

# Regulatory Space and the Flow of Funds across the Hierarchy of Money\*

David S. Bieri<sup>†1,2,3</sup>

<sup>1</sup>*School of Public and International Affairs, Virginia Tech, Blacksburg, VA 24061, USA*

<sup>2</sup>*Department of Economics, Virginia Tech, Blacksburg, VA 24061, USA*

<sup>3</sup>*Global Forum on Urban and Regional Resilience, Virginia Tech, Blacksburg, VA 24061, USA*

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## Abstract

This chapter emphasizes the regulatory linkages between the institutional evolution of money, credit and banking and the spatial structure of the flow of funds. The first part of the chapter treats the trajectory of spatial development and the advancement of the monetary-financial system as a joint historical process. Adopting an evolutionary perspective, I document how different regulatory regimes shape the international and interregional flow of funds across space. As a whole, the structure of the regulatory system influences in important ways the roles played by the various components of the monetary-financial system (financial instruments, financial markets, monetary and financial intermediaries) in promoting the inter-regional mobility of funds and, by extension, the mobility of funds among the various sectors of the space economy. From the historical origins of modern money to the rise of shadow banking, money and credit are always and everywhere fundamentally hierarchical in nature and all money is credit money, even state money. Recognizing the spatial implications of this hierarchy for real-financial linkages in the United States, the second part of the chapter illustrates how the political economy of such hierarchical regulation creates new geographies of flows of funds – a set of spatial circuits that are characterized by a rapid evolution in bank complexity and the growing importance of ‘murky finance’. Overall, this chapter develops the case that money and finance are non-neutral with regard to space, principally because the institutional arrangements of financial regulation matter for how the spatial economy evolves.

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<sup>†</sup>Corresponding author: Corresponding author: Global Forum on Urban & Regional Resilience, Virginia Tech, 250 S. Main St. (Suite 312), Blacksburg, VA 24601-0922, USA. Web: [circular-flows.org](http://circular-flows.org). Email: [bieri@vt.edu](mailto:bieri@vt.edu) (David Bieri)

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“It is well that the people of the nation do not understand our banking and monetary system, for if they did, I believe there would be a revolution by tomorrow morning.” – Henry Ford (1922)

“Capitalism is essentially a financial system, and the peculiar behavioral attributes of a capitalist economy center around the impact of finance upon system behavior. The behavior of the financial system in turn depends upon the behavior of its component parts; and a complex set of financial intermediaries is central to the financial system of an advanced capitalist economy.” – Hyman Minsky (1967)

## 1 Introduction

This chapter emphasizes the regulatory linkages between the institutional evolution of money, credit and banking and the spatial structure of the flow of funds, both from a theoretical and from an empirical perspective. In the first part of the chapter, I treat the trajectory of spatial development and the advancement of the monetary-financial system as a joint historical process.<sup>1</sup> Specifically, I adopt an ‘institutional-evolutionary’ perspective in documenting how different regulatory regimes in the United States have shaped the international and interregional flow of funds across space. In doing so, the theoretical perspective of this chapter engages with the fact that the modern monetary system is not only inherently hierarchical in finance, but it is also hierarchical in power. Funds are transferred across space through the purchase and sale of direct financial assets and through the purchase and sale of claims against financial intermediaries. As a whole, the structure of the regulatory system shapes in important ways the roles played by the various components of the monetary-financial system (financial instruments, financial markets, monetary intermediaries, private nonbank financial intermediaries, publicly-sponsored intermediaries) in promoting the interregional mobility of funds and, by extension, the mobility of funds among the various sectors of the space economy. Focusing on the U.S. banking sector before and after the recent crisis, the second part of the chapter then empirically quantifies how the interplay between structural changes in financial intermediation and shifting regimes of U.S. banking regulation give rise to a distinct unevenness of spatial capital flows and depository agglomeration – a combination that ultimately co-determines the spatial impact of the fall-out from the financial crisis.

From the historical origins of modern money to the rise of ‘shadow banking’, this chapter contends that the political economy of regulation creates specific geographies of flows of funds – a set of spatial circuits that has come to be typified by the rapid evolution in bank complexity and a growing prominence of ‘murky finance’, whereby market-based credit intermediation via minimally regulated entities plays an increasingly central role. Recognizing the importance of real-financial linkages, my argument connects the political economy of regulation with the process of spatial development. Across different historical regimes, the intrinsic instability of the

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<sup>1</sup>The term ‘monetary-financial system’ reflects the view that monetary institutions and financial markets now overlap to such a degree that they are best viewed as parts of a larger whole (cf. Chandler, 1979; Davidson, 2003).

financial system governs a dialectical relationship between financial regulation and government intervention, in turn leading to financial innovation which opens up new frontiers across financial space.

Overall, then, this chapter explores how regulatory developments in the financial system interact with the local and regional elements of the real economy. The remainder of this chapter proceeds as follows. Section 2 engages with the intrinsic instability and hierarchy of the monetary-financial system, highlighting that both of these characteristics are directly linked to the institutional realities of regulation. Specifically, this implies that both monetary hierarchy and financial instability have important spatial implications. As part of this argument, I engage with heterodox economic paradigms that do not accept the neutrality of money, particularly in connection with the broader phenomenon of financialisation.<sup>2</sup> As part of this argument, I revisit a hitherto neglected aspect of spatial monetary thinking in the economic geography of August Lösch's (1940, 1949) economic geography and demonstrate that it ties in directly with central elements of a spatial view of the flow of funds – an equally neglected aspect of regional analysis that saw some attempts of integrating Morris Copeland's (1947, 1952) pioneering work on a balance sheet view of the economy into the core of post-war location theory (e.g. Isard, 1956, 1960).

Section 3 proceeds by examining the process of financial regulation as part of a larger evolutionary process of regulatory governance of the economic system. In this setting, all regulation is deeply path-dependent and every action of a given regulatory regime creates a financial reaction, the consequences of which – both spatial and non-spatial – have lasting effects on the configuration of activity in the financial sector and the real sector alike. In addition to an evolutionary perspective, this section of the chapter touches on to the specific historical circumstances of financial regulation in the U.S., emphasising the link between functional (as opposed to institutional) aspects of regulation and their spatial consequences that range from the integration of financial markets and financial agglomeration to the process of suburbanisation. Section 4 empirically documents specific spatial patterns of the flow of funds across each layer of the U.S. monetary hierarchy. From liquidity injections into the banking system via the Federal Reserve's Discount window to the securitisation of mortgage credit, this section renders legible how the historical trajectory of financial regulation had become inscribed into the economic landscape, producing a variety of spatial effects in the run-up, during and in the aftermath of the recent crisis. Section 5 traces out elements of future research on the geography of financial regulation and offers some concluding considerations.

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<sup>2</sup>Economists generally distinguish between two separate approaches to monetary theory. The first develops monetary theory from the transactions, store-of-value and unit-of-account needs of a basic exchange economy with an exogenous amount of high-powered government money. The second approach, which includes Chartalism, views money as a hierarchical form of credit which renders it essentially endogenous to the economic system. See Godley and Lavoie (2007) and Wray (2012) for comprehensive primers on this literature and its importance for the finance-macroeconomy nexus.

## 2 Instability and hierarchy of the monetary-financial system

The recent financial crisis was a powerful reminder that the inherent instability of the monetary-financial system can entail serious consequences for the real economy. At the same time, the recent crisis has also highlighted that the deeply integrated nature of the global economy by no means implies the end of spatial economic thinking with regard to money and finance. To the contrary, the lasting consequences of the recent financial and its real sector upheavals were anything but uniformly spread across space. In this sense, the 2007/2008 crisis was a “very geographical crisis” (French, Leyshon, and Thrift, 2009) – an unprecedented example of the ‘glocalised’ nature of financialised capitalism, where locally varying origins and global consequences create complex interdependencies and asymmetric feedbacks (Bieri, 2009; Martin, 2011).

In responding to the crisis, both national and international policy makers have identified several gaps in the perimeter of financial regulation as the main culprit for the severe bouts of systemic instability that had dislocated the global financial system; not only did regulatory checks fail to prevent the financial meltdown, but the regulatory system itself appears to have amplified the reverberations from the financial fallout across the global economy. Yet any new regulation – be it the Dodd Frank Wall Street Reform at the local level or the most recent set of capital adequacy and liquidity standards for banks under Basel III (BCBS, 2013a,b) at the global level – is unlikely to completely rid the financial system of the so-called ‘boundary problem of regulation’, that is the problem that institutions in the regulated sector and those in the unregulated sector face different incentives (Goodhart, 2008). During the Great Moderation, the boundary problem profoundly misaligned incentives across many agents in the financial sector as systemic financial imbalances accumulated in the run-up to the crisis. This induced regulatory arbitrage on a large scale, for example in the form of securitization, offsetting some or all of the intended regulatory effects, while simultaneously exposing the financial system to new forms of systemic risk.

### 2.1 The inherent instability of the monetary-financial system

In the aftermath of the crisis, far-reaching disenchantment with the intellectual underpinnings of the conventional regulatory apparatus has led to a dramatic (re)discovery of the importance of Hyman Minsky’s work on financial instability (Minsky, 1977, 1993, 2008) and, perhaps in a more subtle way, to a wider appreciation of Post Keynesian thinking on the ‘non-neutrality of money’.<sup>3</sup> Common to all of this work is the special attention that it pays to the role of the financial sector as a source of fluc-

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<sup>3</sup>The notion of ‘monetary neutrality’ is a central tenet of neoclassical mainstream economics, suggesting that the spheres of money and production are analytically distinct. By contrast, heterodox monetary theories – from the German Historical School to Post-Keynesianism, and in the case of the latter, most prominently and explicitly perhaps in the work of Paul Davidson and Hyman Minsky – emphasize the importance of the financial sector as a source of fluctuations in the real sector, thus opening up a pathway for the non-neutrality of money. See Cottrell (1994) for a good review of monetary analysis in the Post Keynesian tradition. Dow (1982), Arestis (1988) and Davidson (2003) provide a more detailed treatment of this material.

tuations in the real sector and – of particular importance to our discussion – as an influence over the spatial structure of regional economies. In keeping both with its Schumpeterian and Keynesian intellectual roots, there is the fundamental belief at the core of the Minskian system that the inherent instability of the economy under finance-led capitalism can be stabilized or fine-tuned via a specific set of technical adjustments and policies.<sup>4</sup>

In order to achieve such regulatory control over a capitalist economy, we must obtain a detailed understanding of the financial linkages that drive economic activity, both between economic agents and – as I argue in more detail elsewhere [Bieri \(2014a\)](#) – also across space. As Minsky put it,

“to analyze how financial commitments affect the economy it is necessary to look at economic units in terms of their cash flows. The cash flow approach looks at all units – be they households, corporations, state and municipal governments, or even national governments – as if they were banks.” – Hyman [Minsky \(2008, p.221\)](#)

With the increasing globalization of the monetary-financial system, funds are transferred across space through the purchase and sale of direct financial assets and through the purchase and sale of claims against financial intermediaries. As a whole, the structure of the regulatory system shapes in important ways the roles played by the various components of the monetary-financial system – financial instruments, financial markets, monetary intermediaries, private nonbank financial intermediaries, publicly-sponsored intermediaries – in promoting the interregional mobility of funds and, by extension, the mobility of funds among the various sectors of the economy. In an evolutionary sense, financial regulation has played a crucial role in shaping the historical process by which the monetary-financial system grew into a hybrid arrangement of public and private credit creation that is both bank-based and market-based (‘shadow banking’) – a point that is explored in more detail below. In the context of the recent crisis, this hybridity of the system has influenced in important ways the shift of policy goals away from monetary stability towards financial stability, the quest for which has seen a considerable emphasis on an institutional and functional redesign of the regulatory framework that monitors systemic risk. In this regard, institutional responses to the crisis have begun to unify both ‘micro-prudential’ and ‘macro-prudential’ principles of financial regulation to enhance overall financial stability ([Goodhart, 2008](#); [Hanson and Rohlin, 2011](#); [Bieri, 2015a](#); ?).

