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Ridhwan, M.H.A.; Nijkamp, P.; Rietveld, P.; de Groot, H.L.F.

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REGIONAL DEVELOPMENT AND MONETARY POLICY

A REVIEW OF THE ROLE OF MONETARY UNIONS, CAPITAL MOBILITY AND LOCATIONAL EFFECTS

Masagus M. Ridhwan[a,b,c,1], **Peter Nijkamp**[a,b], **Piet Rietveld**[a,b], **Henri L.F. de Groot**[a,b]

[a] *VU University Amsterdam, Department of Spatial Economics, The Netherlands*
[b] *Tinbergen Institute, Amsterdam, The Netherlands*
[c] *The Central Bank of Republic of Indonesia, Jakarta, Indonesia*

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Abstract

Standard economic theory assumes money to be neutral, at least in the long run, driven by interregional arbitrage and perfect capital mobility. This may easily be used as a justification for regional economists to ignore monetary factors. However, in a world with market imperfections, such arguments are no longer valid. This paper provides a critical review of theoretical arguments and empirical evidence on the issue. Special attention is devoted to asymmetric information problems caused by geographical factors. We conclude that monetary policy and financial markets can have a potentially important role to play in promoting regional development especially in less-developed countries.

Keywords: Regional Finance, Monetary Union, Capital Mobility, Asymmetric Information, Economic Geography

JEL classification: R51, R58, G14, E44, F15

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[1] Corresponding author: Dept. of Spatial Economics, VU University Amsterdam, De Boelelaan 1105, 1081 HV Amsterdam, The Netherlands. Email: ridhwan@feweb.vu.nl

1. Introduction

The re-emergence and fast development of regional science has been gaining momentum once more, especially in the last decade, after a period of "crisis" as diagnosed by Bailly and Coffey (1994). Considering regional economics in particular, despite this revival, there is still little attention devoted to the role of monetary policy in regional economic development.

An important reason why monetary policy tends to be largely ignored in economic theories of development is mainly because of a traditional postulate that money is neutral (at least in the long run). Thereby, monetary variables are only considered as a medium of exchange with no implications for long-run economic development. Nonetheless, money is not necessarily neutral because of the potential relevance of market failures, such as asymmetric information problems which will result in, for example, spatial segmentation of capital markets.[2] In the presence of such imperfections, new-Keynesian economics has argued that indeed money may have an influential role for regional growth (see Samolyk, 1991, 1994; Greenwald-Levinson-Stiglitz, 1993; Faini et al., 1993). Money in this terminology is not limited to monetary policy conducted by a central bank but also embraces, more broadly, financial markets, such as banks, stock markets, venture capital, etc. As Levine (1997) pointed out, financial institutions have the important capacity to mobilize savings and reinvest them in a more efficient and productive way. In turn, they could facilitate output growth.

Meanwhile, in view of the growing trend among central banks around the world to confine monetary policy to the use of Inflation Targeting as their policy framework, a good understanding of regional economic structures and characteristics has now become more important than it was previously, primarily because the national inflation rate

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[2] The way how money can affect output due to imperfect information was first studied by Lucas (1972) and Phelps (1970). The Lucas-Phelps model was used and further developed by amongst others, Blanchard and Kitoyaki (1987), and Rotemberg (1987). It emphasizes that unanticipated monetary policy may affect real variables (in contrast to anticipated ones). Keynesian economics emphasizes price stickiness (including wages and interest rates) that arise in a market, where information does not flow properly among economic agents (for further discussion, see Romer, 1996).

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originates from the aggregation of regional inflation rates within an economy. Therefore, understanding regional aspects is a fundamental pillar in meeting national targets.

The relevance of studying the complex relationship between finance and regional development has become gradually more apparent in view of the asymmetric shocks that have hit European economies since the introduction of the Euro in recent years. This also holds for less developed countries such as Indonesia, India and China, where large economic areas are divided into many (decentralized) regions, while monetary policy solely operates for the national economy. Hence, a discussion of this issue might be very relevant for those countries too in order to find optimal stabilization policies in the light of regional heterogenous shocks.

