy/ecological/environmental imbalances more and more frequently materialising as economic disequilibria. Taken together, it is only becoming more difficult to reconcile historical evolution of central banks (the institutions) and central banking (the mandate) with ever mounting stabilisation policy demands and global 'mega-trend' challenges over the next decades.

This essay details our positive and normative analysis and posits our conceptual arguments concerning the very essence of central banks (the institutions) and central banking (the discipline).

We begin with *Historical Evolution*, from the genesis of early 'proto' central banks to the emergence of modern consensus on central banking. Stylised facts and conceptual schemas drawn from that exercise then enables us to formulate the notion of *Policy Space* as a generalization of central bank role and responsibility. We then employ economic rationales to argue for and advocate key elements and principles in terms of *Institutional Integrity* as an imperative foundation for the pursuit of policy goals. The emerging evolutionary perspective also compels us to postulate a number of *Paradigm Challenges* facing current and future generations of central bankers.

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Contents

Economic Rationales for Central Banking

Section 1: Introduction

Central Banking is first and foremost a *discipline*[1], one which quintessentially embodies the art and science of (i) monetary foundation, (ii) economic stabilisation, and (iii) financial regulation. ***Central Bank***, the *institution*, is the realisation of central banking as a policy body, hence a bureaucratically institutionalised implement charged with certain policy mandates, endowed with certain policy instruments, and bounded to certain policy practices.

We contend that central banks once again[2] find themselves at a crossroad, or crossroads, institutionally as well as methodologically. The late-2000s global financial crisis, having erupted as the *US Subprime Mortgage Crisis*, then evolved into the *Global Financial Crisis*, and since transmuted into the *European Sovereign Debt Crisis*, unprecedentedly increased the public *profiles*, along with the *balance sheets*, of the Fed (US Federal Reserve System) and the ECB (European Central Bank), both categorically accosted for letting bubbles form, then burst, right under their watch, yet all the same entrusted with getting the world economy out of the strife. In quick succession, these powerhouse central banks were compelled to initiate and broker a series of financial rescue measures that many saw as pushing the envelope of central banking policy conduct. But this essay isn't about them.

In the meantime, central banks away from crisis epicentres, particularly those of Asian-Pacific emerging economies---whose push to overcome the so-called 'middle-income trap' risks being stalled by this global financial meltdown episode---are increasingly (and increasingly publicly) pressured to assume a more active role in promoting economic growth outright, much to the disquiet amongst proponents of 'pure' inflation targeting and macroprudential stability, who see the same-old 'growth-will-cure-all' trap being set anon.

All the whilst, orthodox economics seems to be bursting at the seams, as academics, professionals, and policymakers witness 'abnormal' capital market events morphed into the 'new normal', global environmental, ecological and energy imbalances manifested as *economic* disequilibria, in other words, *non-economic* problems with destabilising *economic* consequences, requiring *economic* policy responses. How can we reconcile the historical

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[1] The very word 'discipline' connotes two senses of meaning: one negative (as in the discipline to discharge one's duty whilst *not* abusing one's power and privilege) and one positive (as in the regimen and core knowledge necessary *for* a particular vocation). Here we intend to convey both, perhaps with slight emphasis on the positive narrative.

[2] 'Crossroads' are nothing new to central banks. One could also make the case that central banking concepts and practices got refined over the years precisely through such crossroads.

evolution of central banks and central banking with the growing policy demands concomitant with global 'mega-trend' challenges certain to transpire over the next decades?

Thus we are tasked with an intellectual exercise in 'institutional soul searching', a kind of healthy, self reflection that any and all public policy-sector institutions ought to undergo every so often, with or without crisis/external provocation of any origin. Here are our self probing questions: What is a central bank (what is 'central' about it)? What is 'central' to central banking (what roles central banks play and by which principles they abide)? Why are some policy tasks critical (to the functioning of a modern economy and welfare of all economic participants)? And why is it good and proper that the civic society at large entrusts the central bank with such responsibilities (and not, say, leave it completely up to unhindered market mechanisms)? How has the concept of ***centrality***, of being of 'central importance' or 'centre of a network', vis-à-vis a system of banking institutions evolved over the years?

By starting from some very basic questions regarding the ***Economic Rationales for Central Banking***, it is hoped that the perspectives on offer in this essay will complement the existing body of central banking literature **[Blinder (1999)**, **Capie, *et al*. (1994)**, **Cukierman (1996)**, **Davies & Green (2010)**, **Fry, Goodhart, Almeida (1996)**, **Goodhart (1987)**, **Mishkin, (2000)**, **Morgan, (2008)**, and **Ugolini (2011)**, among others---together with the classic triple of **Bagehot (1873)**, **Baring (1797)**, and **Thornton (1802)]**, the bulk of which addresses more specific topical areas such as, *inter alia*, history of national central banks, monetary economics, regulatory economics, monetary policy transmission mechanism, fiscal-monetary coordination, banking regulation/deregulation, central bank independence vs. fiscal dominance, and central bank governance (transparency and accountability). In what follows we shall be contemplating:[3]

On the genesis of central banks and the evolution of central banking – How did central *banks* come into existence in the first place? What did the very concept of central *banking* mean early on? And how has the meaning evolved over the years? What was 'central' about entities that evolved into central banks? Were there many scholarly documented economic rationales for legitimising a central, quasi-public institution as *the* bank for *all other* banks? Are the same economic rationales and modalities governing early central banking operations still valid today? **[Section 2: Historical Evolution]**

Raison d'être, on the fundamental definition and the essence of purpose – What is central *to* central banking, the discipline, hence the reason for being, for central banks, the institution? What are not central to central banking, though nonetheless *congruent* to the

[3] Admittedly we shall not answer them all to a satisfactory degree. But these are the perspective questions that motivate our quest, and we invite readers to join in pursuit.

effective and efficient functioning of central banks? What are *strictly forbidden* areas for central banks, and likewise, areas that those other than central banks must not interfere in the conduct of the affair? In a larger sense, how do we define the ***central banking policy space***? For instance, on what grounds, and how, *as per* what multi-criteria decision framework, could and should national growth-development agenda be internalised as part of the central bank's policy portfolio? Is there such a thing as a 'standard model' of central banking? And in some detail what are the main economic rationales vis-à-vis the 'twin' core mandates of ***monetary stability*** and ***financial stability***? **[Section 3: Policy Space]**

On the foundational prerequisites for effective policy conduct – What is ***central bank independence*** and why? What is the difference between formal, *de jure* independence and informal, *de facto* independence? Why and how is central bank independence predicated upon a commensurate degree of ***transparency*** of policy decisions and ***accountability*** to policy actions? In an ever-increasingly politicised operating environment, what do central banks need to equip themselves with in terms of social-political capitals? Is it one of the central bank's defining characters to mount antithetical counterpoints to prevailing political-social-economic trends? **[Section 4: Institutional Integrity]**

On the (shifting) nature of the economic/policy problem – Has the emphasis (rightly or wrongly) shifted from *ex ante* stability enhancement and crisis prevention to servicing system surveillance and providing essentially *ex post* crisis solution? What makes for an effective central bank 'tradition' and what makes for an ideal ***central banker*** 'personality'? Is it the *will* "to take away the punch bowl", or the *judgment* as to exactly *when* "just as the party gets going" is, that matters most on the job (or the latter the necessary prerequisite to which the former furnishes the sufficient condition)? Has mainstream economic equilibrium paradigm (itself admittedly a *useful* fiction) been proven to fail, hence no longer as useful (even as a fiction) to policymakers? Has mainstream economic paradigm reached its limit, and in what way may ***heterodox economics*** come into play, hence take up the slacks? In the world of globalised banking networks, regulatory standards, supranational entities, and multinational enterprises, is the very concept of national (domestic) macroeconomic policy/programme no longer tenable? What does banking '***centrality***' really mean these days? Are central banks still 'central'? **[Section 5: Paradigm Challenges]**

Our game plan is to begin in at the very beginning. Yes, central banks are at crossroads, just as they were many times over in the past. The purpose of **Section 2: Historical Evolution** is not to pursue herein a comprehensive historical treatise for its own sake, but rather so we can glean from historical occurrences *key elements for and evidences of* the underlying 'central banking' themes, occasionally 'stylised facts' or 'anecdotal

supports'. Only by (re)examining the past of central banks *institution*, would we stand to reason and draw meaningful conclusions as to what central banking *discipline* should be all about.

In **Section 3: Policy Space**, we first introduce our conceptual generalisation of the 'role and responsibility' identification, which will be more useful than a mere list of "yes/no" (this and that *is* or *isn't* part and parcel of central banking). This conceptual framework (i) offers a template for 'mapping' out where various policy areas are in the hierarchy of central banking 'mandate', as well as dictates that (ii) central banks have some unique 'capacity advantage' with respect to some policy areas and not others, (iii) difficult, long-term policymaking requires some degree of 'manoeuvre room', and (iv) how policy levers should be exercised, indeed how much controllability there is to begin with, will depend critically on the financial-monetary-economic 'control dynamics' at work. In other words, analysing the central banking policy space should indicate to us *what* policy areas go *where*, *why* central banks take precedence over such and such policy areas, *how much* time and space are central banks afforded vis-à-vis policy execution, and exactly *how*.

This is followed by **Section 4: Institutional Integrity** outlining the necessary, though sadly not always sufficient, conditions for effective central banking, hence fundamental institutional principles, notably central bank independence, transparency and accountability, by which central bankers discharge their duty and navigate within said policy space effectively, efficiently if possible.

Finally, recalling from history how institutionalised role and responsibility, along with a set of concomitant requisites (technical, knowledge and human resources, etc.) are in a constant state flux, we surmise in **Section 5: Paradigm Challenges** the sort of strategic thinking that today's central bankers must address in order to remain relevant vis-à-vis policy space and credible vis-à-vis institutional integrity well into the future, befitting and benefiting future generations of central bankers.

Section 2: Historical Evolution

Central banks have become such a ubiquitous institution, entrenched and deeply interwoven within our financial-economic fabric, so much so that it would seem implausible that there was a time in the *not so distant* past when the very need for and existence of the 'central' *bank* as such was a matter of debate[4], or that, going yet further back, the progenitors of many of today's central banks embodied the pursuit of goals seemingly so diametrically opposed to what we hold today as good and proper.

This section traces the origin and evolution of central banks, the institution, and central banking, the discipline. Again, the aim is not to pursue a historical treatise for its own sake but rather the purpose is locate the roots, the conceptual underpinnings at the heart, of formalised *economic rationales* for central banking. For a general discussions on the history of central banks and central banking, see, for example, **Bordo (2007)**, **Goodhart (1988)**, **Pringle (2001)**, and **Singleton (2010)**.

Evolution of Central Banking in Four Epochs

Authors of course vary.[5] Here we shall divide the evolution of central banking into four conceptually distinct (but temporally somewhat blurred) epochs thus:

- **(A)** the '**proto**' or progenitor epoch – *somewhere from 15th century Venice to pre-industrialisation Europe* – where our ancestral roots were neither public offices nor given dominion over issues of (bank) notes;
- **(B)** the '**functional**' epoch – *industrialisation era, i.e. 1750s to 1850s, or thereabout, as typified by the writing of Sir Francis Baring, Henry Thornton, and Walter Bagehot* – during which the central bank's role as the so-called ***Lender of Last Resort (LoLR)*** took form, and fairly comprehensive monopoly over note issue got established;
- **(C)** the '**emergence**' as policy body or ***policy-sector institution*** – *from mid 19th century to mid 20th century* – whereby functional commitments of earlier eras, culminating in complete monopoly over note issue, naturally posited central banks as the very instrument of public (economic) policy and (monetary-financial) stability

[4] We are referring to the so-called ***free-banking*** debate. See, for example, **Smith (1936)**.

[5] **Capie, *et al.* (1994)**, for example, divided central bank history according to "macro-policy objectives" into five eras: "Development in Europe" (1668-1873), "Consolidation under the gold standard" (1873-1914), "The (mis)management of disturbances" (1914-1945)", "Post-war success: Keynes and/or Bretton Woods?" (1945-1971), and "The inflationary upsurge and the monetary counter-reaction" (1971-1994).

mandates, though not yet correspondingly fortified with such formal institutional mechanisms as central bank independence law; and

(D) the modern '**synthesis**' – *later half of the 20th century all the way up to the present and onward* – where (we think) we now know how theoretical and empirical pieces of knowledge, lessons learned, institutional reforms, paradigm convergences, and so on, are coming together, i.e. in the sense that, together and wholly synthesised, they are necessary (probably) and sufficient (optimistically) to see us through stability and prosperity challenges with regards to our continually innovative (and yet volatile), technologically driven (and yet dependent), systemically interconnected (and yet fragile) global economy.

Respectively, these 4 epochs can be said to have *created* central banks, *given* them unique places in the increasingly structured economies, *called upon* their natural affinity as publicly accountable agents to effect desired social objectives, and now *arrived* at some kind of consensus as to what central banks ought to do and ought not to do, how to/not to, under this/that operating environment and social-political exigency.

2.1 'Proto' Central Banks

Why 'Central Bank'? What is in the Name?

Why would one find, at the very centre of each country's national economic policymaking, an entity by the designation 'central bank'?[6] Why not instead some kind of a 'Ministry of Economics' (no doubt divided internally into two *counterweights*: Fiscal Policy Department and Monetary Policy Department) or 'Ministry of Monetary Policy and Banking Affairs', as one would have a 'Ministry of Foreign Affairs' to take care of foreign relations, a 'Ministry of Labour' to take care of labour policies, and so on?

A satisfactory account would come when we come to the 3rd epoch of central bank evolution. Here an even more naïve rhetoric is posed: why is this thing, whatever it does, *called* 'central bank' to begin with?

It is called 'central bank' because, first and foremost, it is, and has always been, plainly and simply, a *bank*. That is, it *banks* some kind of monetary media as deposits for some (those designated depositors), in turn, making such monetary media available to others (those designated borrowers) for the purpose of funding the latter's enterprises, whatever they may be.

But what makes it *central*? Well, especially back in the days when ***specie money*** was issued *against* gold, *physical*---as opposed to *accounting*, and later on *online*---robberies

[6] That is, an intelligent extraterrestrial visitor chancing upon earth, one inclined to study social organisation and given to passing interest in semantics, might well ponder.

were more a regular feature of our daily social-economic lives, it was certainly more ***economical*** to safe-keep gold reserves *centrally*.

Thus *was* the economic rationale: the ***economy of scale*** for *banking* gold reserves *centrally* at some centrally located 'bank for banks', effectively forming, in modern parlance, a hub in a 'hub-and-spoke' arrangement, an epicentre of a 'star' interbank network topology. Quite likely, those of banks capable of and suitable for being banks for banks more or less corresponded with the larger ***banks of issue*** whose ***bank notes*** were already in wide circulation. The issuing of bank notes, though not a 'state monopoly' as it is today, nor stamped ***legal tender*** as such, effectively meant these entities were in effect already controlling the ***money supply***, if not quite managing the ***monetary condition*** in the active sense modern readers have grown accustomed to.

Now, in any given economy, it made little economic sense to have concurrently more than but a handful bank of issues operating locally. With convertibility and fungibility hurdles overcome (through mechanism of contract and validation), multiplicity of issuing banks reduced even further with time.

Thus was the economic rationale: the ***natural monopoly*** by which ultimately there needed to be just the one bank of issue (per economy) who then exerted *some* degree of overall control over the domestic money supply.

In short, the ***centrality*** phenomenon here revolves around the practical matter of holding gold reserves *centrally* at a few, and ultimately just one, bank(s) for banks, the larger and better trusted bank(s) of issue.

Origin of (Institutions that Eventually Became) the First Central Banks

As is commonplace amongst central bank historians, we shall identify Sweden's Sveriges Riksbank (est. 1668)---and to some extent its predecessor Stockholms Banco---and particularly the Bank of England (est. 1694) as the archetypical 'proto' central banks.

One thing which stood out glaringly from history, it must be said, was the latter's creation *purposefully* to finance war, more precisely the £1.2 millions (financed at 8%) rearmament of the English Navy following the Admiralty's crushing defeat against France, culminating with the Battle of Beachy Head (1690), during the Nine Years' War (1688–1697) between the Grand Alliance (principally England (and then Scotland), the Dutch Republic, Spain, and the Holy Roman Empire) against King Louis XIV's France.

To the eyes of modern critics, steeped in the tradition of central bank independence and increasingly alarmed by the trends toward greater ***fiscal dominance***, this must at first seems as though central banks had had a rather modest and compromised origin. But concluding thus would be both naïve and wrong.

Quite the contrary, any analysis beyond a mere cursory examination into the underlying economic rationale reveals that, far from being a victim of '*17th century fiscal dominance*' by the government of King William III of England, the founding Bank of England hailed through as the only institution with whom public net savers could trust with 'that kind of money'. In truth, it was the government that, in modern parlance, was beset with such a high ***Probability of Default (PD)*** parameter estimate that it could not borrow directly from the public the sum (£1,200,000 @ 8%) needed to coffer the war chest. The public trusted, instead, in a singular institution, *independent* from the government, *empowered* to lay claim to that which the government owes in full. That singular institution was England's genesis central bank.

Thus was the economic rationale: from the very beginning, central banks was the only viable institution and instrument of ***commitment technology*** available, especially when central government's own credibility is suspect, hence our dictum: for central banks, credibility isn't what makes the business of policymaking possible. For central banks, credibility *is* their business, the core commodity and the very 'currency of policy transactions'. Indeed, it was *to the benefit of the government to be so pre-committed* (to its promise to repay war debt), for without such a commitment mechanism, the government would be entirely unable to get its hands on that sum of money on such term.

One key difference that means war financing 'ok' then and government financing 'not ok' now, of course, was the fact that in an era of *specie money*, as opposed to today's ***fiat money*** regime, and under the carefully designed debt covenants there was no uncertainty then that money came from somewhere, namely investors in the ***joint-stock bank***, not out of nowhere, i.e. *baseless* money printing, otherwise known as ***monetising*** *state finance*, which also goes by a gentler description: '***monetary financing*** *of the state*'. Hence, the meaning of 'financing the state' here was clear: the Bank of England served as an *intermediary* between two parties (the government and the financial investors) and not as the *source of fund*. So in no way could anyone accuse the central bank of '*printing money to finance government spending*'. The most that could be said was that, through special charter arrangement, the Bank of England '*underwrote the credit risk of the government*'.

In short, in addition to handling gold reserves 'centrally', 'centrality' of 'central banking' here revolves around the practical matter of there being one quasi-public agent mediating between the saving public and the spending government, and as an *intermediary*, the Bank of England 'sits in the middle', hence *topologically* at the *centre* in the chain of financial obligations.