The intensified pursuit of financial stability as a policy target after the crisis is closely linked to regulatory control and governance which, in turn, directly relate to the idea of monetary non-neutrality in the sense that it ascribes systemic importance to the monetary-financial system for all sectors of the space economy. With the crisis dealing a devastating blow to the notion of self-regulating and self-stabilising markets in the policy mainstream, the re-regulation of financial markets has rapidly

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<sup>4</sup>A student of Schumpeter’s at Harvard and prominent biographer of Keynes ([Minsky, 1975](#)), much of Minsky’s monetary thinking contains important elements that are common to both the views of Keynes and Schumpeter. See [Whalen \(2001\)](#) and [Bertocco \(2007\)](#) for elaborations on the theoretical importance of the Keynes-Schumpeter connection for the non-neutrality of money. See also footnote 6 below.

emerged as a new paradigm – a ‘new normal’ that is frequently couched in a rapidly proliferating policy discourse around notions of resilience and complexity.<sup>5</sup> As part of this new thinking comes a renewed acceptance of the idea that – across different historical regimes – the intrinsic instability of the financial system is governed by a dialectical relationship between financial regulation and government intervention, in turn leading to financial innovation which opens up new frontiers across financial space (Bieri, 2013). As part of such a narrative of regulation as a dynamic politico-economic process, much of the blame for the financial crisis has been attributed to a general breakdown in the (financial) regulatory system, both in the US and elsewhere (Tropeano, 2011).<sup>6</sup>

## 2.2 The spatial non-neutrality and monetary hierarchy in the Löschian system

The geographical nature of the financial crisis has not only challenged the standard view that globalisation implied the “end of geography for finance,” it has also added a new tenor to theoretical debates that were deemed silenced by the spatial flattening of the global financial system. From the specific vantage point of our discussion of regulatory space, the dissenting positions vis-à-vis the orthodoxy of the classical dichotomy and, by implication, the notion of monetary neutrality, are the most relevant of these debates. Because the neoclassical mainstream ascribes no economic importance to the interaction between real and financial variables, standard theory views money as the proverbial veil, such that ‘real’ factors determine ‘real’ variables. Yet, as we have seen, the financial crisis has in important ways challenged the concept of neutral money, even in the aspatial setting of standard macroeconomics and finance.

At the same time, however, the canon of contemporary regional economic theory, by and large, continues to uphold the classical dichotomy in that it treats the spheres of money and production as analytically distinct. In fact, much of regional analysis is formulated in terms of the mechanics of a pure exchange economy which relegates money and financial interrelations, at best, to being a source for short-term frictions, but not fundamentally relevant to the determination of regional market (dis)equilibria. In short, real factors determine real regional variables. Or, put differently, regional money is neutral in the long run. Despite the fact that the recent crisis so powerfully reminded us that money and finance are also – always and everywhere

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<sup>5</sup>The rapidly expanding literature on spatial aspects of ‘economic resilience’ is most relevant for our discussion here. See Martin and Sunley (2015) for a comprehensive review of this literature. Bieri (2016) examines how ‘financial resilience’ relates to conceptualisations of resilience that implicitly adhere to the classical dichotomy of treating real and monetary phenomena as analytically distinct.

<sup>6</sup>The structural inadequacies of the US regulatory system, in particular, might actually extend beyond just financial regulation and are seen by some as affecting the entire scope of US regulation. From a series of recent environmental regulatory failures – including the BP Deepwater Horizon oil spill in the Gulf of Mexico – to the financial meltdown, the U.S. regulatory complex appears to be plagued by administrative complexity, institutional sclerosis, budgetary austerity and policy uncertainty due to bipartisan polarization (e.g. Carrigan and Coglianese, 2012; Economist, 2012).

– local phenomena with real effects, little theoretical progress thus appears to have been made in the analysis of spatial monetary and financial phenomena.<sup>7</sup>

Table 1: Money matters across different schools of economic thought

| <i>Paradigm</i>                               | Origin of fluctuations | Real-monetary sector link   | Nature of crises                                           | Spatial effects |
|-----------------------------------------------|------------------------|-----------------------------|------------------------------------------------------------|-----------------|
| <i>Classics</i>                               | Real sector            | Neutral                     | Resources                                                  | Not modelled    |
| <i>Marxism</i>                                | Real sector            | Neutral                     | Over-accumulation                                          | Urbanization    |
| <i>(Post) Keynesianism</i>                    | Both sectors           | Non-neutral                 | Investment bubble, effective demand, financial instability | Not modelled    |
| <i>Neoclassical (RBC)*</i>                    | Real sector            | (Super)neutral <sup>†</sup> | Exogenous shocks (technology)                              | Not considered  |
| <i>Monetarism</i>                             | Monetary sector        | Non-neutral                 | Inflation                                                  | Not modelled    |
| <i>Urban economics (NUUE-NEG)<sup>‡</sup></i> | Real sector            | Neutral                     | Cumulative causation                                       | Agglomeration   |

*Notes:* \* Real business cycle theory in the tradition of new classical macroeconomics. <sup>†</sup> Superneutrality of money is a stronger version of monetary neutrality in that real variables are not only unaffected by the level of the money supply, but also by the rate of money supply growth. <sup>‡</sup> ‘New neoclassical urban economics’ (NNUE) and new economic geography (NEG)/geographical economics. *Source:* Bieri and Schaeffer (2015).

In advancing new perspectives on the spatial non-neutrality of money, it may thus be helpful to examine various schools of economic thought regarding the different theoretical explanations they provide as to the origins of economic cycles. For this purpose, Table 1 summarises the treatment of the real-monetary nexus across different economic paradigms, along with the corresponding view on the nature of booms and busts. Table 1 also highlights that – with the notable exception of a spatialised version of the Marxian system pioneered by David Harvey (1978, 1985a,b) – conventional economic doctrine either deals with monetary non-neutrality or spatial economic effects, but not both.

In related work elsewhere <sup>?</sup>, I propose an alternative to the dominant Marxist view of the real-monetary nexus, highlighting that important theoretical insights in this regard are contained in August Lösch’s (1940, 1949) pioneering analysis of the spatial consequences of monetary-financial arrangements and of the flow of credit money across space. Specifically, I argue that these lesser-known aspects of Lösch’s work are broadly consistent with a spatialised version of Post Keynesian monetary theory (Dow, 1982; Arestis, 1988, 1996; Chick and Tily, 2014). At its core, this literature questions the sanctity of the money multiplier and acknowledges that regional money creation happens endogenously by commercial banks ‘at the stroke of a pen’, while the central bank retains ultimate control through monetary policy, particularly by setting the interest rate. In addition to the regional effects of endogenous money, place-based credit allocations are an (re-)emergent core competency of the

<sup>7</sup>This dearth of regional monetary analysis notwithstanding, periodic attempts have been made to incorporate monetary and financial variables into regional economic models (e.g. Dow, 1988, 1999; Klagge and Martin, 2005). At the same time, the burgeoning literature on financialisation remains “spatially anaemic” (Christophers, 2012).

state which, in turn, is tied to a long historical arc of institutional and regulatory changes. In the US, the origins of these changes can certainly be traced back to the Great Depression, and perhaps even as far back as the new monetary order of the post-civil war Reconstruction Era (?).

At the same time, Post Keynesian monetary theory also implies what can be considered a ‘hierarchy of monies’ in that the modern monetary system is a hybrid which is part public (‘outside money’, a net asset to the private sector) and part private (‘inside money’).<sup>8</sup> It has both public and private liabilities that circulate as money (Bell and Freeman, 2001; Mehrling, 2013). Indeed, two specific aspects of Lösch’s analysis of the spatial consequences of monetary-financial arrangements provide a useful lens for linking the hierarchy of money to the spatial structure of the financial system. First, Lösch (1949, 1954) recognizes that money and credit are always and everywhere fundamentally hierarchical in nature and that all money is credit money, even state money. The modern monetary system is not only hierarchical in finance, but it is also hierarchical in power (e.g., in the Federal Reserve’s ex-post definition of what is adequate collateral and its inherent role as the ‘market maker of last resort’ Mehrling, 2011). Table 2 illustrates the hierarchy of money in the Löschian system as a spatial monetary order where money and credit are created by different financial institutions at separate levels of the hierarchy. The Löschian monetary pyramid can be read both institutionally and, perhaps more importantly, in a functional manner, that is in terms of what constitutes money and credit as an accepted mean of settlement.

A central feature of this monetary hierarchy is the fact that the distinctions between money and credit are not strict and largely depend on the specific vantage point from within each layer of the system. In this system, gold and deposits at the Bank for International Settlements are the ultimate money because they are the ultimate means of international payment.<sup>9</sup> Currencies, both international money and national money, are deemed a form of credit in so far as they are promises to pay gold. Similarly, further down the hierarchy, bank deposits are viewed as a form of private credit money, effectively promises to pay currency on demand and thus twice removed from the promises to pay ultimate money. Private money in the form of debt obligations or securities is then a promise to pay currency or deposits over some specific time horizon. A second crucial feature of this hierarchical view of money lies in the fact that at each layer the ‘moneyness of credit’ depends on the credibility of the promise by a given issuer to convert a specific form of credit into the next higher form of money. In other words, what counts as money and what counts as credit depends on the layer of the hierarchy under consideration, on what counts as ultimate means of settlement.

The translated and augmented version of Lösch’s original table in the bottom

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<sup>8</sup>The distinction between ‘outside money’ and ‘inside money’ goes back to seminal work of Gurley and Shaw (1960). In this context, ‘outside money’ is either of a fiat nature or backed by some asset that is not in zero net supply within the private sector, whereas ‘inside money’ is an asset backed by any form of private credit that circulates as a medium of exchange.

<sup>9</sup>See Toniolo (2005) and Yago (2013) for historical details of the BIS as a precursor to the International Monetary Fund and on the creation of the BIS Currency Unit (BCU), linked to the Gold Swiss Franc, as a global reserve currency that was eventually overtaken by the IMF’s Special Drawing Rights (SDR).

Table 2: Hierarchical money in the Löschian system

|                            |            |                                                                                                                                                                                                                                                                                                |
|----------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Geld höchster Ordnung:  | Weltgeld   | (Bargeld: Gold;<br>Buchgeld: BIZ)                                                                                                                                                                                                                                                              |
| 2. Geld hoher Ordnung:     | } Teilgeld | } Großraumgeld (£, <i>R.M.</i> )<br>Nationalgeld (Banknoten,<br>Zentralbankgut-<br>haben, mitunter<br>entsprechendes<br>Regionalgeld)<br>Privatbuchgeld (der Groß-,<br>Regional-,<br>Lokalbanken)<br>Privatbargeld (private oder fis-<br>kalische Schuld-<br>urkunden, beson-<br>ders Wechsel) |
| 3. Geld mittlerer Ordnung: |            |                                                                                                                                                                                                                                                                                                |
| 4. Geld unterer Ordnung:   |            |                                                                                                                                                                                                                                                                                                |
| 5. Geld unterster Ordnung: |            |                                                                                                                                                                                                                                                                                                |

Translated (and augmented) version:

|                  |                                 |                         |                                  |                                                                                                    |
|------------------|---------------------------------|-------------------------|----------------------------------|----------------------------------------------------------------------------------------------------|
| } Outside money* | } Partial money, regional money | 1. Highest-order money: | Global money                     | Currency: Gold; credit money: BIS <sup>†</sup>                                                     |
|                  |                                 | 2. High-order money:    | International money <sup>‡</sup> | Sterling, Reichsmark                                                                               |
|                  |                                 | 3. Mid-order money:     | National money                   | High-powered money (Currency,<br>central bank reserves), occasionally<br>equivalent regional money |
|                  |                                 | 4. Lower-order money:   | Private credit money             | National commercial and retail banks,<br>regional and local (community) banks                      |
|                  |                                 | 5. Lowest-order money:  | Private money                    | Private or fiscal debt obligations, in<br>particular commercial paper                              |
| } Inside money   |                                 |                         |                                  |                                                                                                    |

Notes: This ‘monetary order’ links the hierarchy of money on the left hand side to the spatial structure of the financial system on the right-hand side. \* ‘Outside money’ is either of a fiat nature or backed by some asset that is in positive net supply within the private sector, whereas ‘inside money’ is an asset backed by any form of private liabilities (credit) that circulate as a medium of exchange, an analytical distinction first introduced by Gurley and Shaw (1960). † BIZ/BIS: Bank für Internationalen Zahlungsausgleich/Bank for International Settlements, Basel, Switzerland. ‡ corresponds to both ‘top currency’ and ‘patrician currency’ in the terminology of Cohen’s (1998, 2003) currency pyramid. Source: Original table with monetary hierarchy in Lösch (1949, p.59). Author’s translation.

panel of Table 2 reveals that the Lösschian monetary hierarchy maps directly into a Post Keynesian perspective of monetary hybridity according to which the credit pyramid oscillates between a condition where money is ‘scarce’ and one where credit is ‘elastic’ (Bell and Freeman, 2001; Wray, 2009; Mehrling, 2013; Mehrling, Pozsar, Sweeney, and Neilson, 2013). In fact, one of Minsky’s (2008) key insight was that the hierarchy of money shifts across the economic cycle through three distinct phases, namely hedge finance, speculative finance and Ponzi schemes. Money and credit are thus fluctuating between states of elasticity and states of discipline. In this context, it is then precisely the role of financial regulation, broadly conceived, to determine the institutional plane within which the monetary-financial pendulum swings between different states. Beyond mere institutional design, the influence of regulatory governance thus also deeply determines the extent to which the system’s oscillations spill over to the real sector – all of which is inextricably linked to the spatial structure of economic activity.