The main objective of this study is to analyse and survey how monetary and, more broadly, financial sectors may have an influence on regional development from both a theoretical and an empirical point of view. This will lead to an evaluation of the relevance of monetary policies and financial markets in facilitating regional growth. [3]

Furthermore, this study also attempts to make some refinements and extensions to the existing literature. More specifically, we aim to analyse the link between regional monetary impacts, optimum currency area theory and the role of interregional capital mobility as an adjustment mechanism to differential shocks. Finally, having argued that capital flows across regions may be imperfect, we could assert that there is a strong link between monetary/financial institutions and regional development.

The remainder of the paper is organized as follows. Section 2 discusses briefly the theoretical aspect of regional monetary transmissions. It is divided into two subsections which focus respectively, on the interest rate channel and the bank-lending channel.. Section 3 surveys the empirical literature. Based on the optimum currency area literature, Section 4 critically discusses whether in reality capital across regions is as mobile as envisaged by the classical approach. Having illuminated by reference to several studies that the hypothesis may not hold, we then emphasize that spatial effects may play an

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[3] Dow and Rodriguez-Fuentes (1997) and Rodriguez-Fuentes (2005) have undertaken literature surveys of how monetary policy may affect regional economies. They also discuss the differences between two main strands in economics, i.e. between monetarist (orthodox) and post-Keynesian theory in the viewing relationship between monetary policy (financial sector) and regional development. The former posits that regional monetary impact is exogenous to money, while the latter argues it is endogenous (see Rodriguez-Fuentes and Dow, 2003).

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important role in inhibiting the mobility of capital across regions or a monetary union. Finally, Section 5 attempts to conclude and ends with some policy lessons.

2. Aggregate Monetary Policy and the Disaggregate Regional Economy

Theoretically, monetary policy may influence the real economy through different channels, such as the interest rate, bank-lending, the exchange rate, balance-sheets, asset prices, and expectation channel. In the remainder of this section, we focus on the domestic transmission channels that are likely to be most relevant for regional economic development, viz. the interest rate and bank-lending channels.

2.1. Regional Monetary Transmission Mechanism: a Brief Theoretical Approach
2.1.1. Interest Rate Channel

The interest rate affects the real economy through the cost of capital. Increased money supply reduces the cost of capital, which may positively affect investments and subsequent growth, provided that the increased money supply reduces the real cost of capital on account of, for example, price stickiness, or alternatively that investments also in part respond to the nominal interest rate (e.g. Mishkin, 1995; Taylor, 1995; Mankiw, 1997).

The change in monetary policy could also affect consumption. First, an unexpected increase in the (real) interest rate will lower consumption. Second, households will become more pessimistic about future income and will reduce their consumption as compared with their planned consumption. Furthermore, anticipated increases of the (real) interest rate may have already resulted in lower consumption prior to the interest rate change through an expectations channel (Mahadeva and Sinclair, 2001).

At the regional level, the analysis of the transmission of monetary policies is slightly different, since every region has its typical economic structure and characteristics. Thereby a national monetary policy may affect different regions differently. An illustration is provided below in Figure 1, which describes how two economic regions in one country (for simplicity) may be affected differently by a

common interest rate. [4] The Core region (A) typically has a positive perceived investment climate, and hence has a strong investment demand. Meanwhile the Peripheral region (B) has characteristics of low investment perceptions and therefore experiences weak investment demand.