In any event, upshot of all this was that, having taken on the crown's credit (default) risk, the Bank of England was compensated for, i.e. 'paid in kind', in the form of state-guaranteed monopoly privilege over the issuing of bank notes. The monopoly was complete

and comprehensive by law in 1844. Not long after, 1858 also marked the beginning of the monopolisation of note issues in Sweden **[Fregert (2012)]**. In either case, it was a monopoly that made economic ***public good*** sense, i.e. in the same way that it made much sense to have (from the consumers' point of view) one fully integrated railway *network* serving the entire metropolitan, one seamlessly integrated electricity *grid*, and so on.

Thus was the economic rationale: the granting of monopoly power over money issue to the central bank by the state, i.e. formalising *natural* monopoly as *state-guaranteed* privilege, reflecting the ***public choice*** argument favouring monopoly over competition.

In the final analysis, the genesis of the Bank of England thus serves as a poignant *cause célèbre* testifying to the need for a *credible banking institution independent from political control*, a thinking which, thorough a succession of logical arguments and by a series of institutional changes over the many intervening years, eventually crystallises as *central bank independence*.

2.2 'Functional' Central Banks

Banking and Central Banking at the Centre of Industrial Revolution

For much of the industrial revolution, it was the maturing financial infrastructure, which in the 'old world' meant banks underpinned by 'by now fully functioning' central banks of issues, that created the stable platform from which sprouted the burgeoning private-sector *financial* capitalisation that went hand in glove with---indeed many would say furnished the financial engine for---the spectacular investment in *physical* capitals during that transformational era.

It is no surprise, then, that as the very concept and practice of central banking was being crystallized, it was the Victorian bankers-industrialists-intellects of the days that provided our first coherent narratives of what a central bank or central banking was all about.

Three figures stood out: Walter Bagehot, Henry Thornton, and Sir Francis Baring. Whilst Walter Bagehot's *Lombard Street* **[Bageshot (1873)]** is identified today as the seminal work on central banking, arguably it was Henry Thornton's *Paper Credit* **[Thornton (1802)]**, written nearly a century earlier, which really broke the intellectual ground and foresaw much of the monetary management function that we today identify as an essence of central banking **[Laidler (2002)]**. Revealingly, the genesis of the term "Lender of Last Resort" (LoLR) is owed to Sir Francis Baring's *Observations* **[Baring (1797)]**, in which the Bank of England was depicted as *dernier resort* **[Milne & Wood (2008)]**.

What exactly was meant by 'Lender of Last Resort'

At this point it is instructive and germane to our analysis to note how our present-day, vernacular citing of the term "Lender of Last Resort" is subtly, but fundamentally different from that which prevailed when Baring used the progenitor phrase '*dernier resort*' to describe the Bank of England and her place in the 18th century British monetary system. Indeed there are various myths **[Goodhart (1999)]** surrounding this ideation, compounded by any number of 'folk economics' interpretations out there.

The vernacular take on LoLR proceeds thus: (a) normally banks rely amongst themselves, i.e. via the interbank money market, to manage shortfalls and excesses in daily liquidity, (b) when a bank runs into a tight spot, i.e. cannot rollover short-term liabilities or sustain interbank funding, it could, again if really pressed, approach the central bank for liquidity assistance via the *stigma*-ridden discount window. That is, when we say "lender of last resort", we mean that the central bank is the "lender" banks would resort to "as a last resort".

What was really meant, in essence, amounts to a *topological* description of the system of convertibility in the 'specie-money' era. It meant that ultimately it was the Bank of England who guaranteed that paper credits can be converted to gold. From the apex of this pyramid that was the Bank of England downward, paper was as good as gold. It meant that any and all banks, the lenders, 'downstream' could refer paper credits upward, in essence effecting links in the the continuous lines of guarantee. But the economy's ultimate "lender", the Bank of England, could not likewise resort upward, i.e. find someone else that would turn money into gold, and thence the "last resort" vis-à-vis said long lines of convertibility premises. In short, "Last Resort" today refers to the *desperation* of the liquidity-short (commercial) bank, as opposed to the *position* of the liquidity-source (central) bank.

Thus was the economic rationale: the original, and correct, economic interpretation of a central bank as the "Lender of Last Resort" hinges on her role as the ultimate anchor mechanism underpinning the 'specie-based' monetary economy.

How 'Lender of Last Resort' forms the Conceptual Root of all Things Central Banking

But the link (between old and new interpretations) is not entirely fallacious. Firstly, at the time **Baring (1797)** penned his *Observations*, the notion of bank liabilities as circulating medium (as opposed to total reliance on specie money or bullion coins) was beginning to take hold[7], and ultimate faith in the system was grounded by the very fact that these paper credits could be redeemed *upward*, i.e. from 'country' banks to 'city' banks to 'central'

[7] Here the authors do not intend to convey a strict chronological account, however.

banks of issues who ultimately held the backing gold reserves, hence the *last* stop before ultimately *resort*ing to gold convertibility.

Secondly, it is important to understand how the Bank of England saw her role in managing the problem **Thornton (1802)** referred to as "drainage". In essence, it was up to the Bank of England to *volumetrically* control[8] the amount of *its* bank notes and paper credits which then became the basis for *high-powered money*. Said volume should balance out vis-à-vis the endogenous/exogenous demand/supply of paper money/gold and so on, compensating, as it were, for "internal drainage" as well as "external drainage".[9]

Thus was the economic rationale: to the extent that the economy runs on money, and scarcity of money could in turn drag down the economy, especially given that prices and wages are 'downwardly sticky', central bank, as the most upstream supplier of liquidity, could be tasked with flushing the economy with 'compensatory' stimulus when needs arose; conversely, when the story is that of too much liquidity, the central bank could be tasked with mopping up excess, hence the ***monetary management*** mandate.

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[8] In a nutshell, banks only lend to banks when they cannot lend commercially to business enterprises or to households (i.e. controlled for credit risk). Conversely, banks only borrow from banks when they cannot rely on relatively inexpensive funding from the deposit base (i.e. controlled for drawdown risk). So the amount of interbank lending-borrowing results from a balance between exogenous force (demand for loans, supply of deposits) and endogenous parameter (interbank rate). Obviously, the interest differentials (between borrowing and lending) then cascade upward from country banks to city banks, and so on, all the way to the central bank.

Combined with the basic human psychology, i.e. that we tend to spend more if we had more cash physically in our hands, it is clear how the central bank, positioned at the head of the 'stream' of lending and borrowing relationships, by setting the bottom-most rate prevailing in an economy at a given time, determine how much banks lend between themselves versus to the 'real' sector, hence the proclivity to spend more or less on the part of the public, hence inflationary or deflationary tendency at large.

[9] Different phenomena elicit correspondingly different sets of monetary responses: "external drains", especially *of the temporary variety* could arise from trade deficits, and so the proper response would be to sterilise the outflow of gold with temporary increase of note issue, lest monetary contraction choked domestic industrial production, whose exports would be needed as trade restores balance; "external drains", especially *of the persistent variety*, could also arise from inflationary over issue of notes, and so the proper response would be to pursue monetary contraction; "internal drains" may arise from banking panic, and so the proper response would be to freely issue notes in order to stem liquidity shortage from escalating into a full-scale draw on gold reserves. In any event, such macroeconomic as well as banking-sector events require that the central bank maintains sufficiently robust gold reserves. See **Humphrey (1989)**.

Thirdly, because even by then, the volume of transactions made possible by the invention of paper credits probably many times over overwhelms the 'stock' of gold bullions held 'centrally'. It would be nothing short of chaos should, in one go, everyone demands gold species for the papers they held in their hands. This would have amounted to a 'systemic event', a total run, not on individual banks, but on the entire gold convertibility edifice. Thus it was up to the Bank of England to ensure that liquidity 'hiccups' anywhere downstream be quickly assuaged, promptly redressed before real crises develop. But such is not meant as a regular avenue for liquidity management, hence **Bageshot (1873)** spelled out the conditions under which the facility applies, principally that although liquidity assistance should be made available with little or no restriction, the rate charged is above the prevailing market rate and the borrowing has to be collateralised with good quality assets (not effecting a credit risk transfer), altogether summarised in a dictum: "lend freely at a high rate, on good collateral"[10] This is the very precursor of all the preemptive liquidity injections performed ever since.

Indeed, Baring, Thornton, and Bagehot each had a slightly different take on the LoLR concept---keeping in mind that their writings did not dwell on such phraseology. To our reading, however, the once subtle distinction between these outstanding thinkers of their days, has given rise to the three *inseparable* pillars of central banking: ***monetary foundation***, ***economic stabilisation***, and ***financial regulation***.[11]

Monetary foundation is all about making sure people see money when they hold pieces of paper in their hands, with gold convertibility furnishing the 'credible monetary anchor' at the time. Economic stabilisation is all about making sure people enjoy 'smooth

[10] Disagreements in the interpretation, some slight, some not so, exist even today. On the 'freely' bit, some would read, parenthetically, 'as long as the objective is to ensure systemic stability, not individual survival'. On the 'high rate' bit, some believe Bagehot implied a measure of 'penalty' being extracted; others categorically deny this interpretation. On the 'good collateral' bit, certainly this was of grave concern back when the central bank was strictly a private entity, and could not afford to take credit risk, lest the incurred losses caused the central bank's capital to go negative. In the modern era, although the debate is raging as to whether central banks can run negative capitals indefinitely, at least the potential for capital loss is not, indeed should not, be a prohibiting factor when making policy-driven intervention decisions.

[11] This isn't to say, however, that the three seminal authors had dramatically divergent ideas on the central bank's role as LoLR. All three authors were no doubt aware of all three fundamental aspects of central banking. Nevertheless, they differed *philosophically*. Bagehot, in particular, saw the Bank of England's role more as a result of a series of historical accidents; whereas, Thornton seemed to see in it an institutional arrangement that, no matter how it came to be, was purposeful, if not outright optimal.

running economy' despite greater uncertainty that came with the *industrialisation-era* globalization. Financial regulation is all about making sure people can count on 'regularly operating banks' and so able to focus their economic decision making elsewhere.

Today we see most modern central bank conduct ***macroeconomic-monetary policy*** in conjunction with ***market operations***---thereby underlying the 'credible monetary anchor' and ensuring 'smooth running economy', whilst at the same time conduct ***macroprudential-regulatory policy*** in conjunction with ***banking supervision***---thereby underlying the 'credible monetary anchor' and ensuring 'regularly operating banks'.

For in ensuring that the public, especially under *rational expectations*, occupies an economic *present* without undue fear of inflationary *future*, today's central bank needs to furnish said system with a credible monetary reference, i.e. the emphasis of Baring's LoLR. In ensuring that the liberal, open economy enjoys a globalised trade and capital flows without painful disruptions due to internal imbalances and/or external shocks, today's central bank monitors and adjusts monetary conditions to balance out disruptive money demand/supply shocks, of domestic and/or cross-border origin, i.e. the emphasis of Thornton's concerns over internal and/or external 'drainage'. And finally in ensuring that a modern, highly interconnected financial system, illiquidity, even insolvency in some part of the banking network does not threaten to bring about a general systemic collapse, today's central bank monitors the systemic vulnerability to crisis contagion and hopes to be able to interject at precisely the right nodes so as to localise individual financial collapses, i.e. the emphasis of Bagehot's idea of discount window facility.[12]

Thus was the economic rationale: for rather self-evident reasons, having 'credible monetary anchor', 'smooth running economy', and 'regularly operating banks' are socially desirable; the central bank's monetary foundation, economic stabilisation, and financial regulation functions derive directly from these.

The Legitimacy of Banking Supervision

This would seem to follow from the classic Bagehot's 'central bank as LoLR' paradigm. The central bank, being LoLR, must first and foremost be ready to prevent 'liquidity hiccup' from triggering a general run on the central gold reserves. As such, the

[12] In fact, many of today's misguided critiques on such monetary policy framework as ***Inflation Targeting (IT)***, i.e. that it cannot prevent supply shock, especially from volatility in global energy/commodity prices, rather confuse the notion of 'credible monetary anchor' with 'smooth running economy'. Yes, both are indeed part and parcel of central banking, but to say that inflation targeting is inappropriate as a device for ensuring 'smooth running economy' is tantamount medically to saying healthy nutrition is inappropriate to advice to patients because it cannot stop bleeding from an open wound injury.

central bank must be privileged with the kind of information that would help it decide whether a particular bank is facing temporary liquidity problem or becoming insolvent altogether. In practice, this meant whichever institution acting as LoLR, i.e. the central bank, must be empowered to examine the 'true' financial condition of banks approaching its discount window.

Thus was the economic rationale: the liquidity injector must be privy to information that will help it ascertain whether the problem is strictly one of (temporary) illiquidity, and not one of (more permanent state of) insolvency.

Whether this 'merely illiquid' or 'practically insolvent' distinction could be made so clearly and cleanly today is a matter of debate.[13] But even if central banks do not need to sort out those 'merely illiquid' from those 'practically insolvent' precisely and quickly, the fact remains that their responsibility in preventing systemic meltdown means the prerogative of central banks having privileged information, supervisory scrutiny, and regulatory power remains the same as ever, if not even more so.

However, the above line of arguments, *taken literally*, is not an accurate representation. The Bagehot rule did not read "lend *carefully* at a high rate, on *certainty that the borrowing bank is merely illiquid and not actually insolvent*", but read "lend *freely* at a high rate, on good *collateral*". It would be the quality of collateral securities (paper credits trouble banks used in the discounting), not the solvency of the borrowing bank, that ensured the Bank of England against loan loss.

But taken *less literally*, the arguments very much still stand. For we maintain that the Bank of England, then as now, operate on a public stock of 'institutional credibility'. Liquidity injection works best, it has always been understood, when the central bank needed inject no real cash whatsoever, i.e. when the mere message that the central bank stands ready to intervene is enough to quell market worries. But such would depend on a near-perfect 'track record', i.e. that troubled banks the central bank lent a hand to (or was willing to do so) eventually rode through the turbulence because they were, in fact, merely

[13] With the advent of the 'systemic regulator' role for central banks, it is also a matter of debate as to whether said distinction ('merely illiquid' or 'practically insolvent') really still matters as much. One could argue, for example, that bailing out 'practically insolvent' banks could prove to be socially (as well as financially) much less costly than letting the whole financial system succumbs to self-fulfilling crisis contagion. On the other hand, one could also argue that such action could set a precedence that creates a *moral hazard* in favour of yet other 'practically insolvent' banks to come.

illiquid and not ultimately insolvent. So the need for the central bank to be in touch with the financial economy of its supervised banks must be true then as well as now.[14]

In short, 'centrality' of 'central banking' here revolves around the implicit and explicit contract by which the economy is ensured of the viability and availability of bank liabilities in particular and paper credits in general, for these were the monetary medium that fed the financial engine of the world economy in the industrialisation age, and indeed ever since.

From here, the stage is set for what we can already recognise as hallmarks of modern central banks: a public (nationalized) entity that conducts banking operations in pursuit of long-run economic welfare of the country.

2.3 'Emergence' Central Banks

The Dawn of Modern Central Banking: Becoming Recognised as a 'Policy Body'

Formal institutional analysis of central banks often proceeds with the overarching central bank mandates, i.e. monetary and financial stability, from which *follow* statutory power, then policy objectives, then policy implementation tools necessary to achieve said policy objectives, under said statutory power, and so on. This much is true *by construct*, but we contend that historical evolution[15] is never that straight forward; often events unfold the other way around. An institution, for whatever reason, is first endowed with institution-specific capacity, and it was only 'afterward' when 'needs arose' for an institutional actor[16] to take on the responsibility of conducting public policy, that said institution effectively rose to the challenge, and finally became statutorily *(re)constituted as a policy-sector institution for it*. In short, the evolution of such an institution's role and responsibility well predates the formalization as institutional mandates. It is the case of "with great power comes great responsibility," so to speak. We shall visit this thesis later on as well (see **3.2 The Central Banking Policy Space**).

Thus was the economic rationale: an organisational body might, for whatever reasons, find itself at an absolute (or even comparative) advantage over any other agencies in responding to some fundamental societal needs, and this forms the basis for legitimacy for enshrining said body with the formal, legal and/or constitutional policy mandate.

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[14] Bear in mind also that, compared to 'history of central banking', the body of literatures on 'history of banking supervision' is relatively sparse. See, for example, **Mooji & Prast (2002)**.

[15] We hence align ourselves quite closely to the ***Evolutionary Institutional Economics*** **[Hanappi & Elsner (eds. 2008)]** perspective, particularly in the *heuristic*, as opposed to *ontological*, sense.

[16] For a general introduction to institutions and *institutional economics*, and so-called 'new institutional economics', see, for example, **Hodgson (2006)** and **Williamson (2000)**.

Thereafter, it then becomes a matter or strategic orgnisational management to strive to hone and maintain that ***policy capacity*** on a continual basis.

To wit, the Bank of England, in exchange for financing the state, emerged as monopoly bank of issue, thus effectively controlled the nation's money supply. As Victorian finance and commerce matured and became correspondingly more complex, the control of money supply took on more characteristic of a policy conduct than mere banking operations. With the Bank Charter Act (1844), the *still private entity* that was the Bank of England thus emerged as *de facto* best candidate to become a *public policy body* charged with ***monetary stability***. This 'emergence' central bank thus needed to be reconstituted a public entity with this in mind. In other words, the existence and operations of the Bank of England in particular, and central banks in general, took on so much public policy characteristic that it was a matter of time, sooner or later[17], that nationalisation would follow suit.

Likewise in terms of ***financial stability***, who else, institutionally speaking, but the entities empowered with privileged information, supervisory scrutiny and regulatory power should be charged with this mandate? And thus by the turn to the 20th century, modern central bank, the *institution*, as we would recognise it today, was born.

In short, 'centrality' of 'central banking' here revolves around the public policy nature which of course abstracts the central bank from competing commercially with any commercial banking entities.

2.4 'Synthesis' Central Banks

Modern Central Banking Evolves

By the outbreak of WW I, or in any event by the close of WW II, most of the essential features of central banks and central banking---financing agent of the state, LoLR function, state-guaranteed monopoly over note issue, existence as public policy-sector institution, and so on---were largely in place. ***Central Bank Independence (CBI)*** **[Eggertsson & Le Borgne (2004), Schich & Seitz (1999), Toniolo (1988)]**, together with the concomitant institutional design and governance (transparent policy objectives and tools, accountable policy targets and conducts), were amongst the hurdles left to sort out.