Second, Lössch’s (1940) work on financial markets acknowledges the importance of capital flows throughout the urban hierarchy, highlighting the spatial relationship between financial variables and institutional functions, such as financial regulation. Indeed, Post Keynesian monetary thought counts functional and institutional variation as among the most influential pathways for change in real-financial linkages (Chick and Dow, 1988, 1996). Another important, related perspective that is consistent with Lössch’s work comes from Minsky’s (1991, 1993) re-emphasis of Keynes’ (1930) fundamental insight that the non-neutrality of money needs to be a “deep part of the system, not an afterthought” in a capitalist economy. In contrast to the orthodoxy of the classical dichotomy, monetary and financial variables thus enter different parts of the system in different ways, most importantly, perhaps, via two distinct price levels where the proximate determinants of these price levels are quite different. One price level is that of current wages and output, which – when combined with financing conditions – yields the supply conditions for investment goods and consumption goods. The other is that of capital and financial assets, which is determined by economic agents’ relative preferences for income later versus liquidity now.<sup>10</sup>

### 3 The flow of funds perspective and post-crisis monetary space

In what follows, it will be useful to relate the discussion of the spatial aspects of financial regulation to both an *institutional view* of regulation (that is the regulation of financial institutions) and a *functional view* of regulation (that is the regulation of funding flows and asset flows). These different perspectives are illustrated in Figure 1 which encompasses two schematic representations of the flow of funds across differ-

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<sup>10</sup>The similarities between Lössch’s monetary thought and that of Minsky are far from coincidental, as both were students of Joseph Schumpeter’s (Lössch at Friedrich-Wilhelms-Universität Bonn, and Minsky at Harvard). The Lössch-Minsky relationship and its deep connection to the misadventures of Schumpeter’s *Treatise on Money* [1943] 1970 and its much more successful Keynesian counterpart are discussed in more detail elsewhere (?).

ent sectors of the space economy. The upper portion of the figure – reproduced a from Isard’s (1960) seminal text on regional analysis – underlines the importance of interregional moneyflows across different sectors of the space economy. The lower portion of the figure provides a circular flow-of-funds representation of economic activity that – in addition to the two price levels mentioned above – is consistent with the moneyflow accounting pioneered by Copeland (1947, 1952).

In particular, the focus on the sources and uses of funds in the lower panel of Figure 1 helps to emphasise the two key elements of Löschian monetary system introduced above, namely the hierarchical relationships between different forms of money and credit on the one hand, and the (spatial) non-neutrality of money via the price level of output and the price level of financial assets on the other hand. In this setting, the non-neutrality of money arises from the simple fact that, for each sector, real transactions and financial transactions are closely linked as investment ( $I$ ) and increases in financial assets ( $A$ ) equal saving ( $S$ ) and increases in financial liabilities ( $L$ ) such that  $I_i + A_i = S_i + L_i$ . The spatial consequences of this perspective and its linkages to the regulatory complex are examined next.

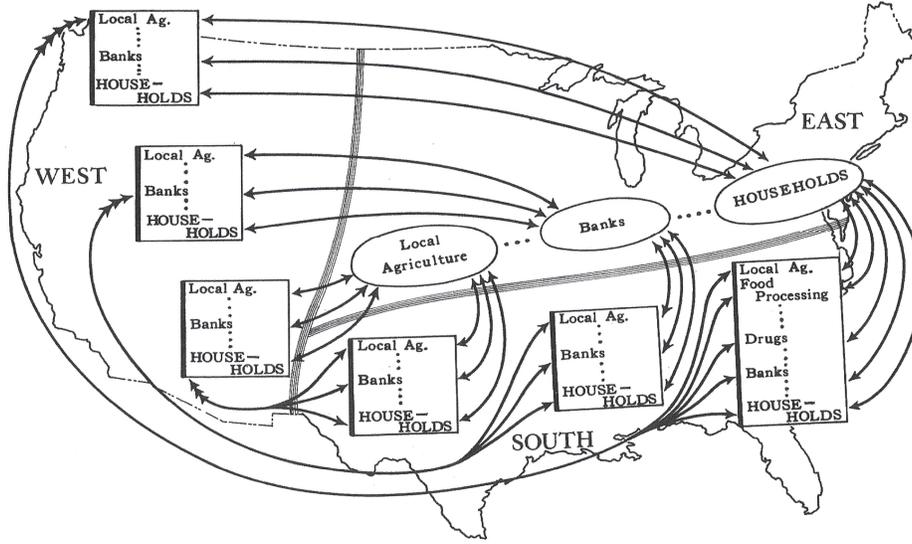
Broadly speaking then, financial regulation encompasses all governance that shapes the flow of funds within the price level of financial assets. While financial regulation provides the institutional and functional vector that undermines the spatial neutrality of money, flow-of-funds accounts are the accounting lens through which its outward appearance becomes empirically tractable. As Figure 1 illustrates, the financial accounts follow funds as they move from sectors, such as households or firms that serve as sources of funds (net lenders), through intermediaries (financial institutions) or financial markets, to sectors that use the funds to acquire physical and financial assets. Indeed, the financial crisis has driven home the importance of financial flows and the composition of sectoral balance sheets for an understanding of real-financial linkages. A good six decades since its conception, the flow-of-funds analysis has seen a flurry of renewed academic and policy interest in understanding central aspects of the financial crisis that the conventional equilibrium-based mainstream models were not able to capture by design (Palumbo and Parker, 2009; Bezemer, 2010; Winkler, van Riet, and Bull, 2013).

As the quote from Minsky (2008) at the beginning of the previous section stresses, the key to the flow of funds perspective is to look at all actors in the economy (households, firms, governments and the financial sector) “as if they were banks”, each with a balance sheet of cash inflows and cash outflows and each bound by the ‘survival constraint’ (that is the requirement that cash outflow not exceed cash inflow). The moneyflow economy then arises in aggregate from the interconnection of all balance sheets which, in turn, gives rise to the ‘fundamental instability of a credit economy’ (Hawtrey, 1919; Minsky, 1977, 1993). The money flow economy is the basis for the flow-of-funds accounting which – as an analytical approach – provides a unique characterisation of how financialisation has progressively been reshaping the modern macroeconomy through the process of financial globalisation and deregulation.<sup>11</sup>

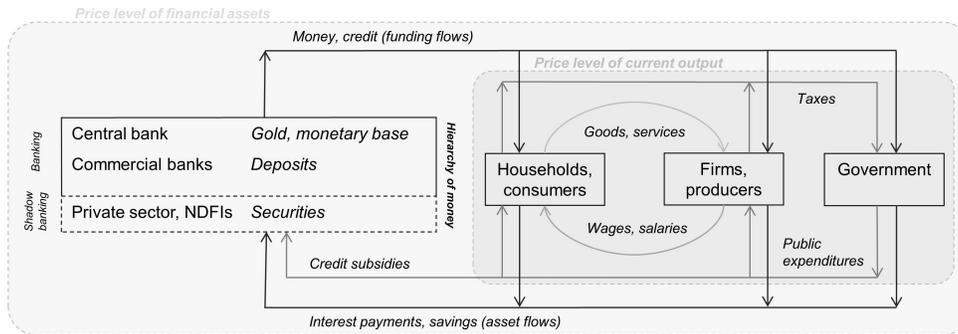
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<sup>11</sup>See Epstein (2006) and Palley (2013) for a comprehensive theoretical framing of how financialisation has been transforming the global economy.

Figure 1: Money flows across the space-economy



(a) Money flows across sectors



|                        | Financial sector |           | Households |        | Firms |        | Government |        |
|------------------------|------------------|-----------|------------|--------|-------|--------|------------|--------|
|                        | Use              | Source    | Use        | Source | Use   | Source | Use        | Source |
| Real transactions      | $I_{fin}$        | $S_{fin}$ | $I_h$      | $S_h$  | $I_f$ | $S_f$  | $I_g$      | $S_g$  |
| Financial transactions | $A_{fin}$        | $L_{fin}$ | $A_h$      | $L_h$  | $A_f$ | $L_f$  | $A_g$      | $L_g$  |

for each sector,  $I_i + A_i = S_i + L_i$  such that:

Surplus  $S_i - I_i = A_i - L_i$  : non-financial sources  $\rightarrow$  net financial savings      Money outflow  $A_i - L_i > 0$   
 Deficit  $L_i - A_i = I_i - S_i$  : financial sources  $\rightarrow$  product expenditures      Money inflow  $L_i - A_i > 0$

(b) Circular flow of funds

Notes: Panel (a) illustrates a set of hypothetical interregional money flows across different sector of the economy Isard and Moses (1960). Panel (b) presents a schematic representation of the flow of funds across different sectors of the economy, paying particular attention on the hierarchical relationships between different forms of money and credit. The lower portion of the panel presents a sectoral flow-of-funds table that is consistent with the moneyflow accounting pioneered by Copeland (1947, 1952). See main text for more details. Source: Bieri (2014a).

Over the past forty years or so, the process of financialisation has completely intertwined the monetary system with the financial system such that we cannot talk about money without talking about finance. This raises the importance of several institutional hallmarks of the current system. At its core, there are the wholesale money markets as the central funding mechanism, with ‘shadow banks’ as key institutions that facilitate short-term funding of long-term lending.<sup>12</sup> Given the importance of these flow-based changes to the relevance of the inner workings of the monetary-financial system, the need arises for refocusing the discussion in conceptual terms. In this process, increased emphasis ought to be placed on the changing nature of the monetary-financial system in terms of increasing complexity and spatial reach.