Monetary policy is typically targeted at the national economy, and hence the interest-rate below called the *policy-rate* is set equally for all its regions (represented by a horizontal LM curve in Figure 1). As Owyang and Wall (2005) posit in this context: "…. *the Fed holds the view that monetary policy cannot and should not be used to affect particular regions or states*". [5]
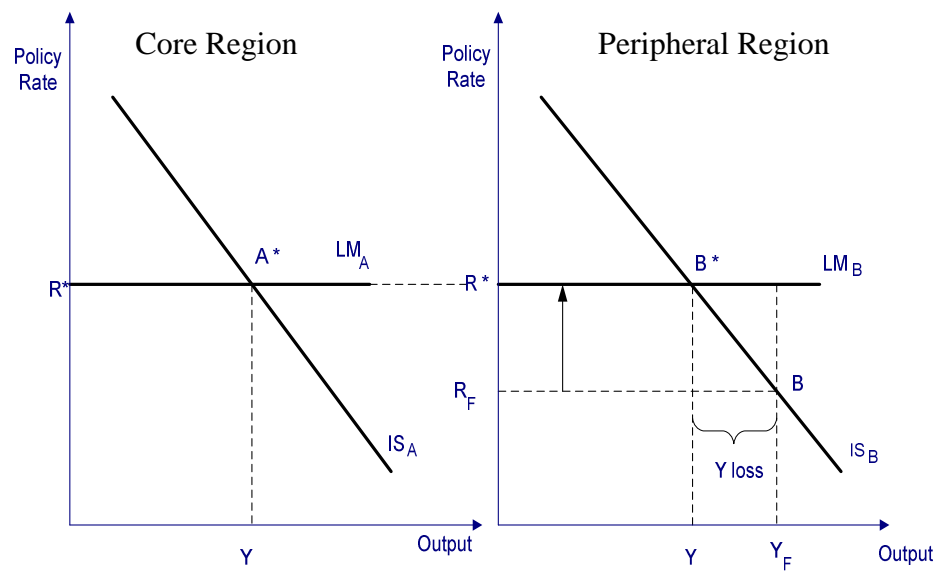
Figure 1. Regional monetary transmission through the interest rate channel

Now suppose that, in order to achieve its national target (let us say maintaining price stability), the monetary authority has imposed a uniform interest-rate ($R*$) over the two regions. Because the regions have different economic structures, the common policy may have differential impacts.

This interest rate is favourable to Region A since it is consistent with full employment or growth. In contrast, such an interest rate is unfavourable to region B

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[4] Modified from McCann (2001).
[5] Non-neutrality of money at the regional level has been long discussed in the Keynesian approach (see, for example, Dow, 1982; Cottrell, 1986; Tobin, 1991).

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which cannot maintain its natural growth at Y_F, but instead experiences an output loss equal to $Y_F - Y_{B^*}$

This simple diagrammatic analysis has indicated that two regions within a country may face differential impacts of aggreate monetary policy via the interest-rate channel. In the next subsection, we will consider the regional impact of monetary policy through the bank-lending channel.[6]

2.1. 2. Bank-lending Channel

Banks play an important role as intermediary agents in the financial market and as such in absorbing asymmetric shocks that may arise in credit markets. If banks are the only source of funds for borrowers, then monetary transmission through the bank-lending channel may work accordingly. A loose monetary policy will increase bank deposits, resulting in huge credit availability. In turn, if the increase of bank loans is used by certain borrowers, this will increase investments and potentially consumer spending, and subsequently output will also rise.

Next, in order to shed some further light on the effect of regional monetary policy through the bank-lending channel, we will use a similar approach as in Section 2.1. above. There are again two regions within a country (core and periphery), but with different economic structures. Assume that banks in the core region A have more access to credit from other sources of funding elsewhere, so they have a strong liquidity level. In contrast, banks in the peripheral region B face liquidity constraints. Thus demand for credit in region A is relatively high compared with region B. As previously discussed, the core region is perceived to have high investment opportunities, while the situation prevails for the peripheral region.

The better perceived investment climate following from the lower degree of uncertainity of region A compared with B implies that its (credit) interest rate is lower. Following best practice, the risk assessment conducted by banks will determine which part of a certain project will be funded, and in turn this could be mirrored by the

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[6] For further analysis, we will use the notion of asymmetric effects of monetary policy only for analysis across regions, despite several studies which also use the notion for highlighting the differential effect of monetary policy over time (see Florio, 2004).

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magnitude of the lending rate. In other words, a riskier project will have a higher lending rate, since it is more costly[7] relative to a less risky one.