In any event the stage was set *initially* for the polar divergence w.r.t. methods and modalities of central banking (i.e. Keynesian vs. Classical, then Monetarist, macro vs. micro, rule vs. discretion, central bank as bank regulator vs. central bank as macro-policy agent, economic orthodoxy vs. heterodox economics, equilibrium vs. non-equilibrium paradigms

[17] In the case of the Bank of England, nationalisation happened in 1946, some two and a half centuries after the entity was created, so it was a case of 'later rather than sooner'.

etc. See **Flandreau (2006)** for a 200-year history of monetary policy targets.) and *subsequently* for what we are seeing today as the 'synthesis' central bank model, synthesised, as it were, from lessons learned in the complex history of central banks, economic thoughts, and banking crises. The *pièce de résistance* in the consensus model of central banking today is of course the aforementioned recognition of the merits and necessity of CBI.

In short, 'centrality'[18] of 'central banking' here revolves around the public policy nature which abstracts the central bank from being embroiled by national politics, overwhelmed by any and all forms of interest groups, or even preoccupied with profit motives, hence ideally a central bank operating independently of myopic, populist, or partisan polity, a central bank whose *modus operandi* are transparent and fully accountable to the public it dutifully serves.

[18] Also in this epoch, the very concept of 'network centrality' was translated into *quantitative* measurement **[Bonacich (1987)]**, Today we see the same concept applied to the algorithmic analysis of websites---ranking web pages in terms of relative importance defined recursively: a web page is more important the more it is referred to by the more important web pages'---by a search engine [**Brin & Page (1998)**], and conceptually as well as *quantitatively* to the analysis of 'systemic importane' amongst financial institutions **[Nacaskul (2012)]**.

Section 3: Policy Space

In this section, we do two things. First, we discuss (subsection 3.1) what lies at the heart of the central bank's role and responsibility, namely monetary foundation, economic stabilisation, and financial regulation (no surprise, given our previous section on historical evolution). Second, we introduce (subsection 3.2) the 'Policy Space' conceptual framework in a general setting as well as in a particular sense of defining the 'Central Banking Policy Space'.

It is important to bear in mind that an institution's ***role*** (singular) is best defined as a conjunction between what it does, and what the public sees, saw, or now expects to see an institution performing. On the other hand, an institution's ***responsibility*** (singular) is best defined as a conjunction between what it is already supposed to do, i.e. as per formal institutional mandate, somewhat informal *memorandum of understanding* with other institutional actors, or even by custom, and what it may be called upon to do, i.e. as in the "ability to respond" when unforeseen needs arise and the institution, by virtue of its core competency and resource endowment, is already equipped for the task, insofar as engaging in such task does not somehow compromise the institution's ***institutional integrity***.

An institution's *roles* (plural) do not always coincide neatly with its *responsibilities* (plural), sometimes for a good reason, many a time not, hence this incongruence between roles *played* and responsibilities *assumed* can both enhance as well as undermine said institution's ***institutional credibility***. Exploring such 'institutional economic' fine points is beyond the scope of this essay. Suffice it to say that this section posits our attempt to lay a conceptual framework for ensuring that the central bank's roles and responsibilities are good and proper in the sense that the role played is true to the responsibility assumed, and when specific roles deviate somewhat from specific responsibilities, there is a supporting (economic) rationale for it.

3.1 Policy Sanctum: the 'Three Chambers' into 'Two Wings'

At the heart of central bank policy space lies an inner sanctum. This chamber houses the overarching imperative which impels the central bank to first and foremost 'define' money, what we term---recalling the terminology from our earlier section on historical evolution---the ***monetary foundation*** function.

The *sanctity* of money, in any monetary economy, has to be taken as an 'article of faith'. In the old days, gold convertibility was the be-all and end-all of *specie* definition of money. Bank liabilities (and generic claimants against banks in general) derived their value strictly as a corollary of this. Paper credits (and general promissory contracts to pay back on borrowing by banks as well as business corporations) are infinitely more convenient when

both the sum first borrowed as well as the sum later returned come in the form of specie money, not bars of precious metal.

In essence, ***specie money*** was '*literally* convertible' to gold. And gold, in the final analysis, was '*figuratively* convertible' to (i) *immediate exchanges* for immediate delivery of goods and services, themselves products of past and/or present economic activities of some description, (ii) *future exchanges* for future products and services, themselves products of past, present and/or future economic activities, as well as (iii) *current claims on future* economic activities, the latter via an instrument of contract, of which today's financial securities, in some cases highly evolved packages as they are, are but elaborate examples.

Today, ***fiat money*** is directly convertible to (i/ii) *immediate/future exchanges* for immediate/future goods and services, and (iii) *current claims on future* economic activities contracted. *In effect, fiat money bypasses gold altogether*, leaving it entirely out of the loop, where it since remains as metal commodity and financial assets as it still does today. In a way, we could paraphrase: this *monetary foundation* function, the primal task modern central banks *must get right*, is the *instituionalisation* of such a permanent 'gold bypass'.

But as common sense also tells us, all else being equal, having more cash in one's wallet tends to impel one to spend more easily, more quickly, or simply more of it. In the aggregate, when production is below potential, spending more is good; it helps close the 'output gap'. But when production is already at or above medium-term, sustainable potential, spending more, again, taken in the aggregate, is bad; it further stokes 'demand-driven inflation'.

In turn, how out of the whole pool of personal assets much one finds economically rational to hold as 'wallet cash' depends on a variety of factors, one key consideration being the ***opportunity cost*** of not putting cash in an interest-bearing bank account.

Thus put together: to the extent that the amount of cash in one's wallet (itself varies inversely with foregone interest yield) to a large degree influences one's proclivity to spend, and that at any given moment there appears to be too much or too little spending out of the 'population of wallets', then it is socially desirable to adaptively modify the amount of cash people hold in their wallets on average. This adaptive modification then forms the basis of the ***economic stabilisation*** mandate.

In other words, having ensured the value of money '*qualitatively*', i.e. "as good as gold", "acceptable as payment for goods and services, redemption of debts, etc.", "qualifies as legal tender", and so on, the central bank must further ensure that the stock of money out there is *'quantitatively'* appropriate vis-à-vis balancing out the economy's production potential and utilization thereof vis-a-vis supply-demand equilibrium. Ensuring the appropriate balance now becomes a matter of ***public good***. And of course nobody else but

the institution with complete monopoly over note issue will have this absolute advantage in performing this balancing act.

Now, if money is *liquidity*, then it must follow that plumbing or piping through vast quantity of said *liquid* such that its flow throughout the economic system is reliable (devoid of disruptions, leak-free, and no large-scale shortage) becomes paramount as a matter of public good as well. As central banks also 'happen to be' the ultimate reservoirs of this liquid stuff we call money, it stands to reason that they have an absolute advantage when it comes to the ***regulation*** of liquidity flow, firstly by preventing disruptions, leakages and shortages, and secondly by preventing local disruptions, leakages and/or shortages from becoming a system-wide crisis. As said plumbing/piping network run through a system of commercial banks in particular, financial institutions in general, the ***regularisation*** of liquidity flow then manifests itself as the ***financial regulation***[19] mandate.

This '*trinity*' of policy affairs comprising the Three Chambers: *monetary foundation*, *economic stabilisation*, and *financial regulation* '*wholly*' constitutes the innermost policy sanctum for the central bank. To paraphrase: the '*wholly trinity*' of policy mandates declares: it is the central bank who 'engineers' the money, it is the central bank who, through the instrument of monetary management, keeps the economy 'aligned true' vis-à-vis current productive potential and future growth path, and it is the central bank who ensures the financial system run 'regularly', i.e. efficiently and nearly crisis free.

In a way, it should have already been obvious from previous discussion (historical evolution) that for central banks, monetary foundation, economic stabilisation, and financial regulation would occupy this inner sanctum of policy space. What is less obvious, but generally preferred in practice, i.e. from an ***institutional design*** consideration, is the tradition of partitioning the central bank(ing) *organisation* internally into Two Wings, namely ***monetary stability*** and ***financial stability***, each headed in most instances by a corresponding ***Deputy Governor (DG)***. In a sense, the 'monetary stability DG' actively handles the whole (or most) of 'economic stabilisation', thereby underlying the 'monetary foundation' aspect of central banking. Likewise, the 'financial stability DG' actively handles the whole (or most) of 'financial regulation', thereby underlying the 'monetary foundation' aspect of central banking. Diagram 1 succinctly summarises this 'three into two' configuration/partition of the central bank's policy sanctum.

[19] At the risk of overstressing the point, our sense of 'regulation' here is not that of 'issuing *regulatory codes*', but one of ensuring that we have 'banks *operating regularly*'.

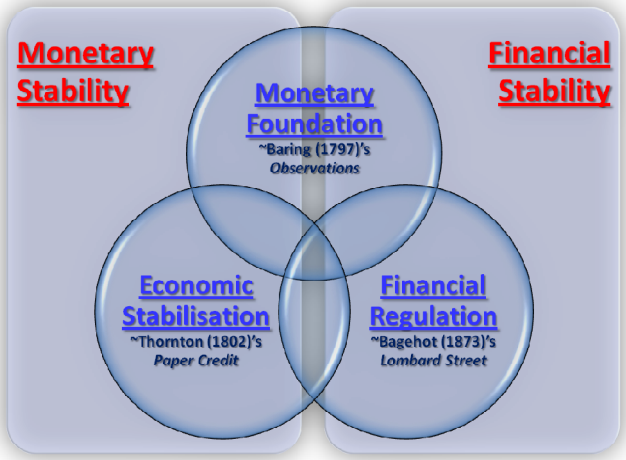

Diagram 1: Policy Sanctum

Indeed there are 'operational' differences, albeit subjective ones, between both wings of central banking, as these differences may well account, at least partly, for why organisationally central banks tend to be partitioned into 'two wings'.[20]

In our interpretation, monetary stability is concerned with events *exogenous* to the banking system.[21] There, *instability* generally pertains to *continuous* events. In contrast, financial stability is concerned with events *endogenous* to the banking system. There, *instability* generally pertains to *discrete* events. Output gap, for instance, moves fairly continuously; whereas, bank runs, in contrast, are quite discontinuous, hence discrete, in nature.

We now discuss the two wings in details (conceptual hierarchy depicted in Diagram 2).

[20] We also prefer to use two wings as opposed to two pillars for a rather obvious reason: *a building may stand even if one pillar is much stronger than (and takes much of the load from) the other, but two wings should be roughly symmetric in power outputs in order for the bird to maintain balance during flights.*

[21] This statement does not preclude, however, the possibility of positive feedbacks (resonance phenomena) between the financial and the real sectors, in which case economic shock can be of banking origin, and *vice versa*.

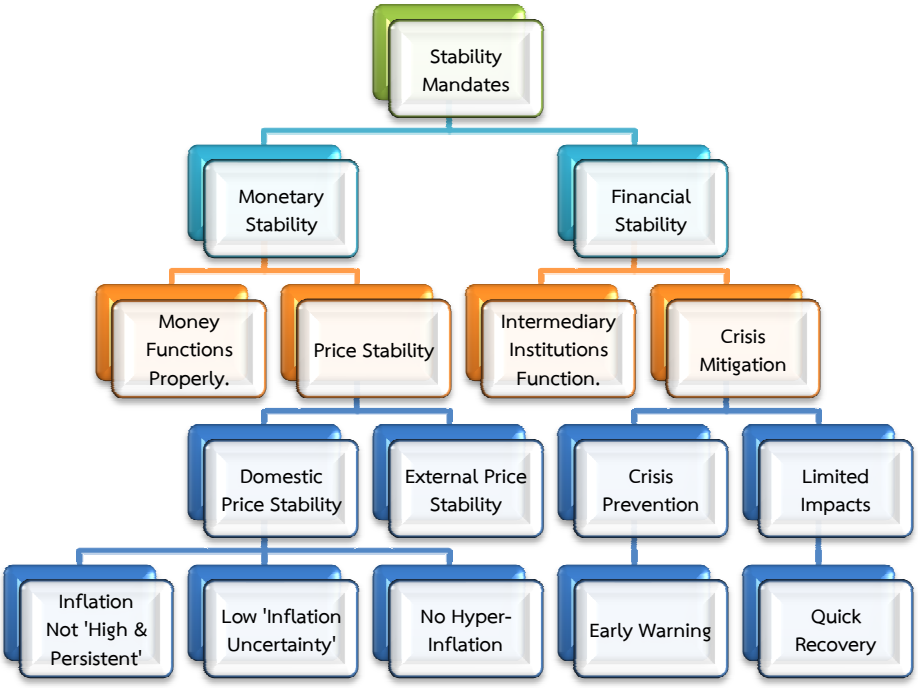

Diagram 2: Stability Mandates for Central Banks

3.1.1 Economic Rationales re: Monetary Stability

What is Monetary Stability, What is Price Stability – Here we make a subtle distinction between monetary stability and price stability, a distinction rarely made in the literature on *central banking economics*. Whereas ***monetary stability*** refers to the stable environment by which an economy's *own* money (whatever it may be) comprehensively fulfills its function as (i) medium of exchange, (ii) store of value, and (iii) unit of account (*numeraire*), ***price stability*** refers to the consistency, continuity, and predictability by which an economy's products and services are nominally valued, hence priced, i.e. to the extent that the risk from price instability *per se* does not become a prohibiting factor vis-à-vis private agents' saving-borrowing and/or investment-commerce decisions.[22] Similarly, ***external price stability*** refers to the consistency, continuity, and predictability by which an economy's ***term of exchange***, hence ***foreign exchange rate***, i.e. to the extent that the risk from external price instability *per se* does not become a prohibiting factor vis-à-vis private agents' investment-commerce (import-export) and/or foreign travelling decisions. When we

[22] Albeit unlikely and rare, it is possible to have price stability and be without monetary stability. (A price of a can of beer in a highly dollarized part of, say, Cambodia may be stable at $0.60 or ฿20 year in and year out, but that does not mean the national currency fulfills its function in its entirety and with anywhere near universal acceptance in the country.) And rather obviously, an institution charged with *monetary* stability will spend much of its energy and resources on *price* stability.

speak of price stability, we generally refer to the former, i.e. domestic, price stability, which is our main focus hereafter.

Price Instability vs. Inflation – Here we make an admittedly even subtler distinction between ***price instability*** (the antithesis to price stability) and ***inflation***, the latter, strictly speaking, being a quantifiable phenomenon to the extent that same basket of products and services costs more this year than the last. Price instability is a policy concern over both inflation itself as well as the ***uncertainty*** in the rate of inflation.

Why Inflation is Undesirable – Inflation, even if fully anticipated, is costly. Firstly, inflation makes *transactions* costly. This happens in either of two ways, indentified as 'Menu Cost' and 'Shoe Leather Cost'. A point worth special attention here is that while the public often perceives a sense of trade-off between 'curbing inflation' and 'stimulating growth', empirical evidences abound that, especially beyond certain thresholds, inflation, even if well anticipated, is *adverse* to economic growth. For example, se the study by **Lopez-Villavicencio & Mignon (2011)** on a sample of 44 industrial and developing countries, and one by **Pollin & Zhu (2006)** on a sample of 80 middle and low income countries.

Secondly, inflation prompts individuals to alter their investment decisions specifically to shield their portfolios against erosion, the so-called substitution effect **[Fischer (1994)]**. This may not be outright undesirable. In fact, it may be argued that this behavioural portfolio adjustment, but creating demands for financial assets (as opposed to cash) helps lower bond yields, thereby stimulating growth **[Bittencourt (2012)]**. Nonetheless, it represents an extra consideration that savers would not have to otherwise make were inflation a 'non-issue'.

Thirdly and perhaps most importantly, because poor people in particular and the economically vulnerable and socially disadvantaged in general have fewer alternatives when it comes to assets available to them for safekeeping, they are most unprotected from inflation eroding their already meagre saving. *So inflation is, in the final analysis, unjust*. Such structurally reinforced injustice could eventually lead to social unrests, albeit under extreme scenarios involving prolonged inflationary environment.

Hyperinflation is Especially Destructive – Thus far we have not even begun to discuss ***hyperinflation***, which history has shown to be invariably accompanied by even worse fates for the human affair. [23] On this, casual commentators on economic affairs (from journalists to 'bloggers') tend to be lulled into a sense of false comfort and complacency, the argument running generally along the line that: "unlike … countries [notably South American

[23] A good place as any to remind ourselves one of role hyperinflation played in hastening, perhaps even causing, the Second World War. See, for example, **Hetzel (2002)**.

economies], ours has never even experienced a double-digit inflation in recent past, never mind coming anywhere close to a hyperinflation ever. Hyperinflation is but a *bogeyman* that theory-obsessed central bankers, the 'inflation nutters', run to when they feel threatened by well-intentioned politicians wishing to stimulate growth."

But of course, this is entirely fallacious. Just because a country hasn't a history of hyperinflation doesn't mean that that country is somehow exempt from the phenomenon. It remains a wishful thinking to assume some kind of structural difference accounting for why certain countries can safely play with fire (inflation, and get away with it) and others cannot.

This form of *non sequitur*, akin to espousing that "absence of evidence certainly *counts* as evidence of absence", is deceptive and can be very dangerous. As a matter of fact, *all* countries which *did* experience hyperinflation also at one time could claim that their monetary histories were completely void of hyperinflation.

To wit, prior to the 1980's, Zimbabwe also never experienced hyperinflation. Yet by July 2008, the official estimate of the Zimbabwean hyperinflation was at 231,150,888.87% (annual rate), and by November of the same year, **Hanke & Kwok (2009)** finally had the figure pegged at 89,700,000,000,000,000,000,000.00%.

Thus *is* the economic rationale: the fundamental societal need for inflation safeguard tends to be downplayed in countries without a history of high inflation. The situation is especially ironic in that countries with hyperinflation past already guard their monetary economies jealously against the merest hint of an inflationary trend, no matter how innocuous it always seem at first. But it is precisely those countries without a history of double-digit territory that runs the greatest risk of false complacency, their central banks having become victims of their own success: the better an economy has done in terms of avoiding past inflation, the more likely its central bank will find itself having to defend the very merit of inflation safeguard.

Why Price Instability is Undesirable – But of course, inflation is *anything but* fully predictable, hence the real issue here is that of price instability. Firstly, inflation *uncertainty* is costly, as savers divert part of investment resources to be dedicated for the very purpose of inflation *hedging*.[24] Secondly, *unanticipated* inflations "are associated with redistributions of income and wealth … [compared with income redistribution] Inflation-induced wealth redistributions are larger, both between private and public sectors, and within the private sector between debtors and creditors" **[Fischer (1994)**, page 275**]**, none of which is fully intended. As for whether inflation *uncertainty* as such is strictly detrimental to growth,

[24] Though not to put a fine point on it, one could further argue that inflation hedging (against 'uncertain' inflation) and inflation protection (against 'certain' inflation) are distinct concept, each costly in its own way.

empirical evidences are somewhat mixed. For example, studies by **Apergis (2004)**, **Wilson (2006)**, **Grier & Grier (2006)**, and by **Jiranyakul & Opiela (2011)** seem to confirm, while **Mughal, *et al*. (2012)** did not. Finally, **Cukierman & Meltzer (1986)** found that inflation *level* and inflation *uncertainty* tend to go together, this in support of the hypothesis put forward earlier by **Friedman (1977)**.