### 3.1 The regulatory-spatial dialectic

A central feature of such a re-conceptualisation of the geography of money lies in distinguishing between physical and functional notions of space, a distinction that draws on [Perroux’s \(1950\)](#) re-theorization of economic space around a set of ‘field forces’. Privileging ‘spaces of flows’ over the more conventional notion of ‘spaces of places’, discourses on the monetary geography are centred around a what [Cohen \(1998\)](#) terms a ‘flow-based model of currency relation’, where networks and hierarchies form the primary units of analysis, all within a largely de-territorialised spatial organisation of monetary-financial relations. At the regional level, early aspects of such ‘flow-based hierarchical monetary spaces’ are illustrated in Figure 2 where panels (a) and (b) trace regional moneyflows through the Federal Reserve Districts, which represent in many ways a prototypical functional monetary-financial space, albeit one with distinct territorial boundaries. Similarly, panel (c) shows the spatial hierarchy of retail banking networks in Switzerland from [Labasse’s \(1974\)](#) novel work on the spatial dimensions of finance.<sup>13</sup>

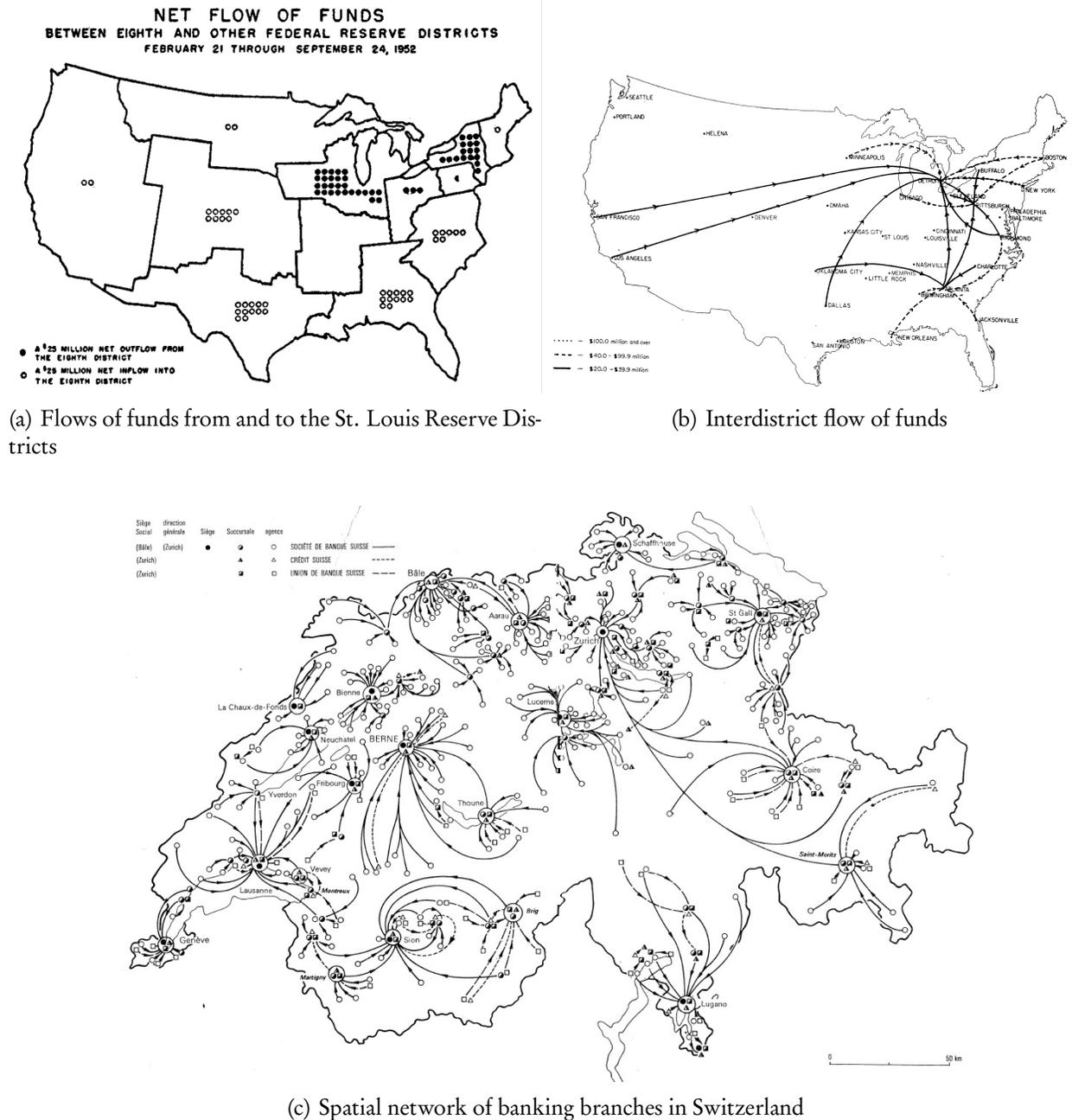
In many ways, the reconfiguration of spatial relations because of monetary-financial globalisation can be read as being consistent with what [Thrift and Olds \(1996\)](#) envisage – in the Perrouxian sense described above – as a “transformative re-conceptualisation of the remit of economic”. Much in the same spirit, [French, Leyshon, and Wainwright \(2011\)](#) suggest that research on financialisation has been insufficiently attentive to network- or flow-based notions of economic space. In fact, of all abstract economic spaces, Perroux places particular emphasis on monetary space – a field of forces “seen more easily in terms of a network of payments, or by means of the description of monetary flows” ([Perroux, 1950](#), p.98). In Perroux’s analysis, monetary space is simultaneously delocalized, yet inherently hierarchical, operating at several

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<sup>12</sup>In the present context, I use the conventional definition of ‘shadow banks’ as financial institutions that conduct credit intermediation without direct, explicit access to public sources of liquidity and credit guarantees, largely emerging as the result of regulatory arbitrage. See [Adrian and Ashcraft \(2012\)](#) and [Adrian, Begalle, Copeland, and Martin \(2013\)](#) for detailed discussions of the regulatory challenges associated with the shadow banking system.

<sup>13</sup>[Lösch \(1938\)](#) explicitly recognized what – in more modern language – might be referred to as the complex network nature of regions, whereby “a clear economic region is a fortunate accident rather than a natural subdivision of state [...] a region is a system of various areas, an organism rather than just an organ.” ([Lösch, 1938](#), p.71).

Figure 2: The monetary hierarchy and the spatial flow of funds



Notes: Panel (a) illustrates the net flow of funds between the Eight Federal Reserve District (St. Louis) and other districts in the Federal Reserve System through the Interdistrict Settlement Account (IDSA) in for most of the year 1952. Panel (b) shows the net regional inflows through the IDSA to the Federal Reserve offices in Detroit, Pittsburgh and Atlanta for two months in 1954. Panel (c) illustrates the spatial hierarchy of the banking network of regional offices and local branches of Union Bank of Switzerland and Credit Suisse across Switzerland. Sources: Bowsher (1952), Bowsher, Daane, and Einzig (1958), and Labasse (1974).

levels of ‘banal space’ (regional, national, and global scale), much like the spatial flow of funds at different levels of the hierarchy of money in Figure 2.<sup>14</sup>

At the same time, the financial crisis has also led to a certain amount of re-territorialisation of the discourse on the spatial consequences of finance as regulatory responses to the crises – from bailouts to the creation of new regulatory arrangements – almost invariably took place within the institutional framework of nations. In this theoretical sense, the current section is motivated by the broader theoretical consideration to lay the groundwork for spatialising the analysis of money and finance in the Post Keynesian tradition within the larger setting of a Löschian economic geography of money and finance. Indeed, I contend that – in contrast to the mainstream view in monetary thought – both Lösch’s economic geography and Post Keynesian monetary theory emphatically challenge the notion of monetary neutrality and both assume that money is created endogenously.

The regulatory process and the political economy of its institutions are central to the view that money and finance are non-neutral with regard to space, principally because the institutional arrangements of finance matter for how the spatial economy evolves. Furthermore, the geographical consequences of the recent crisis have challenged the ‘old geography’ with competing nation-states and clear urban hierarchies as the key spatial units of interest. Instead, a new geography is emerging, where globally dispersed creditors and debtors are the main actors (Bieri, 2009). Within this new geography, the traditional roles and interactions between borrowers and investors are being reconstituted with regard to both their spatial and their institutional organization. While the monetary and financial aspects of this new spatial order still assign states significant regulatory control over currency, money has become de-territorialised and the political governance of the Westphalian system has been replaced by a new geography of globalised currency relations (Cohen, 2007).

In light of the modern regulatory arrangements that have shaped the US financial system since the civil war (beginning watershed moments such as the National Currency Act of 1863 and the National Bank Act of 1864), it becomes clear that a general theory of uneven spatial development must establish explicit regulatory linkages between money, credit and banking and economic spatial structure. Against the background of a hierarchy of globalized money that has the US monetary-financial system at its core, the structure and function of the American space economy must be seen as one that is closely linked to the institutional evolution of its regulatory functions. At the heart of this process lies the ‘regulatory-spatial dialectic’ of the U.S. regulatory complex, the institutional elements and linkages of which are discussed in more detail elsewhere (Bieri, 2015b).

Indeed, the historical trajectory of regulatory regimes and financial innovation creates a dynamic force field in the sense of Perroux (1950) – a force field that is spanned by the vectors of financial integration, agglomeration and suburbanization, setting in motion spatio-temporal processes that continuously reconstitute mone-

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<sup>14</sup>In a related sense, Taylor, Hoyler, and Verbruggen (2010) underline the increasing importance of global flows within networks, proposing ‘central flow theory’ as a complement to conventional location choice models anchored by Central Place Theory.

tary space across the economic cycle. The evolutionary interplay between markets, institutions and the state initiates a dialectical process of adjustments and counter-adjustments with respect to monetary governance and financial regulation.

### 3.2 The scope and spatial limits of financial regulation

Financial regulation is of course not an end in itself, but rather an essential means to the larger end of promoting monetary and financial stability, both of which are key policy goals for national authorities. Conventional, neoclassical economic theory of the public sector generally rationalises any form of government regulation – and intervention, for that matter – as a response to market failures that, by and large, arise because of a variety of market imperfections, ranging from adverse selection, moral hazard to incomplete markets.<sup>15</sup> Specifically focusing on bank regulation, orthodox theories of modern banking explain the asset transformation function of intermediaries and optimal bank liability contracts, while focusing on coordination problems associated with bank failures as the central motivation for regulatory interventions. As such, standard theory focuses on regulations aimed primarily at ameliorating deposit-insurance-related moral hazards, such as cash-asset reserve requirements, risk-sensitive capital requirements and deposit insurance premia, and bank closure policy (Bhattacharya, Boot, and Thakor, 1998).

The monetary thinking at the centre of my argument here, on the other hand, presents a different view on the economic rationale for financial regulation – one that is consistent with the theoretical underpinnings of a credit theory of money. As we have seen in the previous section, money is endogenous and hierarchical according to this approach. Furthermore, the financial system is essentially a public-private institutional arrangement where government yields the exclusive right to provide the means of payment in return for the acceptance of regulatory restrictions that ensure the stability and soundness of financial institutions and the financial system as a whole. According to this more heterodox approach to financial regulation, financial entities should be regulated according to their function in providing different types of liquidity to the financial system (Goodhart, 2010; Kregel and Tonveronachi, 2013).

In the context of our analysis, understanding the nature of financial instability among mature economies relies critically on the path-dependent nature of the regulatory process and the temporal irreversibility of some of its institutional consequences. This is particularly true with regard to one central aspect of the process of financial intermediation, namely the causality between savings and investments, long a source of confusion, contention and debate among different schools of economic thought. Specifically, a central insight in Chick (1983), Chick and Dow (1988) and Dow (1999) is the historical fact that the reversal of causality between savings and investments – that is the textbook version of the loanable funds theory where savings and deposits create loans – and the modern reality where banks create credit ‘at the stroke of a pen’ depends on the maturity of the banking system. In other words,

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<sup>15</sup>See, for example, Stiglitz (2000) for a prominent instance that captures the canon of this approach to theorising government intervention. This literature views regulation as the public economics face of industrial organization, exploring the various ways in which governments interfere with industrial activities (Laffont, 1994).

the historical evolution of the monetary-financial system determines its operational realities. As such it is helpful to distinguish between different stages of banking, each implying a different type of theory for financial instability.