Why Price Stability is Desirable – Naturally, the converse to all this (undesirability of price instability), is also true. That is, price stability, in the sense of low and stable inflation, is in fact, conducive to growth, especially as it renders capital accumulation more meaningful and more certain to yield rewards from investment.[25]

So we stress that it is a *myth* that a national economic policy portfolio must balance between simulating growth and avoiding inflation. In the long run, sacrificing inflation protection in order to stimulate growth is entirely futile, as eventually inflation catches up and erodes all real gain. This is entirely unlike the high-risk/high-return Pareto argument businessmen-*cum*-statesmen often resort to. Ultimately an economy cannot pursue a 'high-inflation/high-growth' agenda any more than a horticulturalist pursue a 'shallow-root/tall-tree' dream. Such would soon prove self-defeating, with the economy saddled with a 'high-inflation/no-real-growth' *equilibrium*.

This is the economic rationale: in the long run, there is no such a thing as a growth-inflation trade-off. Quite the opposite, price stability is conducive to growth, especially the sustainable kind, the kind we all want. In the short run, the apparent opportunity to tolerate a little bit of (surprise) inflation for higher growth figure can only appear to be an attractive proposition on a connivingly myopic platform of electoral politics.

What Guarantees Price Stability – Given that price stability is desirable (and instability undesirable), the question is how to guarantee price stability, if such a guarantee is indeed possible. It turns out that guarantee is exactly the wrong word to use. For while we can certainly institute some kind of price guarantee programmes, it is only possible to *target* price stability. The main thing to remember here is that price stability is concerned with *representative* goods/services and their prices, not *differentially* between prices of different goods/services, hence cannot be curbed by way of ***price controls***, but is directly influenced

[25] Countries with price stability should also attract more and better quality of *foreign* investment, albeit as for measurable statistics, the *quality* of foreign investment is difficult to proxy, hazardous to interpret, and ultimately a function of a great many more variables than macroeconomic price stability. See, **Fernandez Valdovinos (2003)**, for example, for a statistical analysis of the long-run relationship between economic growth and inflation level.

by way of money supply, which is where the national central bank, through credible and effective ***monetary policy*** conduct, comes in.[26]

The External and Domestic Dimensions of Monetary Policy – Just as there are external as well as domestic dimensions to price stability, so too are there external vs. domestic considerations when it comes to monetary policy. On this countries vary. On country's central bank may aim monetary policy squarely at *domestic* price stability and merely 'keep an eye out' for *external* price stability, lest something extreme were to happen. Another may similarly aim at *domestic* price stability, but at the same time clearly obsessing over *external* price stability, if only because the latter impinges heavily on the former. Yet another country's central bank may aim at *both* objectives *simultaneously*, but with priority clearly on the domestic price stability, tending to external price stability so long as the former, priority objective is not in any way jeopardised.

For example, for *external* price stability's sake, a central bank may wish to intervene in the foreign exchange market (against appreciation of the local currency), but then would be sure to entirely ***sterilise*** the otherwise inflationary consequence, even at cost[27], lest *domestic* price stability gets compromised.

What Guarantees Monetary Stability – This is a much simpler problem, and yet one of much greater gravity, than that of ensuring price stability. The issue is rather simple because, on the whole, monetary instability only arises out of ***monetisation***, which central bankers already avoid at all cost *anyway*. This issue is of great gravity because if ever central bankers succumb to the 'evil temptation', once the central bank freely prints money (i.e. to finance government projects, no matter how 'noble' the purpose), *the entire fiat money edifice completely breaks down*, and money is proverbially worth less than the paper it is printed on. This much is obvious. What is not obvious is that there is also a 'backdoor' by

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[26] The raging debate as to whether so-called ***quantitative easing***---see, for example, **Curdia & Woodford (2010)**---constitutes a valid and effective monetary policy instrument is beyond the scope of this essay. For general discussions linking monetary policy challenges with the central bank institutions, see, for example, **Beddies (2000)** and **Siklos, Bohl, Wohar (2010)**.

[27] This could read "often at cost" or even "invariably at cost", for in such a situation it is the domestic assets which generate more real yields, hence the sterilisation programme which the central bank would have to do after it sells local currency in the foreign exchange market would saddle the central bank with low-yield foreign assets. *But implementing policy objectives, even at great financial cost to central bank, the institution, has been central to central banking, the discipline*, i.e. ever since the 'emergence' central banks era (see our earlier section on historical evolution).

which monetisation could still happen, rather inconspicuously, namely by drawing down from the ***international reserves*** to finance fiscal spending.

Especially for a number of East-Asian central banks, who have for the past decade or so amassed unprecedentedly large amount of international reserves, there is a politically expedient temptation to think of the reserves assets as "piles of cash, just sitting there, not being put to good use". This is of course a myth. However many reserves dollars there is, there would be correspondingly many domestic currencies *already circulating the economy*. Using reserves dollars to spend locally means one gets two dollars into circulation for every original one dollar earned.

As an analogy, consider another popular East-Asian institution, that of *shopping mall food courts*. Shoppers buy 'food court' coupons and use the coupons to pay for food. Imagine each food court as a sort of local economy. The coupon booth then serves as the central bank, issuing coupons (local currency) in exchange for real bills (international assets). Things are going well.

Then one day, the shopping mall's 'chief finance office' notices the coupon booth holding on to a "piles of cash, just sitting there, not being put to good use", and decide that it would be for the greater good to just walk up and seize some of the cash, then convert them to coupons, and use the coupons to pay some hire hands to refurnish the food court and built a new, stronger wheelchair access ramp, or just give coupons away to hungry children hanging around the food court (all noble projects), hoping shoppers will not all at once return unused coupons (there won't be enough cash left in the booth). Now, as ridiculous as this sounds (with an equally obvious conclusion), there is hardly any economic difference between this ploy and the plan to "put international reserves to good use in the local economy".

Thus is the economic rationale: international reserves is not a form of national wealth that can be spent in the local economy, for such an action would amount to nothing but thinly-veiled monetisation, fiscal monetisation to be precise.

Taking the above analysis as a case in point, we note a rather unsettling development: we seem to have collectively outgrown 'monetising state finance', if only in form, not necessarily in substance. That is, rare is the occasion these days when we see a central government, figuratively at gun point, commands its central bank to monetise outright, which is not to say that such a thing no longer occurs in our modern world---for this we refer to the *ongoing* case studies, i.e. Zimbabwe and Venezuela, to name but two of the more brazen instances---it is just that increased public scrutiny has made it unlikely such an *obvious* act would be tolerated by the public.

Still, political motives fundamentally drive every country' fiscal authority to (wish it can) spend more (budgets), collect less (taxes), with the gap (shortfalls) made up *elsewhere*. Hence the central government will generally try to (a) get someone else to pay for its spending programmes (e.g. through '*créditos blandos*', literally '*soft loans*', *securitisation* of public assets, from future concession flows to concessionary lease on pieces of prime real estate some government ministries happened to be sitting on), or (b) borrows but somehow makes sure the resulting debt dilutes away (e.g. by inflation), most likely *both*.

In any event, clever central government must do so (a) without the public understanding that that is what is happening (*i.e. cloaking soft loans under emergency decrees*), and/or (b) convince the public that it is the proper thing to do (*i.e. perpetuate the myth that a country can sustainably grow more, if only the central bank would be reasonable and relax the inflation target*), ignoring hundreds of years of economic history, not to mention perhaps millions of man-hours of theoretical and empirical economic researches categorically concluding otherwise.

Thus is the economic rationale: general lack of understanding in the fundamentals of public finance and monetary economics means that whilst old-fashioned monetising or monetary financing of the state might be disappearing in *form*, their emergence in *substance* will continue unabated. As such, enhanced public understanding on such matter increasingly becomes an integral part of modern central banks' monetary policy programme.

3.1.2 Economic Rationales re: Financial Stability

What is Financial Stability – Much has been said about the only definition of financial[28] stability available to us is the '*absence of financial instability*': "Strictly speaking, a financial system can be characterised as stable in the absence of excessive volatility, stress or crises." **[Gadanecz & Jayaram (2009)**, pages 365-6**]**.[29] We then take it upon ourselves to define ***Financial Stability*** as the stable environment by which an economy's *resident* financial institutions (whatever they may be) fulfill their function as ***intermediary*** (i) between payers and payees, (ii) between net savers and net borrowers (i.e. between present and future use of cash), and (iii) between the relatively more risk averse and the relative less

[28] There is a subtle, but meaningful, difference between our definition of '*financial*'--- which can to an extent be construed as a shorthand for '*financial* institutions', which itself can be taken to mean '*bank and non-bank financial* institutions', and ultimately a shorthand for '*financial institutions system*'---and the definition used by some authors to designate 'financial *markets and institutions*'.

[29] See also **Chant *et al.* (2003)** and **Alawode & Al Sadek (2008)**, the latter also attempting a redress.

risk averse,[30] *comprehensively* and without dramatic episodes involving system-wide ***banking/financial crises***.

Two points need to be made quickly. First of all, we know from history that far from being the exception, periodic crises in the banking industry is the norm. But no one stops pursuing peace just because history has taught us that ever since our ancestors settled down to form civic societies, war, perhaps more so than peace, is representative of human existence. So while absence of crisis is the ideal, often it comes down more to an exercise in 'damage limitation' and/or ensuring 'rapid and complete' recovery. Second of all, despite our earlier remark noting the discrete nature of financial stability problems from the continuous nature of monetary stability problems, there are financial stability issues, notably ***liquidity trap*** in particular and ***disintermediation*** in general, that do not materialise in the form of discrete crisis events.

Why Financial Stability is Desirable – Quite simply, financial stability is desirable because stable operations of said intermediary functions comprise a public good. We hardly need any economic construct to argue[31] that economies whose households are able to effect payments easily and reliably, defer present savings into future consumptions (alternatively buy now and pay later), or put away money safely and securely are superior to ones whose households are not able to do the same, or that the banking/financial system is crisis prone.

What Guarantees Financial Stability – Unless we are talking hypothetically about an economy with one state-operated bank, banks in particular, and financial institutions in general, are mostly private entities, so stability objectives, which more often than not conflict with profit motives, rely on the instrument and mechanism of *banking regulation/supervision*.[32]

What is Regulation, What is Supervision – ***(Banking/Financial) Regulation*** refers to the public-policy framework and mechanisms for ensuring that banks perform the

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[30] Here we take the liberty to include 'risk neutral' and 'risk seeking' agents as mere spectral extension to the group of 'relatively less risk averse' individuals.

[31] For deeper discussions re: the '***social costs***' dimension of so-called 'Too-Big-Too-Fail' banks **[Stern & Feldman (2004)]** in particular and banking/financial crises in general, see, for example, **Boyd & Heitz (2012)**, **Llewellyn (1999)**, and **Wray (2011)**.

[32] Henceforth it is understood that regulation/supervision pertains to banks in particular and financial institutions in general, but not *directly* to capital markets. We actually *prefer* to use 'banks' in a generic sense to refer to 'commercial banks' proper as well as any other forms of financial institutions that also provide banking services (as there could be financial institutions that hardly provide any services we associate with banking in the usual sense, i.e. mortgage brokerage).

intermediary functions safely (prudential considerations), competitively (sector efficiency considerations), and fairly (ethical conduct of business considerations), such that their individual entries and exits as going concerns are orderly, and their business strategies are not in conflict with the social objective of fostering sustainable economic growth and preventing costly banking/financial crises. As such, it can be seen that regulation has both *endogenous* dimension, i.e. ensuring that the banks under the regulatory regime operate prudently, efficiently, and ethically and *exogenous* dimension, i.e. ensuring that in birth (incorporation/licensing), living (the business of intermediation) and in death (dissolution), banks do not cause grieves to the society at large.

(Banking/Financial) Supervision refers to the public-policy framework and mechanisms for ensuring that *each and every* bank behaves in line with regulation and that *as an organic whole* the banking system is not in an immediate danger of a full-blown/system-wide crisis, nor operating in ways which will likely result in such a crisis in the not-so-immediate future. As such, it can be seen that supervision has both *individual* dimension, i.e. ensuring that individual bank comply with regulation, and *systemic* dimension, i.e. ensuring that the banking system as a whole does not collapse despite each individual bank in full compliance with regulation.[33]

We may contend further that in some sense, and to borrow from military terminology, regulation is *strategic*, whereas supervision is *tactical*. Successful tactical manoeuvres are necessary to win battles, but wars are won, and lost, by strategic campaigns. Poorly supervised banks will fail, but so too can a system of banks, all properly supervised yet operating under a poorly designed regulatory regime, collapse, and collapse spectacularly. A regulatory regime that perceives an "originate-to-distribute" mortgage banking business model as a "credit risk diversification" device, for instance, could lead to systemic collapse even if individual banks are properly supervised in accordance.

Economic Rationales for Regulation – For this we may refer to the entire body of literature on ***regulatory economics*** or economics of regulation. That is, why and when would it not be socially optimal for a full-fledge *laissez-faire* set-up whereby banks come and go at will (no licenses), conduct businesses in any manner they please (no codes), subject to pure market competition (no regulation). Suffice it to say that banking industry warrants an economy of scale and scope, and that the products and services it offers is a kind of infrastructural goods that the consuming public should not, have to make new purchasing decisions on a daily basis (i.e. in the way that what we have/where we go for lunches constitute daily purchasing decisions).

[33] In this light, we forgo the oft-made distinction between regulation as applies to the system as a whole vs. supervision as applies to the entities as individuals.

Economic Rationales for Supervision – Banks are limited liability entities. Secondly, they are leveraged entities. Together this means that bank owners[34] are fundamentally motivated to (i) leverage the bank's capital structure as much as possible, and (ii) take on greater risk for a given level of capital structure. This tendency holds true for any limited liability company, not just banks. However, whereas with any other businesses, the burden of ***credit risk*** monitoring resides with the creditors, with banks this ***monitoring cost*** is incommensurately high for any *one* creditor, i.e. the individual depositor.

Hence it would only make economic sense if the depositors all relinquish the monitoring task to other agencies, which, from an economy of scale/scope consideration, might as well be the national ***Financial Supervisory Authority (FSA)***.[35] But strictly speaking, this so-called *delegation* (of monitoring task) argument could just as well call for supervisory tasks to be conducted by ***Deposit Insurance Agency (DIA)***. In theory at least (albeit so far unheard of in practice) even an accounting audit firm could be commissioned to perform banking supervision on behalf of the depositors.

Economic Rationales for Financial Stability as Central Banking Mandate – Recall that central bank is first and foremost responsible for making money works like money. As bank liabilities form an integral part of money, the regular, disruption-free operation of the entire intermediary machinery is of essential concern to the central bank. The central bank cannot be divorced from financial stability for this reason.

What then to make of the once-fashionable institutional divorce between "central bank, the monetary policy committee secretariat", on the one hand, and "financial authority, the super regulator/supervisor of all financial institutions", on the other? In truth, even under such a regime, financial stability never left the central bank. Put in another way, the central bank remains fully accountable to financial stability mandate, but opted to transparently *outsource* the regulation and supervision function to a separate legal entity. In any event, there the theoretical argument put forward centred around the supposed conflict of interests between the central bank's monetary policy and banking supervision functions, i.e. a central bank might be 'prepared to go all out' in rescuing its supervised banks, flooding the system with so much excess liquidity and jeopardising the entire economy with an even worse fate (run-away inflation). It turns out that this requires a much simpler fix in the form of *central bank transparency* than the ***coordination failure*** that invariably ensued when

[34] Here we use the generic term 'owners' instead of 'shareholders' in order to sidestep the *principal-agent* conflicts between them and banking 'executives'.

[35] In this one *particular* context, the depositors comprise the principal and the central bank the agent; any principal-agent issue is between the depositors and the central bank (not between the depositors and the deposit-taking banks, as is sometimes understood).

the supervisory function of a central bank got carved out. The global financial crisis finally put paid to the grand 'super-regulator-outside-the-central-bank' experiment. If anything, given the rising complexity involving so-called ***Systemically Important Financial Institutions (SIFI)*** **[Nacaskul (2010)]**, the informational and policy coordination between the monetary policy and banking regulations functions is likely to become even more, not less, critical to financial-economic stabilisation.

Economic Rationales for Regulation as Central Banking Function – Note the subtle, yet meaningful, difference between banking and other regulated industries. Public utility companies, for example, are regulated by an agency created explicitly to design and enforce regulation. With banking, commercial entities are regulated by a public policy body that whose former version is very much one of their own. Hence phone *companies* are not regulated by a 'central' phone *company*; whereas, *banks* are regulated by a 'central' *bank*.

In hindsight, one obvious reason why the central bank should regulate bank *themselves*, is because the central bank is also a fundamentally bank, run by bankers as opposed to legislatures or drafters of banking codes. This kind of regulation-by-peer-entity feature is actually quite unique to banking. Classical rationale for regulation, as per textbook *regulatory economics*, calls for industrial regulator to be vigilant of two things: ***Competition*** (intra-industry collusion, rent seeking and general lack of competition) and ***Conduct*** (consumer protection, ethical practice, and general show of good faith). But *banking* regulation calls for the third component: ***Prudence***. And one cannot regulate for prudence if one does not intimately understand the economics of risk taking. This is why central *bankers* should be put in charge of regulating banks. For a current national survey on 'who supervise what', see **Horakova (2012)**.

Economic Rationales for Supervision as Central Banking Function – Going as far back as the LoLR tradition, we see that it is the central bank that ultimately underwrites the viability of the entire edifice that equates bank liabilities with money and vice versa. Even under ideal circumstances where all banks are sound and profitable, liquidity hiccups do arise, and it is in the interest of the central bank to put out matchstick fires before they become a raging inferno, so to speak. As such, the central bank must be privileged with private information, information of the kind that enables it to judge whether a given bank at any one time or another is facing 'accidental' liquidity shortage or whether it is truly destitute, destined for insolvency.