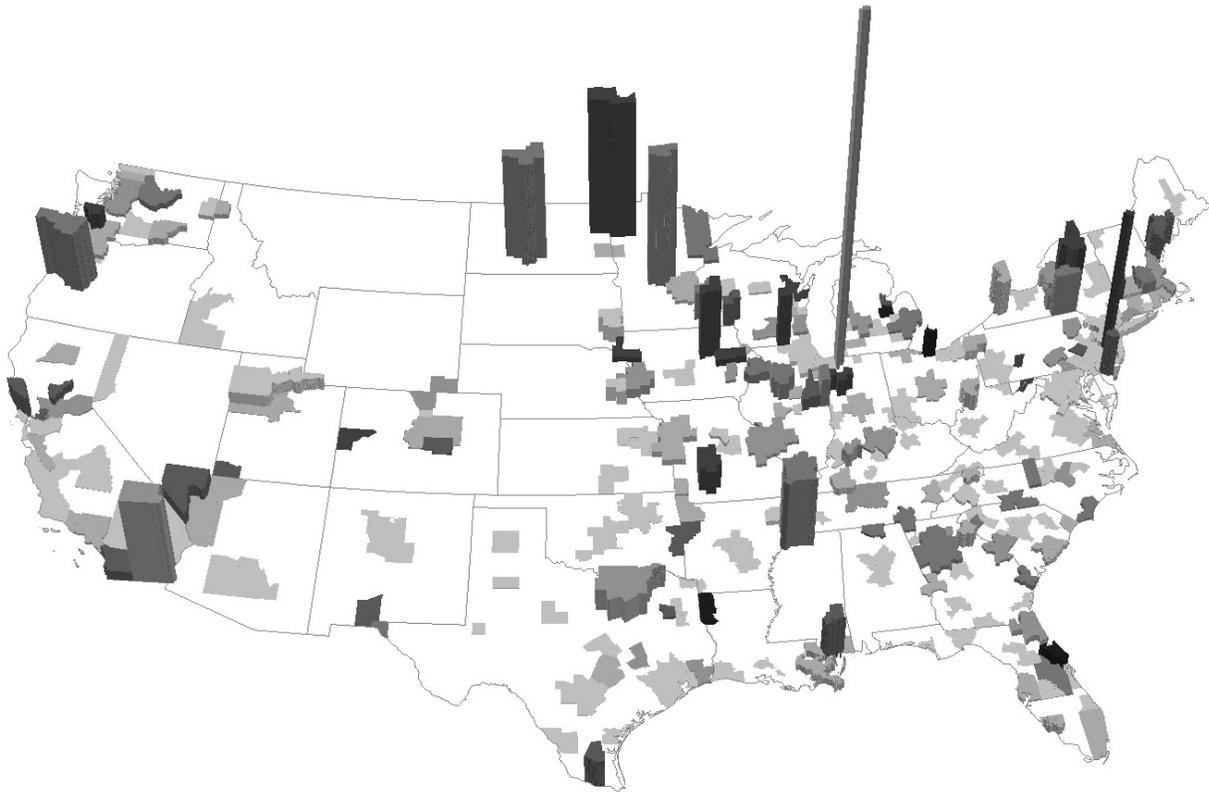
From an historical perspective, financial functions appear to be more stable than the institutional form of the financial system (Merton, 1995). Yet the (spatial) link between the financial system's most basic function – to facilitate the allocation and deployment of economic resources across time and space – and its optimal institutional form remains an issue of much debate (Bieri, 2013). Overcoming the constraints of a spatial mismatch between borrowers and lenders, different participants in the financial system have never been more geographically dispersed, which can have several types of consequences. On the one hand, the operation of global financial entities in local markets means that financial risks taken in one region can have consequences for another. On the other hand, the recent dislocations in the housing market have highlighted the paradox that financial innovation can lead to a concentration, rather than a diversification, of risks among market participants (Bieri, 2010). Against this institutional setting and functional realities of US post-crisis financial regulation, the following section now aims to illustrate the emergence and change of specific spatial patterns in the flow of funds across each layer of the US monetary hierarchy.

## 4 U.S. regulatory space and the changing nature of financial intermediation

From liquidity injections into the banking system via the Federal Reserve's Discount window, the geography of crisis-related bank failures to the spatial patterns of securitisation of mortgage credit, financial regulation influences the spatial flow of funds at each layer in the monetary hierarchy. This section empirically documents a wide variety of these regulatory-driven spatial effects that took place in the run-up, during and in the immediate aftermath of the recent crisis. In order to set the conceptual stage for this analysis, it is useful to recall the different financial functions across our highly simplified hierarchy of money in Figure 2. In what follows, I do not attempt to formally establish any causal connections between specific spatial aspects of the US monetary-financial system and its regulatory arrangements, but rather I present a rich set of visualisations to illustrate the empirical content of the preceding discussion in terms of the relevance of the flow of funds across the hierarchy of money within the broader context of the geography of money and finance.

At the highest layer in the hierarchy, the Federal Reserve fulfils part of its lender of last resort function by providing temporary liquidity to depository institutions in need for emergency funding via the Discount Window. Figure 3 documents the uneven spatial pattern of liquidity strains among US banks in the wake of the financial crisis from 2010 to 2012. Specifically, the extrusions for individual metro areas are proportional to the cumulative borrowing by depository institutions in a given location via the Federal Reserve's Discount Window, expressed as a percentage of local GDP. In order to distinguish between access to Discount Window for 'window dressing purposes' and access for more pressing liquidity needs, the areal shading reflects

Figure 3: Liquidity strains and the spatial flow of reserve funds, 2010–2012



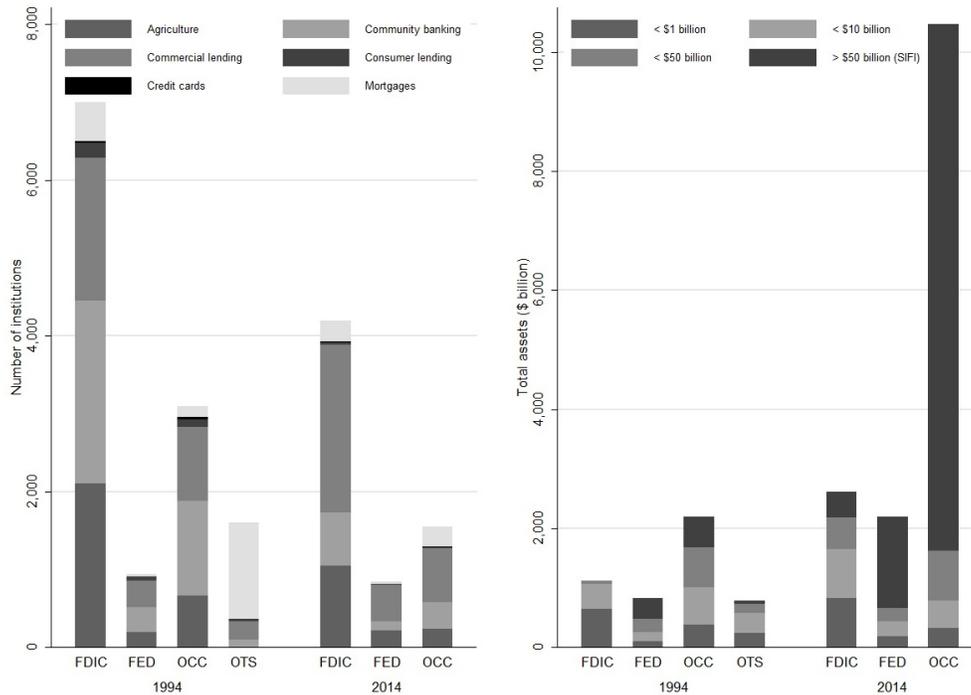
*Notes:* Metro area extrusions are proportional to cumulative borrowing by depository institutions via the Federal Reserve’s Discount Window as a percentage of metropolitan GDP. Area shading reflects the average loan-to-value (LTV) ratio for banks (credit outstanding as share to total collateral pledged) per metro area (ranging from light grey: 3-5% LTV to black: 70-85% LTV). *Source:* Author’s calculations from Federal Reserve data on discount window lending and BEA data.

the amount of reserve fund credit obtained as share of total collateral pledged. The intuition for interpreting this loan-to-value ratio (LTV) is that, analogous to households using home equity to smooth consumption, a higher LTV is indicative of more severe liquidity problems.

Perhaps the most notable spatial feature for this period of exceptional access to reserve funds is the fact that the most extreme liquidity strains of the banking system occur outside of the major financial centres. In these highly-leveraged second-tier metro areas, short-term borrowing accounts for as much as 15 per cent of GDP and the LTV of the local financial system reaches as much as 70 to 85 per cent (in terms of credit outstanding as a share to total collateral pledged). This suggests that access to the Federal Reserve’s Discount Window plays an important role in keeping the financial periphery integrated into the broader fabric of the US monetary-financial system.

Moving down one layer in the hierarchy, the next section documents the profound

Figure 4: Regulatory governance and structural change of US banking, 1994–2014



*Notes:* Depository institutions are grouped by balance sheet size using the groups defined in Section 165 of Dodd-Frank, including the designation of ‘systemically important financial institutions’ (SIFI) for institutions with assets above \$50 billion (Tarullo, 2014). ‘OCC’: Office of the Comptroller of the Currency, US Department of the Treasury; ‘Fed’: Federal Reserve System; ‘FDIC’ Federal Deposit Insurance Corporation; ‘OTS’: Office of Thrift Supervision, US Department of the Treasury (merged with OCC in 2011, Title III of Dodd-Frank Act); ‘NCUA’: National Credit Union Association; ‘HUD’: US Department of Housing and Urban Development; ‘CFPB’: Consumer Financial Protection Bureau (created via Title X of Dodd-Frank Act, effective in 2011). *Source:* Author’s calculations from FDIC data and Federal Reserve data.

structural change that the US banking industry has experienced in the two decades since the abolition of spatial impediments to bank branching under the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, one of the most defining pieces of post-war US banking regulation.

#### 4.1 Regulatory governance and the structural change of US banking

The gradual reduction of spatial barriers to the activity of banks in the United States culminated in 1994 with the passing of the Riegle-Neal Act which repealed interstate bank branching restrictions and allowed interstate bank mergers and was complete in 1999 when the Gramm-Leach-Bliley Act repealed additional restrictions on bank consolidations. Like most of the efforts to deregulate financial markets, the relaxation of the bank branch restrictions in the United States was motivated in part by the belief that financial markets can – by reducing frictions to the circulation of capi-

tal – directly affect economic growth and in part by the political self-interest of financial lobby groups (Kane, 1996). In both instances, there is strong evidence that the deregulation of interstate banking activity had a number of important structural effects, significantly changing the face of depository institutions during the two decades since the Riegle-Neal Act was passed. First, while banking deregulation did not increase the volume of bank lending, improvements in the quality of bank lending appear to be responsible for faster economic growth (Jayaratne and Strahan, 1996). At the same time, the gains from deregulation were highly unevenly spread across the institutional spectrum, largely a result of interest group factors related to the relative strength of potential winners (large banks and small, bank-dependent firms) and losers (small banks and the rival insurance firms). Furthermore, the post-Riegle-Neal environment is characterised by a substantial amount of spatial reconfiguration and intensified competition of retail banking (Pollard, 1999).

Figure 4 captures the nature of these structural changes in the banking industry through the lens of the institutionally fragmented US regulatory complex. Grouping the number of regulated depository entities by activity across their respective regulators, the left panel quantifies the dramatic consolidation and concentration among banks with the total number of depository institutions roughly halving from almost 13,000 in 1994 to fewer than 6,700 in 2014. With around two thirds of all banks under its supervision, the Federal Deposit Insurance Corporation (FDIC) remains the regulator responsible for the largest number of depository institutions. In 2011, Title III of Dodd-Frank Act prompted the merger of the Office of Thrift Supervision with the Office of the Comptroller of the Currency (OCC) which has also led to some redistribution of regulatory responsibility between the OCC and the Federal Reserve.

In addition to the unusual amount of regulatory fragmentation, the US regulatory complex is also characterised by an unusual amount of competition between the main regulatory agencies – the FDIC, the Federal Reserve and the OCC – whereby banks are able to switch among three options for a primary federal regulator. While there is some evidence of efficiency benefits to regulatory specialisation (Rosen, 2003), over the same period, however, there has been a clear and persistent shift in preference by newly regulated banks away from national bank charters and in favour of state bank charters, largely because of the lower regulatory cost of state regulation compared to its federal equivalent (Whalen, 2010).

The left panel of Figure 4 also highlights the changing nature of lending activities covered by the three main regulators, both in terms of the distribution of activities by depository institution and the regulatory coverage of these activities among regulatory agencies. In the right panel of Figure 4, depository institutions are grouped by balance sheet size using the groups defined in Section 165 of Dodd-Frank, including the designation of ‘systemically important financial institutions’ (SIFI) for institutions with assets above \$50 billion (Tarullo, 2014). The uneven distribution of the US banking assets across different regulators is clearly visible, including the striking concentration of assets under the regulatory control of the OCC, covering approximately four times as many assets of SIFIs than the FDIC and Fed combined. By the end of 2014, the combined assets of US depository institutions had reached close to

\$27.9 trillion, or about 175 per cent of US GDP, but only 37 institutions, less than 1 per cent of all regulated entities, accounted for almost 40 per cent of all industry assets. By contrast, the vast majority of all depository institutions (90 per cent) are small banks with a balance sheet size of less than \$10 billion, controlling a mere 5 per cent of all assets.