Of course, today the picture is rather more confounded. The line between 'pure' liquidity shortfall and 'true' solvency threat is harder to drawn, especially as the latter is but one self-fulfilling phenomenon away from the former. It could well be the case that central banks, in waiting for 'proof positive', have in the past contributed to said self-fulfilling chain of events. But the need remains for the liquidity-injecting agent---and none more powerful

to do so than the central bank---to "fully suss out" the genuine financial health of each bank. So the LoLR argument for supervision by the central bank is as relevant today as it was in the days of Bagehot's *Lombard Street*.[36]

3.2 The Central Banking Policy Space

Policy Space *conceptual framework*[37] generalises the very notion of how we go about identifying each ***(public) policy area***[38] with a (policy-sector) institution's core, critical and peripheral role and responsibility. It involves four concepts.

3.2.1 The Four Concepts

Policy Mandate Mapping is a sort of 'topographical' mapping, identifying each (public) policy area as belonging to any one of the ***policy domains***---i.e. 'policy sanctum', 'policy foundation', 'policy territory', 'policy neighbourhood', and 'policy environment'[39]---relevant to any (public-sector) institution in general, central banks in particular.

Multiplicity of policy domains greater than two thus allow for a greater gradation (vis-à-vis the *spectrum* of do and don't, from absolute must to absolute mustn't, from absolute can to absolute can't, from absolute should to absolute shouldn't) than is available with the conceptually harsh binary categorisation (i.e. whether a particular policy area is or isn't an institution's role, does or doesn't belong to an institution's responsibility).

Basically, policy mandate mapping represents the final locality of each policy area within each of the institution's policy domain, i.e. where, but does not on its own give the (economic) rationale, i.e. why, this policy area would belong to one institution's policy sanctum, and yet considered part of policy neighbourhood by another institution. For example, consider 'fiscal discipline', which for the Ministry of Finance (most would agree) reside in *its* policy sanctum; whereas, for the Ministry of Commerce the same issue would be considered an area in *its* policy neighbourhood.

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[36] And finally, almost as a bonus, supervision has also been shown to enhance the monetary policy function **[Peek, Rosengren, Tootell (1999)]**.

[37] See, for example, **Mayer (2009)** and **Ocampo & Vos (2008)** for similar, albeit separately derived notion of 'policy space'.

[38] Our definition of 'policy area' is *intentionally* vague. It could refer to anything from formal policy charter, i.e. Monetary Policy (for a Monetary Policy Committee), to current issues, e.g. household indebtedness, to social-outreach initiative, such as enhancing financial literacy, etc.

[39] The concept of policy space of course can accommodate any other 'domain construction scheme'.

Policy Capacity Advantage – a sort of 'metric' between fundamental societal needs for policy responses, on the one hand, and, on the other, each institution's core *competency*, hence *capacity* to provide policy actions and exercise policy-oriented tools and instruments.

It is generally thought (or at least pedagogically narrated as such) that an institution is *first* charged with certain policy mandates, following from which is is *then* endowed statutorily with the authority (legal, technical, manpower, or whatever) to exercise policy controls. In short, *responsibility begets power*. We maintain, however, that exactly the opposite chain of events tends to be the more natural order of things. That is, a type of organised body *first* emerged with ***absolute advantage***, or even mere instance of ***comparative advantage***, in fulfilling certain societal functions, which upon being found perfectly viable, acceptable, and suitable as policy agents, is *then* compellingly legitimized, perhaps decades later, with formal policy mandates and legal authority. Something about a particular type of institutional actor, its *core competency*, aligns very well with some fundamental societal need, making it more able to respond, hence '*response-able*', than any other types of institutions. In short, *power begets responsibility*. Our comments here echos observations we made earlier about the 'emergence' of central banks as policy-sector public institutions (see **2.3 'Emergence' Central Banks**).

Basically, a policy capacity advantage 'analysis' gives you the (economic) rationales for *why* this, but not that, institution is charged with these, but not those, policy areas. For example, consider 'hurricane relief', for which, as it generally requires large amphibious ships, it is hard to imagine anybody but the Naval/Marine Corps put in charge.

Policy Manoeuvre Room – the idea that difficult, long-term policy needs time to bear fruition and in the meantime are beset with all kinds of problems, so an institutional actor needs 'time and space' so that the right strategic policy orientation can be pursued and steadfastly 'stuck to' despite near-term gestation and setbacks. For example, consider reforestation, with which the Ministry of Agriculture's Forestry Department is charged, and the sort of time span necessary to see tangible results. Or consider 'global climate change modelling', which for the better half of the 20th century had to fight very hard to gain traction. Likewise, many policy areas are hidden from public view and only make headlines when struck by disasters. Consider, for example, responsibility over sewage treatment or flood management.

Basically, a policy manoeuvre room 'analysis' tells you *how urgently* or *how often* an institutional actor has to defend its policy territory in order that it may maintain institutional credibility. A Forestry Department with meagre policy manoeuvre room may find its reforestation programme challenged (funding curtailed, forest reserve areas turned over to the construction of hydro-electric dams, agricultural land-lease, or even commercial

developments etc.) if it could not convert barren land to lush rain forest *soon enough* to satisfy the public's expectation. The connection between this line of arguments and public-policy research on such slippery, yet critical, concepts as ***political/social capitals***[40] is largely unexplored.

To be fair, this notion that benevolent policy agent, charged with long-term, difficult public-policy agendas, requires extra 'elbow rooms' so that it may execute policy manoeuvres (that are only likely to bear fruitions only far into the future, as well as fraught with numerous setbacks in the meantime---is not without controversy. Nonetheless, we need to insert this ideation as an element of *policy space* because how much 'manoeuvre room' an institutional actor has depends, to a significant extent, on how much policy 'real estate' the institution has as *policy territory* in its possession, i.e. the extent to which the institution credibly internalise a number of non-core policy engagements onto its institutional ground, within its institutional boundary.[41] A concrete example of this can be found, for example, in how a central bank takes control of fiscal-monetary policy coordination agenda. A central bank that fails to *internatlise* fiscal-monetary policy coordination may find inflation threat arriving suddenly, knocking on the door to the policy sanctum, having taken a ride on a runaway fiscal-budget train!

But policy manoeuvre room is not just about having the time (to let long-term policy measures take effect) and the space (to allow the institution to adhere steadfastly to a good piece of policy despite short-term setbacks). It is also about the balance between policy requirements on the one hand, and how much '***policy ammunitions***' the institution has on hands. Imagine two countries with similar deflation threats, one with the current policy rate much nearer to double digits, and the other with the policy rate already near zero, whence the former can be said to possess a larger policy manoeuvre room than the latter. A central bank that shies from raising the interest rate to temper an exuberant economy will, ironically (nay, *poetically*), find itself short of policy ammunitions just as said economy eventually crashed.

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[40] The term as at least two usages: social capital representing the value of social *cohesion* within a community that helps it withstand hardship and even catastrophes as well as resisting political manipulations (social capital is that which belongs to the society, see especially **Ostrom (2000)**), and social capital representing the amount of social *goodwill* exhibited toward an institutional body (social capital is that which belongs to an institution operating in a society). We use the term 'social capital' in the latter, somewhat less extensively researched, sense.

[41] We parenthetically point out that this notion has much in common with the outstanding body of literature on ***political business cycles*** (for example **Nordhaus (1975)**, **Drazen (2001)** and **Leertouwer & Maier (1999)**]. See also **Gabillon & Martimort (2004)** and **Maxfield (1997)** for discussions relating to the political economy of the central bank' institutional boundary.

Policy Control Dynamics – the recognition that 'law of dynamics' governing the system and entity interactions, in a given policymaking context, at any given moment, and in relation to which policy actions take effect, can be overwhelmingly complex, subject to frequent regime changes, sensitive to model calibration, and/or endowed with low degree of controllability (in a sense of *cybernetic-optimal control*) by any and all policy levers.

For example, consider 'earthquake prediction' vs. 'hurricane prediction'. The differences in terms of predictability, reaction time, loss prevention, etc. means the agencies in charge of respective policy areas will have to invest their resources very differently (one predicated on efficiency of rescues, another predicated on quality of forecasts, and so on). In each, the *practical* implications as to which 'control levers' are appropriate (whether any will actually work), how long will regimes of effective policy 'control leverage' last (if at all), or what role an institutional actor may play unilaterally or in conjunction with other policy agents (if coordination possible), will differ greatly. So being able to identify, verify, and in a very real sense *engineer* the relevant policy control dynamics is critically important to the job. At the very least, as policy control dynamics shift and change, a policy-sector institution must seek to *understand* and continually update the 'body of knowledge' as to what 'dynamical laws'[42] are at work in the relevant policy context.

As another example, an economic policy space where private agents *actively* form expectations about the medium-term effects of fiscal and/or monetary policy measures will qualitatively differ from an economic policy space whose private agents are easily *surprised*, and from yet another economic policy space where private agents remain categorically *incredulous* as to whether fiscal and/or monetary policy measures shall yield any results whatsoever.

Basically, a policy control dynamics 'analysis' tells you what kind of policy response framework is/isn't feasible, desirable, or optimal, and correspondingly *how*, methodologically speaking, to operate the policy control levers.

3.2.2 The Five Domains

Having applied the four concepts to our analysis of central banking (the discipline) here we elaborate on each of the five policy domains for generic/idealised central banks (the institution).

[42] This sense of policy space in particular is analogous to the notions of physical universe in physics. In mathematics, space is not merely endowed with laws of interactions, the notion or set, i.e. mathematical space, is actually defined in terms of set elements and mathematical operations encapsulating the interaction laws.

Policy Sanctum – the place for 'policy areas' that form the *core institutional mandates* in the sense that they (a) spell the very essence and purpose of an institution (its *raison d'être*), (b) answer to fundamental societal needs (policy requirements that contemporary civic societies cannot satisfactorily function without), *and/or* (c) constitute the exclusive dominion of the 'host' institution (political 'right-of-way'). In short, society needs them, the institution *now*[43] exists to answer those very needs, and no one else takes priority over on such matters. The entire subsection 3.1 was devoted to elaborating our conception of the central bank's policy sanctum.

Policy Foundation – portfolio of institutional functions that directly supports policy sanctum, i.e. in the sense that they endow a particular form of institution with core competency in responding to some fundamental societal needs, *encapsulated within said institution's policy sanctum*. In the case of central banks, many were banking operations that 'proto' and 'functional' central banks were historically linked with.

Here, a medieval castle's 'foundation stones' offer a useful visual analogy. For a Ministry of Finance, coin mintage and statistical department are examples of the ministry's foundation stones. Just as it is true that not all castles were built on the same exact set of foundation stones, today we see that not every country's Ministry of Finance mints coins, although most do, or had done so in the past. And just as edifices of a different purpose, i.e. stone bridges, could have employed nearly identical type of foundation stones, today we see *more* similarity than difference between Ministry of Finance's statistical department and, say, one at the Ministry of Commerce.

For most central banks, we have (tentatively) identified twelve such areas, namely: (physical) note printing/issuance, payment and settlement, bank licensing, banking codes, on-site bank examination, opening discount window, maintaining reserves accounts (for member commercial banks), gathering/analysis of monetary/financial/economic statistics, open market operations, foreign exchange intervention, being a fiscal agent, and, last but not least, managing the international reserves. Not every central bank takes up all these, but most central banks do most of them. These central bank 'foundation stones' are depicted in Diagram 3.

[43] Again, in keeping with our thesis that an organisational body may have existed long before, hence pre-dating the formal recognition as a policy-sector institution.

Diagram 3: Foundation Stones

Policy Territory – the place for areas of policy engagement that are not generally considered 'central' to the institution---neither policy sanctum nor policy foundation, and probably have more in common with tasks performed elsewhere, by other agents, within the greater 'economic ecology'---but nevertheless deemed critical to the functioning of the institution, hence 'internalised' and 'planted' on the ***institutional ground***, which goes all the way out to the limiting ***institutional boundary*** (i.e. the *absolute no-no's*) that 'fences' the institution's proprietary domain therein.

Here a Victorian 'ground of the estate' provides a fitting analogy, for just as gardens are very much part of the estate, trees and shrubs are by no means exclusive to it, and it is for the landscape architects/artisans[44] to carefully choose what particular trees and shrubs so enhance the estate. The institutional boundary is then analogous to the outer castle wall, or mote, and is often defined in terms of what an institution must not engage in. For most, if not all, public-sector institutions, one of the principal tenets defining their institutional boundary is that they shall not compete commercially with private-sector entities, most definitely not those over which they exercise some kind of supervisory oversight authority.

[44] An especially apt place to pay homage to Lancelot "Capability" Brown, whose 18th century 'naturalistic composition' meant that many of the trees planted on estate ground are probably of the *common* variety (to be found in the wooded area just on the outside), yet are chosen carefully and specifically for the purpose of enhancing the grandeur of the estate, much like *elements* of national agenda posited (planted) within an institution's policy territory.

We cite the following four areas as good examples of policy areas generally found on many central banks' institutional ground: coordination/cooperation vis-à-vis governmental bodies and inter/supranational organizations---notably the International Monetary Fund (IMF) and the Bank for International Settlements (BIS), strategic policies/programmes vis-à-vis banking/ financial-sector landscape/master plan, ***financial markets development*** agenda, and deposit insurance/consumer protection mechanisms.

On coordination/cooperation with the government, note how the extent to which the *monetary stability* wing of the central bank internalises and manages ***fiscal-monetary policy coordination*** issues materially contribute to the degree of (monetary) policy manoeuvre room it then commands. With little or no such coordination, the central bank may find that an overzealous government has already laid out an inflationary, populist spending programme, effectively bringing the issue to the very edge of the central bank's policy sanctum. Had the central bank been in the capacity to temper 'fiscal exuberance' from the very beginning of the budgetary process, the inflation *outlook* it has to face (with the same set of policy options) might not prove so *exacting*.

Also, in countries where the government also sponsors the creation of specialised financial institutions, then coordination between it and the *financial stability* wing of the central bank will also feature prominently on the latter's institutional ground.

On financial markets development, note how it is essentially a national agenda, yet most central banks would take active interest in ensuring that the domestic-currency bond and money markets are particularly well developed, seeing as they rely on these very markets for effective ***monetary policy transmission mechanism***.

As regards the central bank's institutional boundary, we have identified a couple of absolute central banking no-no's: a central bank must never directly fund or finance the government[45] and/or individuals (directly contravenes with all that is sacred, the policy sanctum), never let profit motives override or in any way compromise key policy objectives (ever since we became 'emergence' and 'synthesis' central banks), and never set out to compete commercially with banks in their supervisory jurisdictions (clearly in conflict). Our central bank's institutional ground and institutional boundary are depicted, respectively, in Diagram 4 and Diagram 5.

[45] Preferably make it into law, as many countries wisely do so **[Jácome, *et al.* (2012)]**.

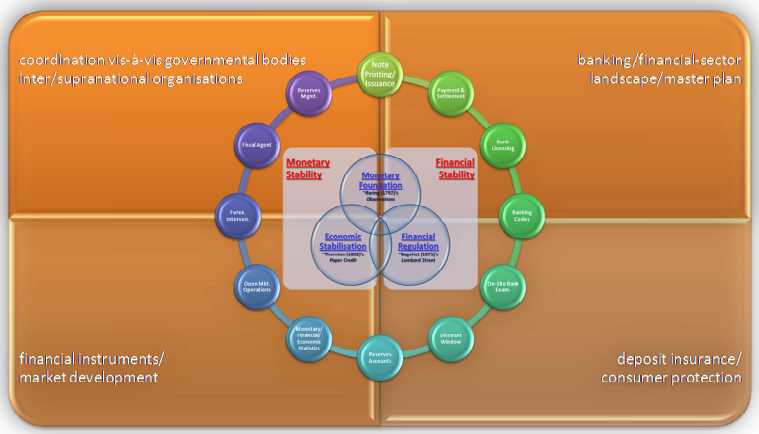

Diagram 4: Policy Ground

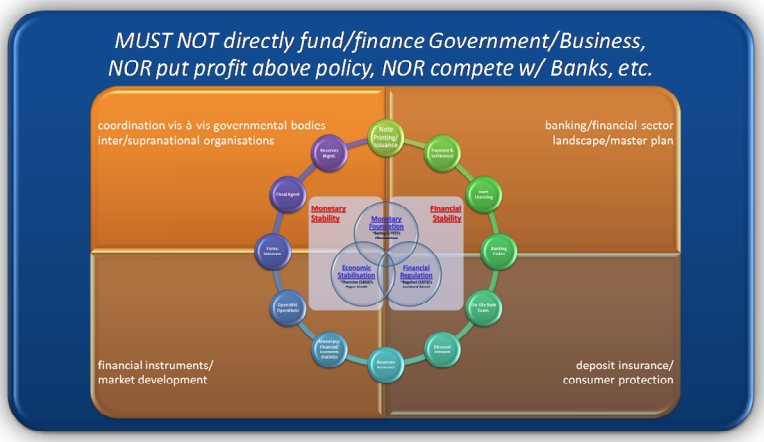

Diagram 5: Institutional Boundary

Policy Neighbourhood – the place for policy areas not belonging to an institution, either because they are unequivocably domains of *other* 'neighbouring' institutions, or perhaps because they resemble some sort of '*public-policy no-man's lands*'. Such policy agendas and agencies basically do not belong to the institution of concern, but nevertheless impinge heavily on *its* policy conduct. For any central bank, chief amongst neighbours are of course the Ministry of Finance, i.e. in its ***fiscal authority*** guise (see Diagram 6).