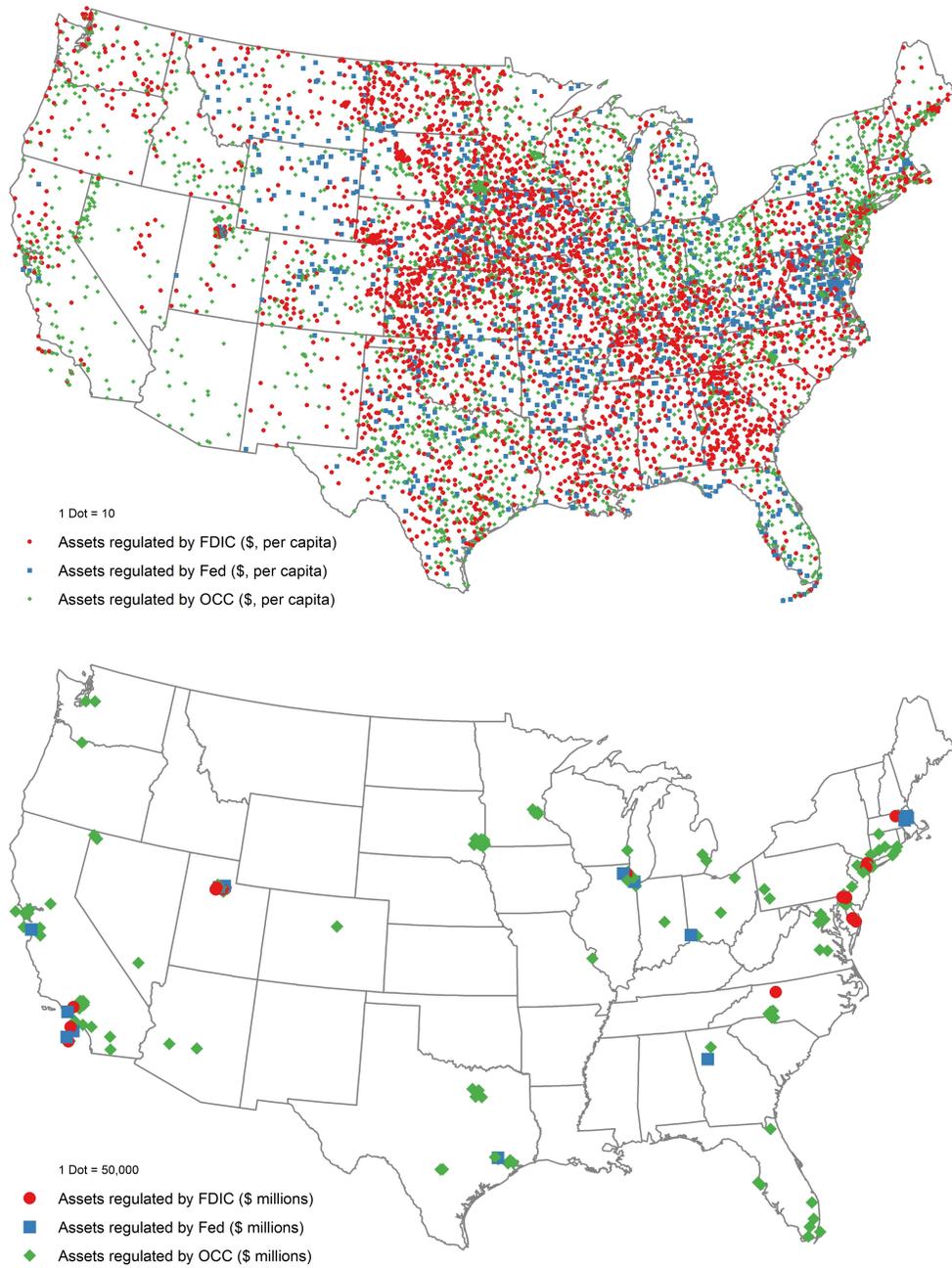
The extreme increase and concentration of banking assets in the two decades from 1994 to 2014 is both the result of a steady process of global consolidation and the accelerated concentration fuelled by the disruption of the financial crisis. In particular, the expansion of the regulatory control in terms of assets under supervision is to a large part the outcome of seemingly technical, but structurally important regulatory and structural changes in the aftermath of the crisis. First, a number of near financial implosions of non-depository institutions such as Bear Stearns and Merrill Lynch were absorbed into the balance sheets of existing, large bank holding companies (BHC) such as JP Morgan and Bank of America. Second, former Wall Street icons Goldman Sachs and Morgan Stanley, the last two independent investment banks, were converted into BHCs, also giving them access to important government liquidity subsidies via the Federal Reserve's Discount Window.

The spatial dimensions of this concentration of banking assets across different regulatory agencies are illustrated in Figure 5. The upper panel of the figure shows the extent of the regulatory space for the FDIC, the Federal Reserve and the OCC on a banking assets per capita basis, whereas the lower panel depicts the high degree of spatial concentration for the three agencies with regard to the assets controlled by SIFIs.

One of the most remarkable features of Figure 5, perhaps, is the decidedly uneven and intensely clustered nature of US regulatory space expressed in terms of the balance sheet strength of its regulated depository institutions. Unsurprisingly, SIFIs are highly clustered in the traditional US financial centres along the coasts and the primary cities of the Midwest – the lower panel of Figure 5 also illustrates the asset concentration by regulatory agency, spatially replicating the large concentration of large financial institutions under the oversight of the OCC. Indeed, among this class of financial institution, the OCC's regulatory space has the largest 'geographic reach' regarding its absolute spatial coverage.

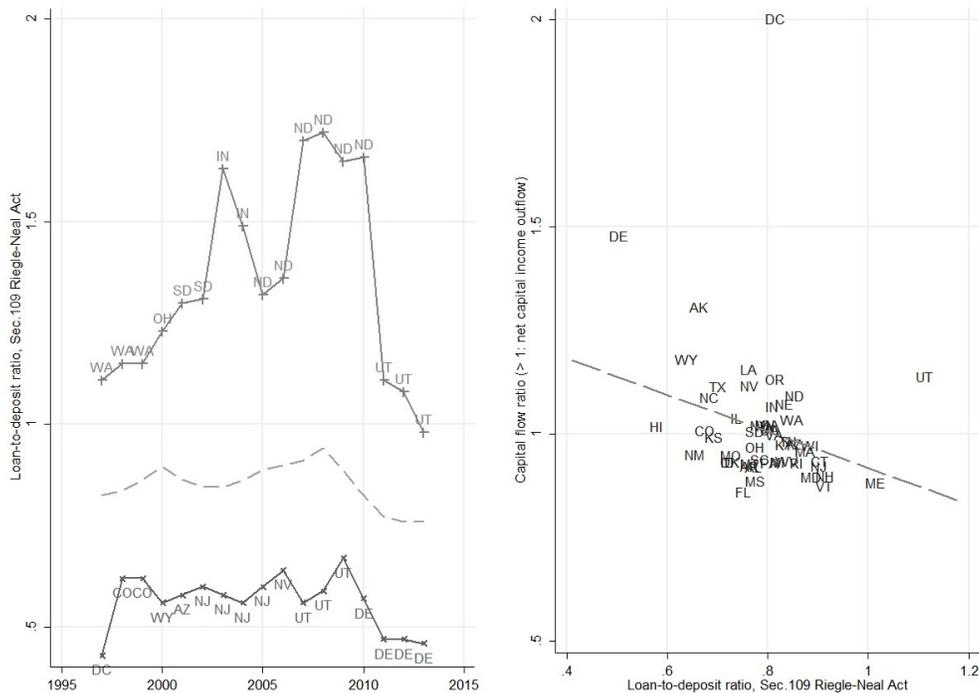
By contrast, the span of regulatory space – visualised in terms of banking assets per capita (at the county level) in the upper panel of Figure 5 – presents a different feature of the geographical extent of regulatory influence for the three main banking regulators: the FDIC is the undisputed regulator of middle America, covering the depository activities of most of America's Heartland more densely than either the Fed or the OCC. In many ways, this pattern is fully consistent with US regulatory history and the evolution of its financial frontier from the coasts to the rapidly developing urban system in Midwest and the Sunbelt (Conzen, 1975; Calomiris, 2000; Barth, Liy, and Luy, 2010; Bieri, 2014b). In other words, the institutional divides of US regulatory space thus trace out the frontiers of past financial crises. I show next that this phenomenon of a historical imprinting of the particularities of regulatory arrangements onto the financial landscape by no means is an exception.

Figure 5: Banking asset concentration across US regulatory space, 2014



Source: Author's calculations from FDIC, Federal Reserve and Census Bureau data.

Figure 6: Regional capital flows and the legacy of interstate banking regulation



Notes: Section 109 of the Riegle-Neal Act “prohibits a bank from establishing or acquiring a branch or branches outside its home state, pursuant to the act, primarily for the purpose of deposit production” (FRB, 2002, p.1). Regulatory enforcement of this provision takes place via the ‘host state loan-to-deposit ratio’ (LTD) and requires the lending and deposit activities of a given bank’s interstate branches to lie within a certain fraction of the host state LTD ratio. The right panel is uses the 2013 cross section. Capital flows are approximated by the difference between gross state income and gross state product (cf. Kalemlı-Ozcan, Reshef, Sørensen, and Yosha, 2010). Sources: Author’s calculations from FDIC, Federal Reserve and Census Bureau data.

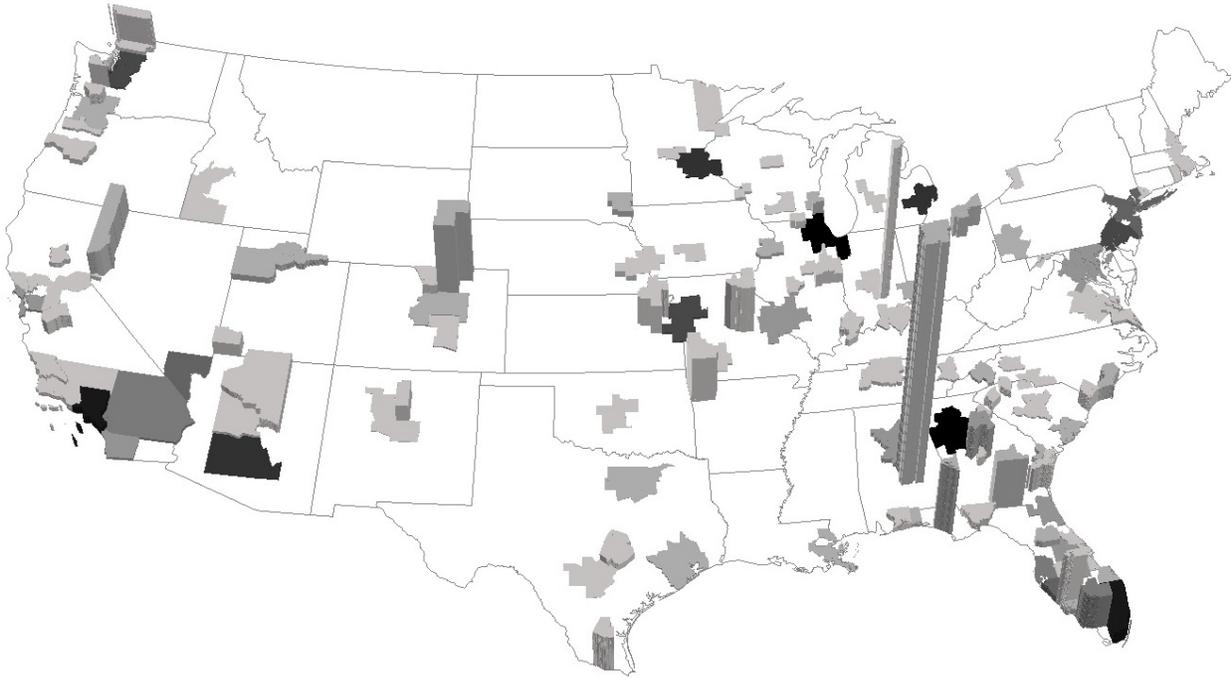
## 4.2 Financial agglomeration, path-dependency and the geography of banking failures

Contrary to the common belief the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 completely removed regulatory barriers to the interstate flow of deposits and loans, section 109 of the Interstate Act still restricts the spatial distribution of credit across the US banking system today.<sup>16</sup> While the Riegle-Neal legislation allows banks to branch across state lines, it contains a little-known regulatory provision that still affects the flow of funds across space today.

Specifically, Section 109 of the Act “prohibits a bank from establishing or acquiring a branch or branches outside its home state, pursuant to the act, primarily for the purpose of deposit production” (FRB, 2002, p.1). Indeed, the political reasoning behind the enactment of section 109 (which became effective in 1997) was to ensure

<sup>16</sup>For example, section 106 of the Gramm-Leach-Bliley Act of 1999 further expanded the coverage of section 109 by changing the definition of an ‘interstate branch’, also applying the coverage to any bank or branch of a bank controlled by an out-of-state BHC. Interagency regulations implementing this amendment are still effective today.

Figure 7: Geography of banking failures across US metro areas, 2007–2014



*Notes:* Metro area extrusions are proportional to total losses from FDIC-supervised depository institutions as a percentage of metropolitan GDP. Area shading reflects the total number of failed institutions per metro area (ranging from light grey: 1-5 failures to black: 20-59 failures). *Sources:* Author’s calculations from FDIC Historical Statistics on Banking and BEA data.

that interstate branches would not “take deposits from a community without the bank’s reasonably helping to meet the credit needs of that community” (FRB, 2002, p.3). Regulatory enforcement of this provision takes place via the ‘host state loan-to-deposit ratio (LTD)’ and requires the lending and deposit activities of a given bank’s interstate branches to lie within a certain fraction of the host state LTD ratio.<sup>17</sup>

The temporal evolution of this provision is shown in Figure 6 where the left panel shows the upper and lower bounds for the host state LTD ratio (the dashed line is the US average LTD). One implication of this regulatory requirement is that credit creation by out-of-state banks is tied to differences in the structure of the local banking industry which, in turn, is a function of the funding models of individual banks. LTD ratios are highest in (more peripheral) states where home banks are particularly risk averse, focusing almost entirely on traditional banking services for a regional customer base. By contrast, the lowest LTDs are in states where there is a substantial local presence of large BHCs with diversified international loan portfolios for which

<sup>17</sup>A loan-to-deposit ratio of 1 indicates that a bank lends a dollar for each dollar in deposits. Note that the reasoning behind this regulatory provision – that is to ‘keep deposits local’ – is inconsistent with the mechanics of modern banking where the arrow of causality runs from loans to deposits and not the other way around. See also Chick and Dow (1988) and Dow (1999).

regulatory requirements force them to keep more of their deposits liquid.

In other words, because LTDs are endogenously determined by the conditions of the local banking industry, the regulatory provisions of section 109 of the Riegle-Neal Act create some form of ‘regulatory lock-in’ effect whereby local conditions in the banking industry are reinforced to the extent that outside banks have to comply with local funding models and lending practices. In the context of another industry, this is functionally equivalent to imposing the regulatory requirement that a high-tech company wanting to establish operations, say, in Silicon Valley, must adopt the same average technology that all other local high-tech companies in the State of California deploy. While disentangling the qualitative economic effects of this regulatory provision is beyond the scope of our discussion here, it is clear that such regulation – at a very minimum – accentuates and accelerates the cumulative causation of agglomerative forces in the banking industry. The right panel of Figure 6 adds further emphasis to this point by documenting a robust connection between interstate capital flows – approximated by the difference between gross state income and gross state product (cf. [Kalemlı-Ozcan, Reshef, Sørensen, and Yosha, 2010](#)) – and LTDs, whereby low LTD states, that is states with more globally active banks, tend to experience the largest capital outflows.

Another dimension of the intensely agglomerated nature of the US banking industry was revealed by the spatial incidence of banking failures during the financial crisis. Figure 7 depicts the uneven geography of these banking failures across US metro areas from the beginning of the crisis in 2007 to the present day. The metro area extrusions in this graph are proportional to total losses from FDIC-supervised depository institutions as a percentage of metropolitan GDP and area shading reflects the total number of failed institutions per metro area (ranging from light grey: 1-5 failures to black: 20-59 failures). Remarkably, the number of failed depository institutions and the relative economic magnitude of these failures are inversely distributed between the financial cores of the large urban centres and the more remote periphery. In other words, while more institutions failed in large metro areas, the cumulative economic impact of these failures was relatively modest in terms of local GDP, not exceeding 2 per cent for the ten MSAs with the largest number of banking failures. By contrast, a few catastrophic failures of local depository institutions lower down in the urban systems had much more devastating impacts that were tallying up costs of as much as 30 per cent of GDP in Montgomery, AL – almost exclusively due the collapse of just three banks, including Alabama’s second largest community BHC, Superior Bancorp (Table 3).

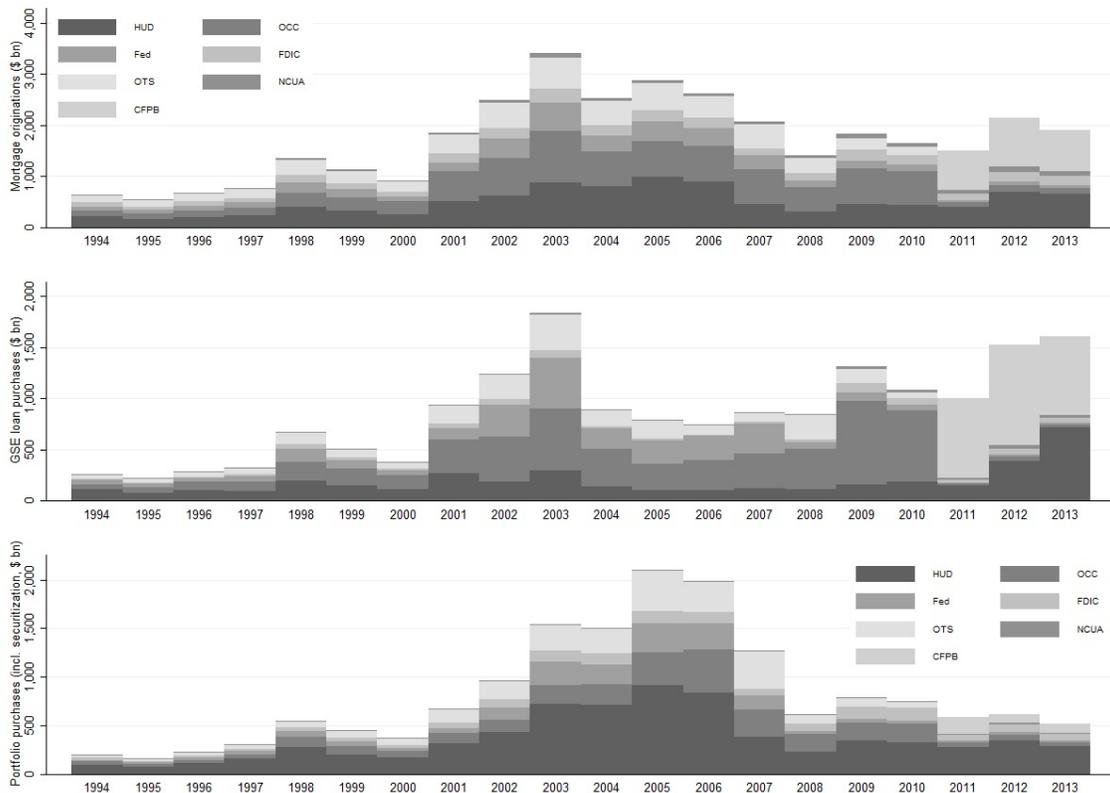
In the remaining part of this section, I now turn to the lowest layer in the hierarchy of money, namely the world of market-based credit intermediation where ‘shadow banks’ are most active. In what follows, I examine the spatial realities of the institutionally and functionally fragmented US regulatory complex in the context of the stunning growth and decline of housing credit during the Great Housing Boom and Bust.

Table 3: Failures of depository institutions across US metro areas, 2007–2014

| <i>Metro area</i>                                                               | <i>Loss as % GDP</i> | <i>Loss as % total deposit base</i> | <i>Loss as % FI's assets</i> | <i>Deposit-to-asset ratio</i> | <i>Deposit-to-asset ratio MSA</i> | <i>Losses (\$ mn)</i> | <i>Deposits (\$ mn)</i> | <i>Failed FIs</i> |
|---------------------------------------------------------------------------------|----------------------|-------------------------------------|------------------------------|-------------------------------|-----------------------------------|-----------------------|-------------------------|-------------------|
| Metro areas with the largest number of bank failures                            |                      |                                     |                              |                               |                                   |                       |                         |                   |
| Atlanta, GA                                                                     | 0.1%                 | 6.5%                                | 32%                          | 90%                           | 76%                               | 8,253                 | 127,439                 | 56                |
| Chicago, IL-IN-WI                                                               | 0.0%                 | 1.3%                                | 16%                          | 91%                           | 71%                               | 4,501                 | 357,573                 | 42                |
| Los Angeles, CA                                                                 | 0.8%                 | 3.9%                                | 23%                          | 69%                           | 74%                               | 1,5281                | 391,348                 | 14                |
| Miami, FL                                                                       | 1.6%                 | 3.7%                                | 36%                          | 72%                           | 74%                               | 6,681                 | 182,613                 | 13                |
| Minneapolis-St. Paul, MN-WI                                                     | 0.0%                 | 0.3%                                | 25%                          | 94%                           | 78%                               | 551                   | 211,213                 | 13                |
| Phoenix, AZ                                                                     | 0.0%                 | 0.8%                                | 24%                          | 88%                           | 74%                               | 530                   | 70,460                  | 13                |
| Detroit, MI                                                                     | 0.1%                 | 1.3%                                | 28%                          | 90%                           | 72%                               | 1,320                 | 100,909                 | 12                |
| Kansas City, MO-KS                                                              | 0.2%                 | 1.8%                                | 21%                          | 89%                           | 77%                               | 855                   | 46,853                  | 11                |
| Seattle, WA                                                                     | 0.2%                 | 1.6%                                | 19%                          | 88%                           | 74%                               | 1,289                 | 78,560                  | 10                |
| Las Vegas, NV                                                                   | 0.0%                 | 3.5%                                | 1%                           | 28%                           | 75%                               | 1,635                 | 47,294                  | 8                 |
| Metro areas with the most sizeable bank failures in terms of economic magnitude |                      |                                     |                              |                               |                                   |                       |                         |                   |
| Columbus, IN                                                                    | 18.8%                | 77.1%                               | 29%                          | 79%                           | 73%                               | 831                   | 1,078                   | 1                 |
| Montgomery, AL                                                                  | 30.1%                | 62.5%                               | 18%                          | 79%                           | 78%                               | 4,542                 | 7,268                   | 3                 |
| Greeley, CO                                                                     | 8.8%                 | 35.4%                               | 39%                          | 85%                           | 74%                               | 1,054                 | 2,974                   | 2                 |
| Macon, GA                                                                       | 4.1%                 | 34.4%                               | 42%                          | 90%                           | 78%                               | 962                   | 2,798                   | 4                 |
| Panama City, FL                                                                 | 8.7%                 | 27.6%                               | 37%                          | 95%                           | 79%                               | 796                   | 2,886                   | 2                 |
| Valdosta, GA                                                                    | 6.4%                 | 15.6%                               | 33%                          | 86%                           | 78%                               | 301                   | 1,933                   | 2                 |
| Fayetteville, AR-MO                                                             | 5.7%                 | 12.7%                               | 54%                          | 96%                           | 78%                               | 1,032                 | 8,095                   | 1                 |
| Naples-Marco Island, FL                                                         | 4.4%                 | 11.3%                               | 31%                          | 87%                           | 75%                               | 1,387                 | 12,251                  | 7                 |
| Bellingham, WA                                                                  | 3.8%                 | 10.8%                               | 26%                          | 88%                           | 74%                               | 313                   | 2,901                   | 1                 |
| Olympia, WA                                                                     | 2.7%                 | 9.0%                                | 24%                          | 95%                           | 73%                               | 235                   | 2,609                   | 1                 |

Source: Author's calculations from FDIC and BEA data.