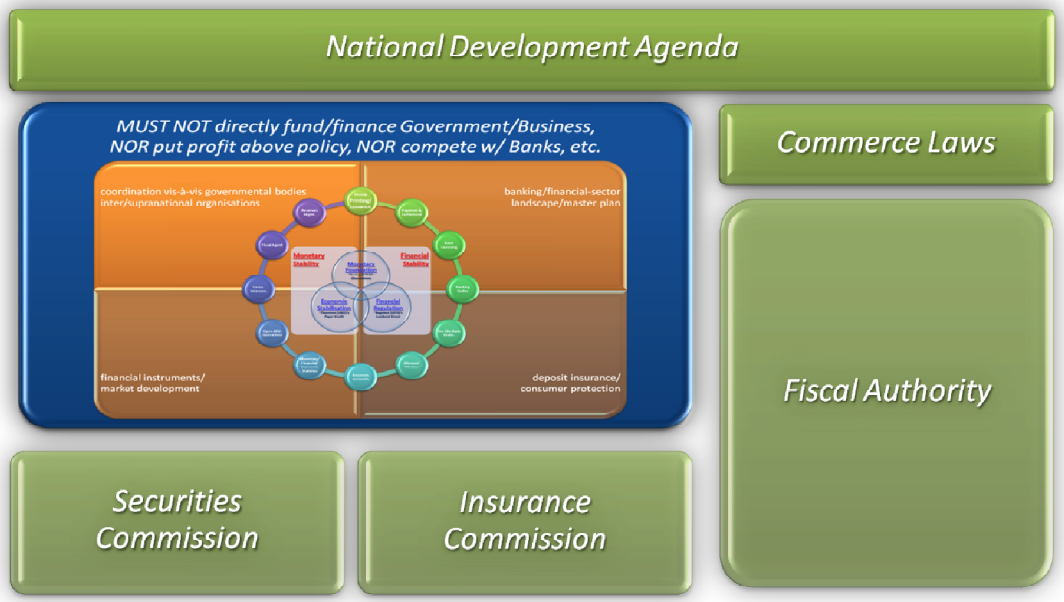

Diagram 6: Policy Neighbourhood

Policy Environment – the realm of policy issues and backdrops that properly *pervade* all neighbouring institutional actors. It is the very operating context within which policy-relevant factors and elements---near or far, miniscule or overwhelming, domestic or global---jointly limit, largely define the scale and scope by which an institution's policy actions take effects. What especially distinguishes policy environment from policy neighbourhood is that the elements of the former normally *infuse* deep within an institution's policy territory; whereas, elements of the latter only *breach* an institution's institutional boundary occasionally. National politics in the broad sense, sustainability of economic growth, international competitiveness, household indebtedness, basic literacy, etc. are examples of 'policy-environmental' elements of concerns shared by central bankers, finance minister, and national economic development board alike.

In particular, promoting ***sustainable, balanced and equitable growth*** is foremost amongst national agenda making, and the central bank, by virtue of its being a large public institution, would naturally takes an active role. But the meaning of 'active' here does not suggest the central bank actively promotes growth, rather, what it *actively* does, i.e. maintaining monetary and financial stability, forms the basis for ensuring that the country's economic growth *is* a sustainable, balanced and equitable one.

The central bank also partakes in national education, not so much because it can contribute significantly to the national education program, but more so because the level of national education, which, in turn, translate indirectly to financial literacy and the populace's ability to safeguard their economic wellbeing on a household level, makes the job of central banking all the easier.

Conversely, in an economy populated by poorly educated mass, lacking in basic understanding of economics, susceptible to political spins, the central bank would probably have to spend as much energy defending what it does (i.e. stability mandates) and its principles (i.e. central bank independence) as it does policymaking. This constitutes, from institutional economics standpoint, true dead weight loss.[46]

Likewise, *a culture of honestly, transparency and accountability in all offices*, public or private, i.e. general good governance, is not only good for the country, but also makes central banking tasks more efficient and effective, and so on. That these good governance-derived positive externalities are desired is nothing new, our point here is to reiterate that *institutionally*, the central bank has more *economic rationale* to *internalise such externalities* than is generally recognised.

Understanding the central banking policy space is very critical vis-à-vis the discipline of central banking, but in practice, central banks, the institution, will achieve nothing if they do not possess that most critical of all ingredient, institutional integrity, the subject to which we now turn.

[46] To avoid having to argue *forever* with the mass why stability is a good thing, and so on, the central bank should promote *lasting* public understanding, particularly about what it does that is so critical to the people's *own welfare*. In the long run, a better educated public might actually prove instrumental in ensuring, *for their own sake*, long-term economic prosperity and stability.

Section 4: Institutional Integrity

Institutional Integrity refers to trueness in the following senses: (i) the institution's responsibility is true to some fundamental societal needs, (ii) the institution's role is true to its responsibility, and (iii) the institution's action is true to its role. In short, an institution with integrity with one that effectively "does what it says (for the sake of fulfilling fundamental societal needs) on the tin". *An institution with integrity is one that properly understands, reveres, and protects its policy space*.

The late ex-Fed Chairman **William McChesney Martin, Jr.** is attributed with the incisive, evergreen remark that the job of the Federal Reserve is "to take away the punch bowl just as the party gets going". Sense (i) of institutional integrity requires simply that, because it would be unacceptable for all the party guests to end up overly intoxicated, *someone* in that room should be on guard against such a disorderly turn of event. Sense (ii) requires that someone then makes it *his/her* business to take away the punch bowl, recognising that nobody else would, could, or should (and certain there is no alcohol or any other intoxicating agents elsewhere in the room). Step (iii) requires that he/she has (a) the *mental acuity* to judge precisely when the exact moment of "just as the party gets going" is, (b) the *will* to proceed "to take away the punch bowl", and (c) the *authority* to carry out 'punch bowl removal' successfully.[47]

Thus is the economic rationale: when the society is swayed by an economic mood swing, it is up to the central bank, under the right kind of leadership, to not succumb to the illusion. A stronger case *may* yet be made for the central banker (profile) to be not merely neutral, but perhaps bias toward apprehension, erring on the side of caution.

We all know the story of a child "crying wolf", but in the complexity of contemporary financial economy, what appears to be "crying wolf" might hide a larger truth. What if there *was* a wolf lurking, its *proven* absence having been a direct result of the rallying town cries. Perhaps the converse of "predicting 9 out of the last 5 recessions" [48], i.e. "predicting 9 out of the last 5 *bubbles*" is precisely the role that the central bank does best, and the public should understand that *after-the-fact* absence of bubbles is no evidence of absence (of potential for eventual bubbles, had the central bank not raised the alarm).

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[47] Parenthetically, we contend that while step (iii) can be very challenging, it is the 'instinct' vis-à-vis step (ii) that is the hallmark of keen central bank governorship.

[48] First attributed to Prof. Paul Samuelson in his September 19th, 1966 *Newsweek* column, in his description of *Wall Street*, and more recently used by Prof. Yoram Bauman, parenthetically the "world's first and only stand-up economist", in his description of *economic forecasters*.

Thus is the economic rationale: it is in the society's best interests to pay attention to alarms, even if they turned out to be "false". When central bankers *truthfully* warns of financial bubbles, and none came, that alone is no indictment on the *truthfulness* of said warnings. Just as there is a lot of *truth* in self-fulfilling prophecies, failed economic prophecies do serve a purpose.[49] For central bankers, false alarms can be both an indictment and a badge of honour.

But conscious, mindfulness doesn't just apply when central bankers need to temper public exuberance. Central bank leadership must also not succumb to a temptation of a different kind, namely to take on anything that resembles public goods and incorporating them into the central banking policy portfolio. The key is to recognise that *not everything that is good and proper for a society is good and proper to pursue at/by the central bank*. Many a well-intentioned but injudicious 'policy hogging' end up compromising and undermining the very of the central bank. The central bank must not be eager to import policy areas inside its policy territory, lest it proves a 'Policy Trojan Horse'.

For example, is hurricane/flood/earthquake/tsunami relief programme good and proper? Of course it is. But that is not the same as, in fact a very far cry from, having the central bank 'robin hood' reserves assets to finance it, regardless of how trivial the sum stands relative to the international reserves position. This becomes especially hard when the central bank leadership, human beings after all, is being publicly strongarmed by the government, taunted for "standing by callously amidst public suffering". This is precisely where strong central bank leadership must prevail. By giving in to public slant, the central bank does more harm than good. By "sticking to its gun", the central bank does more good than harm.

To be sure, an institution may occasionally step outside its policy territory when extreme circumstances called for, without compromising its institutional integrity. A casual bystander may be called upon to administer a CPR (Cardio-Pulmonary Resuscitation) someone despite not having a proper training whatsoever, just because there is no one else available. By this reasoning, central bank funding in the wake of the 2010 Haiti Earthquake Disaster, where *economic* losses amounted to some 120% of the Haitian GDP, might be called for. But for natural disasters in general---and according to the World Bank most natural disasters run just between 2 and 15 percent of GDP---the central *government*, through ordinary and extraordinary budgetary processes, must assume fiscal responsibility and not try to shift the burden to the central *bank*. The habit of (and excuse for) monetising the economy "for a good cause", once formed, puts everyone on the proverbial *slippery*

[49] Unlike prophecy of UFO landing and mankind's enslavement, etc., the "false alarm" regarding the "Y2K" *crisis did mobilise resources* that *may* be said to have exactly prevented it.

slope overlooking an even greater catastrophe. A government with a minor natural disaster on hand asking for the central bank to monetise the economy to pay for it is no more respectable than a psychosomatic person asking to for a CPR every time he/she runs slightly out of breath.

But many issues are not so clear cut. For example, if, as we have seen (recalling the earlier discussion on policy space), financial market development is very much an agenda that central banks legitimately take active interest in---as a deep domestic fixed-income market is instrument to contemporary monetary policy conduct, and so on---then there might arise circumstances in which it is good and proper for the central bank to shore up government bonds from the *secondary* market. But we all appreciate that if bonds perform well in the secondary markets, new issues in the *primary* market get a boost. So to what point does this then border on actively helping the government obtain debt financing, which is *never* good and proper for a central bank?

Thus is the economic rationale: desirability of policy objectives and direct outcomes along does not dictate that it is good and proper for the central bank to be the one implementing the measures.

Of course, in the reality of national politics and public policymaking, political interference is the norm, not the exception. By political interference here we mean especially in the form of goading the central bank to step outside its policy territory and help finance the government "of the people, by the people" in its earnest desire to do good things "for the people". The point here is not to deny political interference as a social phenomenon, *but to deny it as a legitimate democratic discourse*.

Thus is the economic rationale: in a highly compromised state of affairs, any central bank may find itself occasionally manhandled, interfered, and even overpowered. But even while said central bank cannot muster sufficient political power or social capital to be able to repulse such brazen incursion deep inside its policy territory, the fundamental *wrongness* of said breaches in policy sovereignty must be maintained. In a sense, institutional boundary shifts and changes--we have seen that from our analysis vis-à-vis historical evolution---but it should not be *redrawn* simply because at present an institution is forced to live with the reality of policy interference and political dominance.

4.1 Interplay between Institutional Integrity, Credibility, Principles and Policy Space

But institutional integrity is by no means an isolated phenomenon. Firstly, we contend that institutional integrity is fortified by a set of ***institutional principles***, and for central banks principal amongst them are ***central bank independence*** and, as a direct

corollary, ***central bank governance***,[50] which itself comprises of two key components, ***central bank transparency*** and ***central bank accountability***.

Secondly, we posit that ***institutional credibility***[51], which, on the one hand, can be thought of as a sort of public perception of institutional integrity and, on the other, can be thought of as the amount of public esteem held in regard to the moral and intellectual leadership exhibit by the people running the institution, matters crucially to central banks, perhaps much more so than most other forms of public institutions. After all, the very medium the central bank governs, namely *fiat* money, is fundamentally backed by public *belief* in its validity and legitimacy as national currency.

Thus is the economic rationale: (institutional) credibility is the very currency of central banking policy conduct. This is especially true in the modern era of *fiat* money, which can be said to operate entirely on a publicly reinforced 'belief system'. As is true of *monetary* currency, which itself serves as *financial* capital, we maintain that institutional credibility can and does *accumulate*, *runs low*, and *gets filled up (recapitalized)*: central bank credibility runs down with each poorly tackled banking crisis, policy target shortfall, etc., but accumulates over time the longer the public *sees* it successfully resist political interference, economic exuberance, etc.

Summarily, whilst *institutional integrity* is the fundamental 'quantity' we seek, it is a quantity that requires reinforcement mechanisms in the form of *institutional principles* (see next subsection), and it is when manifested as *institutional credibitlity*, that the 'quantity' of institutional integrity, thus accumulated, becomes instrumental in 'all things central banking'. Diagram 7 succinctly summarises the relationship.

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[50] For an extensive discussion of central bank governance from an *institutional economics*, see **Oritani (2010)**.

[51] Though not fully fleshed out in this essay, we are working on the concept of "*credibility as currency for policy engagement*". With this, we can proceed to conceptualise 'policy services' (to be delivered by an institutional actor) as a quasi-measurable *quantity* and 'institutional credibility' as its *pricing currency*. The *upward*-sloping line summarising the truism that 'credible institutions can (are entrusted to) deliver more policy service' then becomes our ***(public) policy supply function***. The *downward*-sloping line summarising the similarly self-evident argument that society will 'engage an institution with more policy services, the less degree public trust is required outright in discharging said policy services' then becomes our ***(public) policy demand function***. What 'policy service' a particular institution is tasked with thence corresponds to the equilibrium intersection between these new types of demand and supply functions. Moreover, recalling our earlier exposition on the underlying policy space concepts, calibration of said policy demand and supply functions will be affected to varying degree by factors determining policy *capacity advantage* and policy *manoeuvre room*.

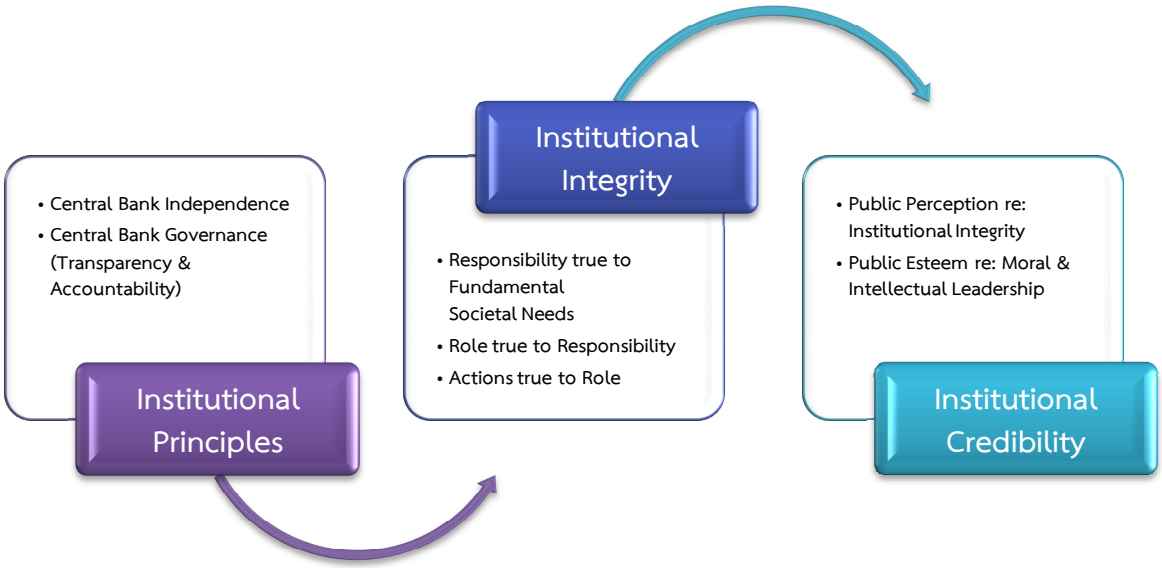

Diagram 7: Institutional Principles, Integrity & Credibility

We now discuss the concepts and highlight the economic rationales underlying central bank independence, transparency and accountability in details (conceptual hierarchy depicted in Diagram 8).

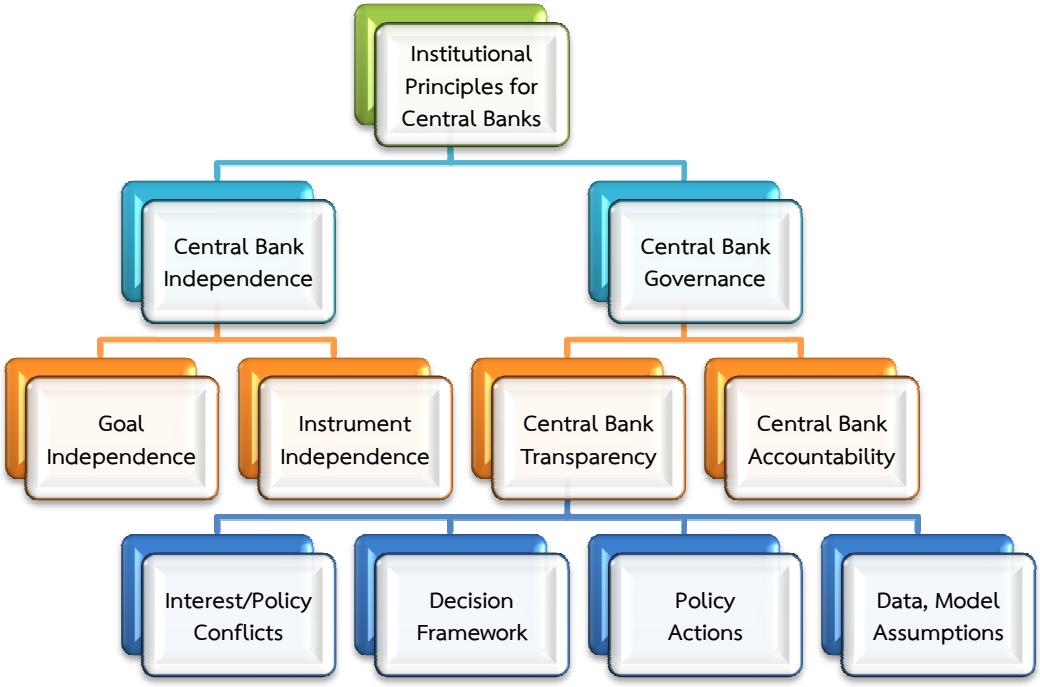

Diagram 8: Institutional Principles for Central Banks

4.2 Central Bank Independence

Central Bank Independence (CBI) refers to the degree[52] to which the central bank (its policy executive power, whatever form it takes) is entitled to *define* its role and responsibility *true* to its core mandate, and that in fulfilling its role and responsibility the central bank is not interfered, especially politically, from the central government or any interest groups.

Here it is most pressing to be unequivocal about one thing: *independence is not the same thing as freedom*.[53] An independent central bank is not free to do what it pleases. In a proper political discourse, freedom pertains to the *liberty* by which an individual chooses to do or not to do something, so long as his/her action/inaction does not infringe on the liberty of others. As a matter of fact, as freedom is deeply tied to the notion of civil liberty vis-à-vis an individual, it would be rather meaningless, indeed puerile and nonsensical, to impute any central bank, an *institutional* actor, of somehow yearning to be 'free'.

Thus is the economic rationale: independence is that which enables an institutional actor to function, to perform the tasks it was designed for, free of undue interference and with a degree of strategic and tactical autonomy. For that reason, independence is invariably *bound* to accountability to mandate and transparency in the execution, hence central bank independence, central bank transparency and accountability come together as a package. And parenthetically, a properly 'independent' central bank is never 'free', certainly not from the sanctity of its sacred promise to uphold monetary stability and financial stability.