Figure 8: Regulatory competency across the US housing credit cycle, 1994–2013



*Notes:* The horizontal axes show volume of mortgage originations (top) and loan sales by purchaser type (GSEs, middle; private securitisers, bottom). ‘OCC’: Office of the Comptroller of the Currency, US Department of the Treasury; ‘Fed’: Federal Reserve System; ‘FDIC’ Federal Deposit Insurance Corporation; ‘OTS’: Office of Thrift Supervision, US Department of the Treasury (merged with OCC in 2011, Title III of Dodd-Frank Act); ‘NCUA’: National Credit Union Association; ‘HUD’: US Department of Housing and Urban Development; ‘CFPB’: Consumer Financial Protection Bureau (created via Title X of Dodd-Frank Act, effective in 2011). *Sources:* Author’s calculations from HMDA microdata.

### 4.3 Housing credit, regulatory arbitrage and the geography of shadow banking

Perhaps more than anywhere in the US financial system, the intensely regulated domain of housing credit was – and continues to be – the venue for a substantial amount of regulatory arbitrage, whereby BHCs directly attempt to circumvent costly regulatory requirements or specific financial activities get driven into the least regulated areas of the monetary-financial system, namely the opaque realm of ‘shadow banks’. In the context of the creation of housing credit more than anywhere else, the severity of the regulatory tax on traditional banking entities has arguably pushed these activities beyond the perimeter of financial regulation into the world of ‘murky finance’ (see for example, [Demyanyk and Loutskina, 2016](#)).

Figure 8 illustrates the large volumes of mortgage origination by regulatory agency over the two decades that marked the largest rise and fall of house prices in modern US financial history. Two regulatory aspects of these developments are particularly worth highlighting. First, in addition to the three main banking regulators – the FDIC, the Fed and the OCC – the US Department of Housing and Urban Development (HUD) has regulatory oversight over all mortgage-related activities of non-depository institutions that can originate housing credit. This includes online mortgage originators, some of which play important roles in the long chains of the vertically disintegrated shadow banking machinery (Adrian and Ashcraft, 2012). At several points during the Great Housing Boom, up to one quarter of all mortgage originations – some \$1 trillion in housing credit – took place outside of the conventional regulatory remit of the FDIC, the Fed and the OCC.

Second, Figure 8 also documents the strong amount of ‘regulatory sorting’ that reveals itself in regard to another stylised fact of lending during the housing bubble, specifically the very distinct pattern of secondary-market loan sales (including sales for the purposes of securitisation) to the GSEs (Fannie Mae, Freddy Mac) on the one hand, and sales and securitisation activities of private-sector entities.<sup>18</sup> The middle and bottom graphs of Figure 8 document that, while the bulk of GSE-related loan sales were originated by traditional depository entities under the regulatory control of the either the FDIC, the Fed or the OCC, up to a third of all secondary-market loan sales into private portfolios were originated by entities under the oversight of HUD. Indeed, on eve of the financial meltdown in 2006 when loan sales into private portfolios reached a historic peak, more HUD-regulated mortgages were sold to private sector securitisers than all the portfolio purchases by the GSEs combined.

Put differently, the ‘origination-to-distribute’ (OTD) patterns of mortgage activities in the secondary market displayed a significant amount of variation not only over the course of the housing cycle, but also across different regulatory agencies. For example, loans originated by HUD-supervised entities had the highest likelihood of being sold for investment purposes (including securitisation) in almost every year between 1994 and 2013. At the same time, the financial crisis also led to another instance of the regulatory sorting in that there was an immense transfer of regulatory responsibility for the (functional) oversight of housing credit away from the pre-Dodd Frank regulators to the newly-created Consumer Financial Protection Bureau (CFPB) – to a large part, this shift in regulatory jurisdiction affected depository entities that were hitherto covered by the OCC. In this sense, the creation of the CFPB in 2011 under the Dodd-Frank Act marks an important departure from the US regulatory tradition of decentralized agencies whereby the institutional locus of financial oversight depended on the precise nature of the legal structure of and business activities pursued by individual financial intermediaries (Bieri, 2015a; ?).

For the purposes of the final part of our analysis, it is useful to retain the broad distinction between depository financial institutions (banks, savings institutions, credit

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<sup>18</sup>Among the information included in the annual Home Mortgage Disclosure Act (HMDA) data is the type of purchaser for loans that are originated and sold during the year. Although one of the few sources of information on loan sales, the HMDA data tend to understate the importance of the secondary market. See Avery, Brevoort, and Canner (2007) for more technical details on this point.



unions and their affiliated mortgage subsidiaries (MBS)) and non-depository financial institutions (NDFIs). The systematic spatial variation in securitisation patterns of banks and NDFIs over the course of the housing credit cycle is documented in Figure 9. As we have seen above, regulatory arbitrage by financial institutions outside the regulatory perimeter manifested itself in particular in the large differences in the loan purchase (and securitisation) activities of the GSEs versus those of the private sector. While GSEs tended to purchase and securitise bank-originated conventional loans that met the underwriting standards established by those entities, a large share of private-label purchases were originated by NDFIs.

Panel (a) in Figure 9 shows the remarkable change in the spatial relationship between this government-sponsored secondary market activity and private-sector secondary market activity. At the peak of the securitisation boom in 2006, those US metro areas of the Sunbelt and on the coasts where housing markets were heating up the most also saw the highest amount of activity regarding the amount securitisation conducted by NDFIs. In fact, in areas where NDFI were aggressively pursuing their OTD strategies, GSE secondary market activities were comparatively muted, while at the same time MSAs with the highest share of GSE-driven loan sales generally saw less private-sector securitisation.<sup>19</sup>

As local housing markets were increasingly getting overheated, there appeared to have been a veritable form of ‘spatial crowding out’ of bank-originated loans sold to the GSEs by the glut of NDFI-originated mortgages destined for private-label securitisation. The very distinct spatial patterns of GSE loan sales by banks and private loan sales by NDFIs is illustrated in panels (b) and (c) of in Figure 9. In panel (b), metro area extrusions are proportional the share of total loan sales by NDFIs – this is the y-axis variable in panel (a). The area shadings reflect the relative share of securitisation by GSEs (again, this is the x-axis variable in panel (a) – ranging from dark grey: 15-20 per cent to dark red: 60-70 per cent). In panel (c), by contrast, extrusions are proportional to the volume of loan sales/securitisation by NDFIs as a percentage of MSA GDP and area shading reflects the relative share of private label securitisation by NDFIs (ranging from dark grey: 40-50 per cent to dark red: 95-99 per cent). While these distinct spatial patterns do not permit any causal inference about the regulatory origins of the housing bubble, they emphasise the intensely geographical nature of financialisation in the housing market – a rapidly expanding, promising area of research (Hall and Leyshon, 2013; Immergluck and Law, 2014).

By 2013, with private-label securitisation activities at only a fraction of their pre-crisis levels, the phenomenon of spatial crowding out between government-led and private securitisation had completely disappeared – to the contrary, now, in the metro areas where the GSEs were most active in terms of their loan purchases, private sector financial institutions followed suit (see right section of panel (a) in Figure 9). The spatial effects of regulatory arbitrage in the lowest layer of the monetary hierarchy had all but vanished.

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<sup>19</sup>The literature on the spatial distribution of foreclosures is most directly related to this point. See, for example, Immergluck (2011) for a discussion of the spatial consequences of high-risk mortgage lending that came with greater financialisation.

## 5 Conclusion and Outlook

In very broad terms – as the global economy no longer stares into the abyss of a financial market fallout – the principal regulatory lesson of the recent crisis seems to suggest excessive risk taking by global financial actors outside the perimeter of regulation as the origin of current crisis. Going forward, this implies both expanding the scope of regulation of institutions (improved disclosure, limits on leverage, liquidity requirements, and governance standards) and a tighter regulation for markets and individual financial products. What are the implications of the financial crisis for the regulatory spaces of the global financial system? In some ways, the crisis has highlighted disruptive potential of the regulatory-spatial dialectic, putting a preliminary stop to market forms of regulation. Before the crisis, the preferred mode of regulation was "market-based" in the sense that private organizations such as credit rating agencies and international regulatory governance standards - codified by the internal-risk management standards of the Basel framework - would allow financial institutions to deploy and decipher price-based risk signals that would exert sufficient regulatory pressure as to avoid any serious financial disasters, both at the institutional and at the systemic level (Lee, Clark, Pollard, and Leyshon, 2009).

For now at least, the crisis has debunked the idea that markets can effectively be understood as rational or efficient. Both nationally and at an international level, this has led to a significant strengthening of the political argument for greater levels of regulatory intervention and much stronger international co-ordination, tackling in particular the issue of regulatory arbitrage that so deeply dominated the dynamics of regulatory competition, both among financial centres (French, Leyshon, and Thrift, 2009) and, as this chapter argues, among different sectors of the monetary-financial complex. The scale of relevant activities outside the formal regulatory perimeter depends on the definition of regulation. For the United States, it has been estimated that the total assets of the 'shadow banking system' – that is, bank-like entities not subject to bank-like prudential regulation – were roughly US\$10 trillion in late 2007, about the same size as those of the banking system.<sup>20</sup> Indeed, the regulation of the shadow banking system has been one of the most active areas of regulatory reform efforts since the financial crisis. Despite some improvements in strengthening the stability of the shadow banking system, progress to dates has been uneven, at best (see, e.g., Gorton and Metrick, 2010; Tarullo, 2012; Adrian, Bego, Copeland, and Martin, 2013).<sup>21</sup>

From the historical origins of modern money to the rise of shadow banking, this chapter has attempted to illustrate how the political economy of regulation creates new geographies of flows of funds – a set of spatial circuits that has come to be typified by the rapid evolution in bank complexity and a growing importance of 'murky fi-

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<sup>20</sup>However, it is important to recognize that this total includes the assets of entities such as investment banks, which were subject to a some degree of regulation, although regulation in those instances was often focused mainly on ensuring investor protection and appropriate business conduct (Carvajal, Dodd, Moore, Nier, Tower, and Zanforlin, 2009).

<sup>21</sup>In the context of shadow banking regulation, a key challenge is the potential for regulatory overlap when regulated banks actively participate in shadow financial system (Schwarcz, 2012; Tarullo, 2013a,b).

nance', that is the role of market-based credit intermediation. Recognizing the importance of real-financial linkages, my argument connects the political economy of regulation with the process of spatial development. Across different historical regimes, the intrinsic instability of the financial system governs a dialectical relationship between financial regulation and government intervention, in turn leading to financial innovation which opens up new frontiers across financial space.

Disciplinary debates about the future direction of the economic geography project call for an engaged pluralism. In this spirit, I have tried to argue the relevance of Post Keynesian monetary thinking for the economic geography of money and finance, as a complement to rather than substitute for a longstanding analytical tradition following the Marxian political economy in economic geography (Scott, 2000). While Sheppard and Barnes' (1990) seminal work has laid the foundations for a rich spatialising of Post Keynesian thought, their work is primarily focused on the real sector, that is production and consumption in a cash or barter setting that abstracts from the challenges of a modern monetary system that is dominated by the role of finance. I argue that a successful spatial theorizing of the monetary-financial system must complement the dominant Marxian view of money among geographers with heterodox monetary theories.

Overall, then, this chapter recognizes that regulatory developments in the financial system interact with the local and regional elements of the real economy. By demonstrating that the institutional arrangements of financial regulation matter for how the spatial economy evolves, I argue that money and finance are strongly non-neutral with regard to space, contrary to the central tenet of monetary neutrality in orthodox economics. In doing so, this work also seeks to contribute to an emergent literature on the spatial dimensions of financialisation (Lee, Clark, Pollard, and Leyshon, 2009; French, Leyshon, and Wainwright, 2011; Sokol, 2013). Perhaps a more subtle implication of the evidence presented here is the implicit relevance of Post Keynesian monetary thinking for the rapidly evolving literature on economic geography of money and finance. In this sense, Lösschian economic geography implicitly contains essential spatial elements of Post Keynesian monetary theory, including the notion of a hierarchical credit theory of money and the assumption that money is created endogenously.<sup>22</sup>

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<sup>22</sup>I discuss the theoretical aspects of the relevance of Post Keynesian monetary theory for economic geography in more detail elsewhere (Bieri, 2014a).

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