Goal vs. Instrument Independence – Here we follow **Fischer (1994)**, **Debelle & Fischer (1995)**, and **Blinder (1999)**. ***Goal Independence*** refers to the degree to which the central bank is entitled to take the policy mandate entrusted to it and translate it into ***policy goals*** as it sees fit and proper. For instance, while central banks generally are not free to 'opt out' of the monetary stability mandate, central banks with goal independence will themselves interpret what is required to ensure, ultimately, that the economy is *monetarily stable*.

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[52] There have certainly been attempts to put numbers to the concept, for example, in **Crowe & Meade (2007)**, where both the independence and transparency concepts were proxy-measured.

[53] Another popular misconception is that independence begets coordination failure, or that the central bank is always there to "police" the government. For example, **McCulley & Pozsar (2012)** points out how "in a liquidity trap the central bank's role changes from one of policing the government to keep it from borrowing too much, to one of helping it to borrow and invest by targeting to keep long-term interest rates low…" (page 4).

Instrument Independence refers to the degree to which the central bank is *not* entitled to define policy goals, not by itself, but with these set, is free to specify whatever ***policy instruments*** necessary and within its power to achieve them. For instance (again, sticking with the monetary stability mandate example), many central banks operate under the so-called ***Inflation Targeting (IT)*** regime, which generally means that some polity external to the central bank, i.e. the central government (deemed democratic representative of the people) gets to translate from policy mandate into *quantitatively precise* policy goals, hence ***inflation targets***, but then leave the central banks alone to do whatever they deem necessary (and within their power) to achieve them. Usually, i.e. to prevent ridiculously ambitious or nonsensical policy goals being set, the central governments and the central banks will sit down together to define, and subsequently review, those inflation targets.

We conclude the matter thus: no central bank enjoys "*mandate* independence", some are endowed with *goal* independence, but *instrument* independence is the absolute *minimum* needed as amongst the fundamental institutional principles to ensure institutional integrity for the central banks.

Incidentally, we have frequently seen central bankers defend CBI by appealing to this "instrument vs. goal independence" distinction, i.e. to the effect that CBI is desired insomuch as it refers to the former, but it would be contrary to the spirit of electoral democracy if by CBI one means the latter, which should never be the central banker's intention *anyway*. It is as if, with instrument independence, the central bank is held accountable to the public via the mechanism of jointly setting monetary policy target; whereas, with goal independence, central bankers somehow aren't *answerable* to the public. So CBI is at once necessary and *limited* (to the "instrument" interpretation). Unfortunately, this popular defense is also fallacious.

Indeed, **Debelle & Fischer (1995)**, who originally coined the "instrument" vs. "goal independence" definitions, did not really push the case for one or against the other. Both are equally valid, albeit they differ consequentially in the degree and manner of accountability to which central bankers are held vis-à-vis their monetary policy conduct.

This clarification is worth repeating. We maintain unequivocally here that (a) the distinction is a matter of degree, (b) goal independence isn't any more categorically unacceptable or undemocratic than instrument independence is automatically acceptable and democratic, (c) both forms of CBI must be defined, modality-wise, in terms of mandate and accountability, and (d) it is entirely consistent and may be argued that with proper and commensurate pairing between mandate and accountability, CBI in the sense of goal independence may well be *more* socially desirable, stability promoting, and democratically sustainable, perhaps even libertarian, than CBI in the sense of instrument independence if/when for the latter mandate and accountability are somehow mismatched.

We further argue that the key variable is the central banking regime's credibility. With instrument independence, the mandate is narrowly defined and generally takes the form of numerically verifiable target, i.e. "headline inflation within the 3% plus-minus 50 basis points", hence accountability is verifiable via a metric measuring the gap between *ex ante* target and *ex post* performance. This narrow, simple to verify set-up is easy to legislate and put in practice, hence likely to work irrespectively of the degree of credibility commanded by the central banks.

With goal independence, the mandate is broadly defined and generally takes the form of *semantically loaded* objective, i.e. "stable monetary environment conducive to sustainable growth", hence accountability is based on a burden of proof testifying as to whether the central banks had been *duly diligent and competently in charge*. This broad, difficult to ascertain commitment is hard to legislate and put into practice, hence likely to conditionally require a high degree of credibility on the part of the central banks.

De Jure vs. De Facto Independence – With the reality of national polity in mind, **Cukierman (1996)**, also **Cukierman (2006)**, distinguishes formal, legal independence *de jure* from informal, actual independence *de facto*.[54]

The consensus is that *de jure* is necessary but not sufficient. A stronger view is that *de jure* is not even necessary when *de facto* independence is already working. Of course, this stronger view does not preclude the possibility or likelihood that *de jure* independence helps to ensure *de facto* independence, especially when central banks under go changes or transitions in the leadership. But neither is the stronger view vulnerable to the argument that *de facto* independence is strictly a personal attribute of any one individual central bank governor. It could be attributable to a *culture* of respecting central bank independence, much as there was a *culture* of respecting bureaucrats in the case of the celebrated MITI (Ministry of International Trade and Industry) in post-War Japan **[Johnson (1982)]**.

Interestingly, it has been observed that non-democratically elected governments, in particular military regime having seized power by way of a *coup d'état*, consistent with ***rational choice theory***, tend to accord the central bank much *de facto* independence, probably as it gives credibility boost to the ruling regime. As **Doner & Unger (1993)**

[54] Furthermore, according to **Schich & Seitz (1999)**, the *European Monetary Institute (EMI)*, forerunner of today's European Central Bank (ECB), further refines the distinction into Institutional vs. Personal vs. Functional vs. Financial Independence. It can be seen how their first, third and forth elements roughly correspond to *de jure* independence, while their second element roughly corresponds to *de facto* independence. See also, **Cobham, Cosci, Mattesini (2008)** for country analyses.

observed: "In times of government's credibility needs (through the eyes of the world), the central bank is given more autonomy in implementing the monetary policy."[55]

Why Central Bank Independence? – **Grilli, Masciandaro, Tabellini (1991)** implicitly referring to the well-subscribed trade-off between employment and inflation, *aka* Phillips' Curve, argue that elected officials, i.e. politicians, being creatures of four-year lifespan, would push popular employment enhancing platform at the expense of excessive inflationary pressure, hence ***Inflationary Bias***. From here it's a matter of common sense that a separate body, independent of electoral politics, should be assigned anti-inflation vanguard, hence CBI. Proceeding backward, it could be argued that central banks without CBI would be inflationary [**Barro & Gordon (1983)**]

In the words of former Reserve Bank of Australia (RBA) governor **Frazer (1994)**: "To be able to do their job of keeping inflation under control, central banks have to be able to say 'no' to governments when that objective is threatened. This is why the notion of central bank independence is so important."

In addition, **Calvo (1978)** and **Lucas & Stokey (1983)** referred to the largely fixed-income structure of government debts, and argued that deficit-ridden government would like nothing more than to have inflation wipe away public debt. From here it is a matter of good sense that a separate body, independent of electoral politics, should be assigned anti-inflation vanguard, hence CBI.

Empirically, the bottom line is that CBI is proven to lower inflation (see table B2 in **Eijffinger & de Haan (1996)** for a list of supporting articles). And while CBI has not been conclusively proven to promote growth, at least this much has been: CBI cannot hurt growth (see table B3 in **Eijffinger & de Haan (1996)** for a list of supporting articles). Effectively this makes CBI, at least according to **Grilli, Masciandaro & Tabellini (1991)**, a "free lunch".

Central Bank Independence beyond the Monetary Policy Context – We note that in the literature CBI manifesto is usually framed and elaborated in terms of monetary policy conduct.[56] The stylised setting is that of myopic, inflationary government, being popularly elected polity, wants to spend liberally (and then inflate away government debt), and the central bank has to be independent enough to not be forced into buying government papers and/or lowering interest rate cycles synchronously with fiscal boost. But there are

[55] Quite the contrary, there is also a body of literature devoted to "electoral manipulation of policies" **[Alesina & Stella (2010)]**.

[56] One notable exception is a paper by **Klomp & de Haan (2009)**, who showed empirically that CBI is negatively correlated with financial *instability*.

subtler forms of interference and other arena in which political interests compete with stability objectives and the country's long-term welfare.

In a sense, CBI is essentially a broad concept that pertains to all policy spheres that central bank is engaged in. It is NOT just independence *from* Ministry of Finance in the narrow sense, but *from* other social-economic forces that may be at work in general including, *inter alias*, financial market expectation and perhaps even supranational standard setters. It is NOT just independence *for* the sake of the Monetary Policy Committee (MPC) in the narrow sense, but *for* the credible presence of the central bank in national policy agenda in general including, *inter alias*, financial system stability and perhaps even grassroots microfinance programme. Yet the bulk of CBI literature seems to anchor the discussion around MPC/Ministry of Finance conflicts. Our main message here is that there is a gap in the literature.

4.3 Central Bank Transparency

The institutional economics of transparency is vast. And there are many dimensions of transparency. Still, there certainly isn't as much literature specifically on *central bank* transparency (or *central bank* accountability, for that matter) as there is on central bank independence.[57]

In any event, we shall focus on the four areas considered most relevant here. But first, it is important to get this one misconception out of the way: *transparency is not the same thing as disclosure of data or sensitive information*. In fact, transparency is not even all about data or information. Transparency is about the *process*, in particular, the decision making process and all the mitigating and surrounding circumstances and exigencies that make for efficient, diligent, just and fair decisions, or inefficient, negligent, unjust and unfair decisions.

The first aspect of transparency of particular relevance within the context of central banking is the disclosure of conflict of interests in particular and policy bias in general. This should apply both to the institutions and to the leadership. In most countries, for example, the very top central bank executives are prohibited, either by law or by custom, to take executive posts in commercial financial institutions.

The second aspect of transparency of particular relevance within the context of central banking is a very broad area, as it pertains to the disclosure of policy decision

[57] At the time of writing, "central bank independence" got 248,000 Google™ hits, "central bank governance" got 116,000, "central bank transparency" got 21,600, and "central bank accountability" got 23,800.

making, of which the (delayed) publication of Monetary Policy Committee (MPC) minute and vote counts is a prime example.

The third aspect of transparency is related to the previous. But whereas the previous deals with the public understanding of *how* central banking policy decisions are made in general, this one is about individual policy actions and decisions in particular. The right amount, timeliness and channel of communication will go a long way toward ensuring the public appreciates the policy rationale and so isn't unduly alarmed by a "regulatory shock". This is perhaps akin to what **Posen (2002)** refers to as the "Cell Phone-like Uses of Central Bank Transparency: Think of the relationship between a central bank and the attentive public as analogous to the relationship between a married couple. Good communication is key if the relationship is to cope well with the bumps and bruises of everyday life."

The fourth aspect of transparency of particular relevance here pertains to data and information, as well as model assumptions used as input to the decision making process. Some advance central banks go so far as to publicly release the macroeconomic models they use internally for generating economic forecasts.

Why Central Bank Transparency? – While it is widely understood that central bank transparency (of all three kinds) boost central bank credibility in general, it is worth pointing out that central bank transparency also comes to the defense of central bank credibility particularly when certain policy objectives are not met **[Laurens, Arnone, Segaloto (2009)]**. This is largely because policy measures are by definition difficult, often with desired outcomes derailed by unforeseeable extenuating circumstances. And appropriate degree of central bank transparency enables the public to evaluate the quality of central bank's decision making *ex ante*, not just *ex post*.

Many studies have shown that central bank transparency reduces information asymmetry and uncertainty in financial markets. The mechanism at works seems to be that being transparent in the decision deliberation process helps private agents better ground their inflation expectations **[van der Cruijsen & Demertzis (2007)]**. The real question is not whether central bank transparency is good[58], but how much of it is *optimal* **[van der Cruijsen, Eijffinger, Hoogduin (2010)]**. There is such a thing as too much of a good thing, so it seems.

In any event, overall, central bank transparency has also been shown to lower inflation, inflation variability, output variability, and the "sacrifice ratio" (the cost to disinflate

[58] One possible doubter is **Silbert (2007)**, who found some ambiguity and evidence to the contrary, and was able to demonstrate, for example, that "non-transparent central banks with private information inflate less than central banks in a regime with perfect information."

the economy measured in terms of foregone growth) **[Corbo, Moreno & Schmidt-Hebbel (2001)]**.

4.4 Central Bank Accountability

Whereas central bank transparency refers to the relationship between central bankers and the public "*as things happen*", central bank accountability refers to the relationship between central bankers and the public "*after the fact*".[59] At the risk of oversimplification, an ideal central bank is the one that is (i) responsible for policy actions and decisions, (ii) transparent about how actions and decisions are made, and (iii) held accountable to actions performed and decisions made. As with institutional transparency, perhaps even more so, institutional accountability comes with institutional independence. Indeed **Walsh (2002)** goes so far as to advocate a kind of 'dismissal rule'. In any event, the degree of accountability must be *commensurate* with the degree of independence. Central banks with goal independence and those with instrument independence are *both* accountable, but they are by necessity accountable to a different degree.[60]

Thus is the economic rationale: democracy is predicated on a general creed of check and balance. As critical it is for the central bank to command institutional independence, this too needs to be kept in check. But what keeps central bank independence in check is central bank governance, particularly the mechanisms for central bank transparency and accountability, which allows for mandate monitoring *directly* by the public, bypassing the politically motivated 'middlemen' altogether. As such, ***political interference*** can *never* be argued as a legitimate instrument of check and balance, for it ultimately undermines and

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[59] In this sense our use of the word 'accountability', as in "*governance = transparency + accountability*" is more specific than, for instance, that of **Eijffinger, Hoeberichts, Schaling (1998)**, whose analogous equation reads "*accountability = transparency + final responsibility*".

[60] Indeed, proponent of instrument independence (over goal independence) would be quick to say that one reason (for the superiority of instrument independence) is that it allows for more accountability, especially as a central bank can be held accountable, in an unequivocal manner, to a numerical inflation target, for example.

We categorically disagree with this proposition, however. While we concede that instrument independence allows for the exercise of accountability *itself* to be more transparent, central banks operating with goal independence assume a much larger set of policy responsibility, and should correspondingly be held *more* accountable, not less. Conversely, in a monetary-economic paradigm and system whereby central banks are entitled to less independence, such central banks should be held commensurately less accountable, i.e. accountable to a narrower scope of responsibility.

nullifies institutional independence in its entirety. Simply put, transparency and accountability keep independence in check; interference destroys it.

Section 5: Paradigm Challenges

In this section, which also serves as the paper's conclusion, we shall lay out a number of paradigm challenges facing central banks (the institution), central banking (the discipline) as well as central bankers (the leadership) of today, and well into the foreseeable future.

The challenge is for central banks, central banking and central bankers to maintain (i) Integrity/Moral Leadership, as well as (ii) Knowledge/Intellectual Leadership.

5.1 Integrity & Moral Leadership

Having argued for most of the paper how institutional integrity is underlined by how true the central banks' responsibility is to societal goods, how true the central banking role is to said responsibility, and how true the central bankers' action is to said role, we turn our focus to the human side of the equation, i.e. more about central bankers in particular (less about central banks and central banking in general).

What Characters & Attributes would an Idealised Central Banker Possess? – In this regard, we have engaged in a mental exercise of sort, trying to *agglomerate* exemplar attributes we have noted to be of fundamental character in past governorship. Of course, such an exercise could be misleading. By patching together the desirables from distinct real-life individuals, we are more likely to end up with a paradox of a human being than a coherent "superlatively engineered" specimen of central bank leadership. But let's try anyway.

Without launching a proper segue into the philosophy of democratic governance, let us remind ourselves that there is more to democracy than democratic *processes*. To be precise, referring to as far back as drafters of the United States Constitution, *the best available form of government is not a democracy, but in fact a republic, albeit one with democratically elected representatives*.[61] There, public officials of the executive and legislative branches, but not the judicial branch, are *democratically elected*. However, once elected, they are expected to execute the power vested in their office in the interest of the nation. And in at least two key areas that can (sometimes should) mean running against

[61] One way of distinguish governmental affairs being *run* as a democracy and as a republic is with reference to human rights. In a republic, human rights reside at the level of *individuals*; whereas, in a democracy, strictly speaking, rights reside as the level of *majority*. In a democracy, rights of the minority can be compromised if the majority, by way of democratic ballots for example, wants it. This is more than just a technical distinction. One only has to look to 1930's Germany to see what could happen if rights reside at the level of popular majority.

popular majority opinions, hence *non-democratically*. One is human rights. The other is long-term social-economic viability (survivability, even). We focus on the latter.

We maintain that central bank leadership, the very person trusted with having "to take away the punch bowl just as the party gets going", but most likely booed by the already well-lubricated public and democratically-elected political heads, will have to act "non-democratically" to protect the right of individuals not represented at the party, namely the future residents of the republic, who will inherit the fiscal-financial excesses of today. This will, this absolute resolution, to take away the punch bowl, rather than ask for a popular consensus on it, is the hallmark of moral leadership required of true central bank leadership.

So, above all, central bankers must have *straight spines*. Moreover, central bankers must have good eyes, eyes that let them see all the relevant issues, not just those on the radar screens of popular polities, eyes that let them *see well into the future* the consequences or non-consequences of today's decisions and non-decisions, eyes that let them spot potential troubles (anything from potential asset bubbles to dangerous misconceptions that can be exploited for political gains) before they get out of hand. But what central bankers aspire to do, they must be grounded in the social-economic reality in which they operate. So they need to have *firm feet on the ground*, so to speak. Finally, any policy body, particularly one cursed with being a spiritual counterpoint to the society at large---cautious just as the economy is buoyed by over confidence, aggressive precisely when the markets cowers with fear of risk and volatility---operates just as much with social capital as financial one. Central bankers, although they may be steeped in the tradition of Monetarist purity, should strive to, *hands extended*, engage themselves in the greater sphere of social affairs. This does not constitute a compromise with regards to their Policy Sanctum or Policy Foundation, but an enhanced level of involvement vis-à-vis Policy Ground, Policy Neighbourhood, and Policy Environment.

5.2 Knowledge & Intellectual Leadership

Having begun this paper motivated by the *changing* environment and requirements made of central banks the institution and central banking the discipline, we finally come to *speculate* on bodies of knowledge and intellectual paradigms central bankers need to think about *presently*, as more changes in the Policy Environment are certainly on their way here.

What Other Intellectual Disciplines Central Bankers of Tomorrow May Come from? – Speaking in terms of ***Human Resource (HR)***, it used to be that a fully equipped central bank could hire technocrats from just two or three disciplines: banking professionals, monetary economists, and financial accountants. Now there isn't a modern central bank

anywhere that does not employ legal specialists, communication strategists, database designers, and financial engineers, just to name a few.

Whereas there used to be, going back just a few decades, a sort of implicit "No Non-Monetarist Needs Apply" sign outside the central bank HR office, now we see graduates of other areas of orthodox or mainstream economics---notably microeconomics, political economics, institutional economics, information economics, game theory, etc.---as well as heterodox economics---notably evolutionary economics, non-equilibrium economics, operations research, systems theory, chaos theory and highly nonlinear system dynamics, adaptive agent-based model and emergent/self-organising systems, nonparametric statistics and heuristic machine learning, economics of corruptions, public malfeasance and political nepotism, network theory and crisis epidemiology, computer simulation of contagion dynamics, cybernetics, etc.---making inroads. And this can only be a good thing.

In particular, adopting evolutionary/non-equilibrium[62] paradigms of economics may help us better gauge our evolving role whilst remaining true to our responsibility. Given a *streak* of devastating financial crises worldwide, we may begin to ask whether, in answering our stability responsibility, our role has shifted more from *prevention* toward and *containment* and *cure*. Perhaps the observation that we (central bankers, policy reformers, etc.) seem to always be solving the *previous* crisis is itself a truism. If financial crises are getting bigger and more frequent, perhaps our role, true to our responsibility, is all about making sure they are smaller (in impacts), but not necessarily less frequent or absent altogether. These are questions that cannot be answered on philosophical grounds alone, but must be backed by the science of, *inter alias*, non-equilibrium economics, chaos theory, etc. For these will tell us our proper place and procedure in terms of Policy Control Dynamics.

After all, following the operations research distinction between (scientific) modelling problems, (mathematical) optimization problems, and (optimal) control problems, the stability problem in central banking is fundamentally a problem of exercising *(optimal) control* vis-à-vis the highly *nonlinear* **[Prokhorov (2001)]** trajectory of the national economy.

[62] The authors find non-equilibrium economics particularly appealing. That is, whilst equilibrium-seeking behaviours are no doubt default operating mechanisms observed in the markets and between rational individuals, the continued faith that the macroeconomy in its entirety will tend toward a stable equilibrium seems irrational to us. Economic theorists have been, for over a hundred years, 'retrofitting' model features---from the notions of cycles to multiple equilibria, and so on---that will help them hold on to the 'equilibrium' vocabulary despite reality of disturbances. So perhaps recognising the inherently non-equilibrium **[Chiarella, Flaschel, Franke (2011)]** nature of macroeconomics might be both liberating (don't have to keep inventing retroactive fixes) and practical (revealing sensible policy control dynamics) at the same time.

Note that the notion of controllability does not mean someone, not even the central bank, is fully in control, but that the economic trajectory itself is not 'out of control'. To this former Bank of Thailand governor **M.R.Chatu Mongol Sonakul** is remembered as remarking along the line that contemporary central banking, particularly with regards to the monetary policy conduct, is best viewed as the difference between deploying an anchor once at port and deploying a sea anchor especially during rough sea condition. In other words, no central bank today can be said to set the economic agenda and be completely in control over precise macroeconomic trajectory---more like steering a boat, deploying a sea anchor, in open sea, less like steering a car, applying carbon-ceramic brakes, on a dry road. In the final analysis, however, it remains essential that (the central bank sees to it that) the economy heads in the right direction at a reasonable speed, and when rough conditions make further passage impossible, at least the economy remains *afloat*.

As a parting thought, the word governorship is derived from the word "steersman", meaning that the central bank governor steers the monetary economy such that it remains on course (on the path of sustainable, balanced and equitable growth). To the extent that cybernetics[63]---itself derived from the Greek word "***kybernetes (κυβερνητική)***", meaning "steersman"---is the modern science of system governorship, we posit the following dictum:

"Central Banking is the Exercise of Cybernetics vis-à-vis Monetary-Financial Economy."

[63] Kindly allow us to make one final (admittedly bold yet unsubstantiated) claim that much of monetary economics thinking from the 1950's was inspired by, if not directly referencing, **Wiener (1948)**'s seminal exposition on Cybernetics concepts and principles. Even today, we still see vestiges of quintessentially cybernetics vocabulary, i.e. 'policy rule', 'target' vs. 'instrument', 'optimal control', monetary 'anchor', interest rate 'path', policy-expectation 'feedback', etc.

We suspect that public acknowledgement of the influence of cybernetics thinking on mainstream economics became increasingly difficult especially from the 'cold-war' 1960's and 1970's onward, when the notion of '*cybernetically controlled* macroeconomic policy' became associated with '*centrally planned* economic doctrine', a predicament made worse, no doubt, when many former 'iron-bloc' universities began adopting the practice of (re)naming their economic departments as cybernetics departments. In the West, we tend to see scholarly pursuits of cybernetics more and more closely associated with engineering and robotics.

In conclusion – Talking about central banks has never been easy, even less so the task of summarily defining the role they play and the principles they abide by. What this paper has done is to demonstrate that central banks the institution and central banking the discipline have their economic rationales. The economic rationales are rooted in the Historical Evolution, determine the very central banking Policy Space (the inner/outer/non policy areas, why one institution is more 'response-able' than others, and so on), and, in return, dictate the key institutional principles (independence, transparency and accountability) underlying Institutional Integrity of the central banks.

But the art and science of monetary and financial stability is itself in a state of flux, and diligent central bankers must be open to the examination of critical Paradigm Challenges facing their institution and their discipline. This paper reflects our small contribution to that tradition of self examination by hitherto exemplar generations of central bankers.

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Historical Timeline of Central Banking

Before 1900

'Proto' Central Banks [Nacaskul, Janjaroen, Suwanik (2012)]

17th Century

1st Stage
Making loans to the government [Fischer (1994)]

18th Century

'Functional' Central Banks [Nacaskul, Janjaroen, Suwanik (2012)]

19th Century

2nd Stage
More emphasis on their role as bankers to other banks, hence Lender of Last Resort [Fischer (1994)]

1668 — **Sverige Riksbank: The Beginning of the first central bank**

1694 — **Bank of England:**
Established in the midst of a major war with France when it required ever-higher government expenditures

1750

American War of Independence (1775 – 1783)

1791 — **First Bank of the United States (1791 – 1811):**
Assisted in redeeming forced wartime notes

Napoleonic Wars (1792 – 1815)

1816 — **Second Bank of the United States (1816 – 1836):**
Extended role as the lender of last resort

Gold Standard Era (1870 – 1914): Most central banks were required to maintain convertibility of the national currency (to gold at a fixed exchange rate)

1900

Multiplicity of Banks of Issue

Classical or Archaic Period (1st and 2nd Stages) [Bruni (2001)]

Industrial Revolution (1750 – 1850)

War finance the main factor in the rise of early central banks [Broz (1998)]

Historical Timeline of Central Banking

1st Revolution (1930 – 1940s) in reaction to the Great Depression and WWII [Singleton (2011)]

20th Century

'Emergence' Central Banks [Nacaskul, Janjaroen, Suwanik (2012)]

1907 – 1907 Bankers' Panic (Financial Crisis in USA)

1913 – **Federal Reserve (Fed):** Created mainly to address banking panic

1914 – Collapse of the Gold Standard

World War I (1914 – 1918)

The term 'central banking' gained wide currency.

1918

Great Depression (1929 – early 1940s)

1930

3rd Stage (1930 – 1950) Many privately-owned central banks were taken into state ownership, private ones became subservient to the government [Fischer (1994)]

World War II (1939 – 1945)

1940

Keynesian Era: Fiscal Policy believed to be more effective.

Traditional period (3rd Stage) [Bruni (2001)]

Central banks played a subsidiary role in the formulation of monetary policy between 1940s – 1980s [Singleton (2011)]

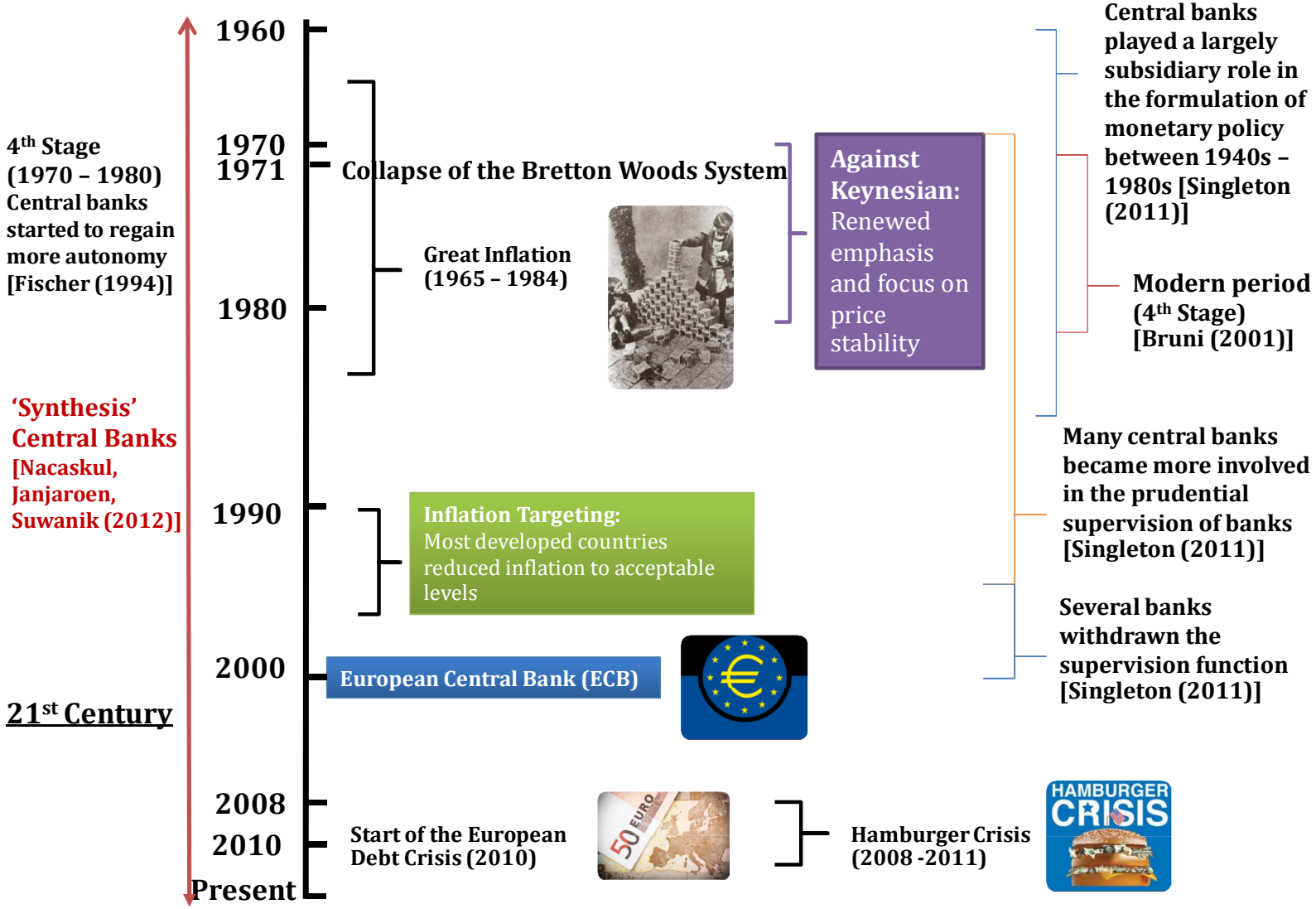
1942 – **Bank of Thailand:** Created in the midst of the Greater East Asia war

1944 – **Bretton Woods' system (1944-1971):** Established the US Dollar as the world's reserve currency, other national currencies to be pegged to the dollar rather than gold.

1950

Historical Timeline of Central Banking

2nd Revolution (1980 – 1990s) in reaction to the Great Inflation [Singleton (2011)]



Historical Timeline of the Bank of Thailand

Before the Revolution of 2475 (Period of the Absolute Monarchy)

19th Century

King Rama V's Reign
(1868 – 1910)

1888

1898

Proposals to establish the Thai central bank from foreigners e.g. Sir Andrew Clarke, Duke de Marignan, Admiral de Plessis de Reckclien

Proposals were rejected due to the lack of Thai banking knowledge, expertise and vulturine proposals from foreigners.

1903

Proposals to establish the Thai central bank from the Thai people, Mahisara Rajaharudaya, Prince Mahisorn and Phraya Suriyanuwat

Proposals were rejected as the government gave priority to infrastructure investment.

1906

The emergence of Thailand's first commercial bank, "Siam Commercial Bank"

20h Century

King Rama VI's Reign
(1910 – 1925)

1914

Bank run crisis i.e. Siam Commercial Bank, resolved through government bailout

World War I
(1914 – 1918)

1918

The post-WWI recession
(1918 – 1929)

1925

Proposals to establish the central bank were rejected due to the war time and economic recession.

Historical Timeline of the Bank of Thailand

The Revolution of 2475 (1932) until the emergence of Thai National Banking Bureau (1940)

King Rama VII's Reign (1925 – 1935)

King Rama VIII's Reign (1935 – 1946)

1932

The Revolution of 2475:
Pridi Banomyong, proposed economic plan, called "The nationalization of all land and labour", including the central bank establishment. But it did not acquire the accord from the PM and several ministers.

1933

The proposal was revived when **Phraya Phahon Phon Phayuhasena seized power.** But it was rejected given the lack of experts on capital and commercial banking system in the country.

1934

Phraya Suriyanuwat, again, proposed the National Bank project, which was rejected by **Prince Vivat** fearing that the national reserves would be lent to the government and private sector.

1935

A bill on the Establishment of the National Bank, B.E. 2478 (1935), drafted by **Luang Voranitipricha**, was proposed, endorsing the Siam Commercial Bank Ltd as the national bank. But it was rejected as the draft was considered not comprehensive enough.

1938

The Reviving Idea to establish a central bank:
Lieutenant-General Luang Pibulsonggram was appointed Prime Minister, who in turn appointed Pridi Banomyong as Minister of Finance. He appointed Prince Vivat, the Director-General of the Customs Department, as the adviser to the Ministry of Finance, a position hitherto held by foreigners.

1939

Prince Vivat finalised the bill on the establishment of the National Banking Bureau, drafted by foreign advisers. Ultimately, the bill was presented to the Prime Minister, whose cabinet agreed to name it **"Act on the Establishment of the Thai National Banking Bureau".**

1940

Thai National Banking Bureau: (13 May 1940, Officially 24 June 1940)
One of the reasons for establishing the Thai National Banking Bureau was to lay groundwork for central banking and manage government debts.

Great Depression (1929 – early 1940s)

World War II (1939 – 1945)

Historical Timeline of the Bank of Thailand

The Greater East Asia War (1941) and the establishment of the BOT

1941

The Greater East Asia War:
Japanese troops landed on Thai shores on 8 December 1941. The invading Japanese demanded that the Thai Government set up a central bank comprising of Japanese advisers and department heads.

1942

The Bank of Thailand (BOT): (16 April 1942, officially 10 Dec 1942)
The "Bank of Thailand Act" was promulgated on 16 April 1942. The inauguration ceremonies were held on 10 December 1942, which was Constitution Day. On the following day, the Bank of Thailand started its operations at the former offices of the Hong Kong and Shanghai Banking Corporation on Siphraya Road. **Prince Vivat assumed the position of the first Governor.**

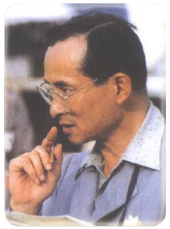
World War II (1939 – 1945)

H.H. Prince Vivadhanajaya (27 Nov 1942 – 16 Oct 1946)

1945

The Bank of Thailand was relocated to its present place in the grounds of the Bangkhunprom Palace on 3 March 1945.

King Rama IX's Reign (1946 – Present)



1946

Mr. Serm Vinicchayakul (17 Oct 1946 – 24 Nov 1947)

1947

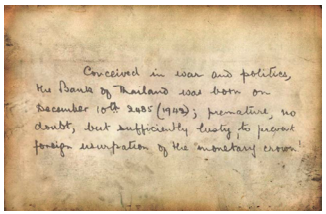
1948

Mr. Leng Srisomwongse (25 Nov 1947 -2 Sep 1948, 3 Dec 1948 – 3 Aug 1949)

H.H. Prince Vivadhanajaya (3 Sep – 2 Dec 1948)

1949

M.L. Dej Snidvongs (4 Aug 1949 – 29 Feb 1952)

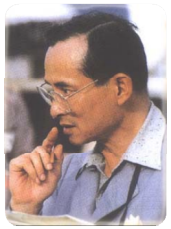


1952

Historical Timeline of the Bank of Thailand

Fixed Exchange Regime (1945 – 1997)

King Rama IX's Reign (1946 – Present)



1952

Mr. Serm Vinicchayakul
(1 Mar 1952 – 24 Jul 1955)

1955

Mr. Kasem Sriphayak
(25 Jul 1955 -23 Jul 1958)

1958

Mr. Jote Guna-Kasem
(24 Jul 1958 – 3 May 1959)

1959

Dr. Puey Ungphakorn
(11 Jun 1959 – 15 Aug 1971)

1971

Mr. Bisudhi Nimmanhaemin
(16 Aug 1971 - 23 May 1975)

1975

Mr. Snoh Unakul
(24 May 1975 – 31 Oct 1979)

1979

Mr. Nukul Prachuabmoh
(1 Nov 1979 – 13 Sep 1984)

1984

Mr. Kamchorn Sathirakul
(14 Sep 1984- 5 Mar 1990)

1990

Mr. Vijit Supinit
(1 Oct 1990 - 1 Jul 1996)

1996

Mr. Rerngchai Marakanond
(13 Jul 1996- 28 Jul 1997)

1997

Fixed Exchange Rate Regime

Collapse of the Bretton Wood's (1971)

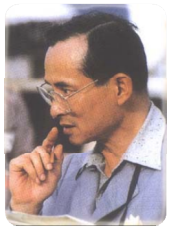
Great Inflation (1965 – 1984)

Mr. Chavalit Thanachanan
(6 Mar – 30 Sep 1990)

Historical Timeline of the Bank of Thailand

Monetary Targeting Regime (1997 – 2000) & Inflation Targeting (2000 – Present)

King Rama IX's Reign (1946 – Present)



1997

Mr. Chaiyawat Wibulswasdi
(31 Jul 1997 – 4 May 1998)

1998

M.R. Chatu Mongol Sonakul
(7 May 1998 -30 May 2001)

2000

2001

M.R. Pridiyathorn Devakula
(31 May 2001 – 7 Oct 2006)

2006

Mrs. Tarisa Watanagase
(8 Oct 2006 – 30 Sep 2010)

2010

Dr. Prasarn Trairatvorakul
(1 Oct 2010 - Present)

Present

Monetary Targeting Regime

Inflation Targeting Regime