Following an approach by Dow and Montagnoli (2007), assume there are two segmented regions each with their own bank. The national banking system has a local monopoly in finance in Region B, while borrowers in Region A have access to alternative sources of finance (see Figure 2 a,b,c). Hence, credit demand in region A is relatively elastic than region B, that is described by the relatively flat AR curve. The MR curve represents the marginal revenue of the banks. The marginal cost of funds is represented by MC. The equilibrium supply of credit in the national economy is where marginal costs and revenues intersect. This determines the benchmark interest rate which is supplemented by a mark-up by local banks reflecting their liquidity preferences and a premium for perceived risk.
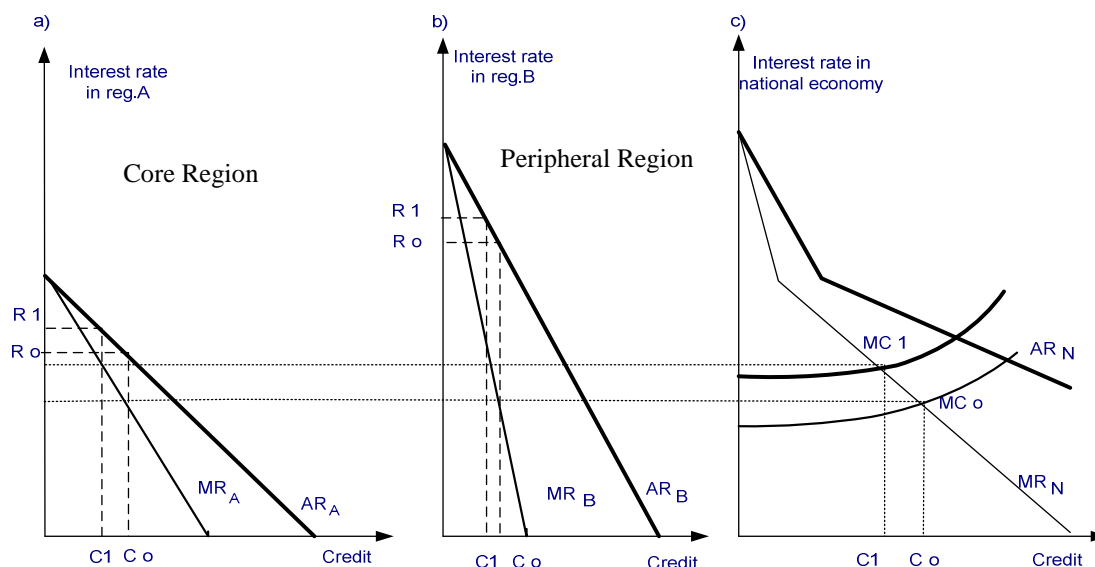
Figure 2 a), b), c). Regional bank-lending channel

Now suppose region A faces macroeconomic instability due to inflation pressure, which potentially affects the entire economy. In response, the central bank increases its interest rate. This in turn, will induce an upward shift of the MC curve in both regions

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[7] Banks are normally required to add more reserves (loss provision) for a riskier project, since this may be viewed as their cushion if the project quality is deterioriating. More provisions allocated for riskier project mean higher costs of fund for the bank since they have to pay interest to their depositors as well. Furthermore, banks are obliged to do this by the regulator.

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equally, from MC_0 to MC_1 that is shown at the aggregate level in Figure 2c which represents the national economy. Next, the intersection of the MC and MR curve will also change (moving upwards).

Since region A has more elastic demand, the rise of the central bank's rate will result in a relatively strong increase of the lending rate (from R_o to R_1), as well as a decrease of the supply of credits (from C_o to C_1). D-M summarize the effects as follows: "*The cost of credit rises more in region A ....than in region B..... in absolute terms, but proportionately more in region B relative to the fall in credit level*". This is because region A has more access to alternative funding sources than region B, thereby reducing the adverse impact of the increased cost of credit.

3. Empirical Evidence

3.1. Survey of Empirical Studies

A study by Carlino and DeFina (1998) revealed why the change of the Fed policy rate has a differential impact across states due to differences in their economic structures and characteristics. The main reasons for the asymmetries are based on the variations in the interest-rate sensitivity of a region's industrial mix, the share of small firms in the local economy, and the share of small banks in the local economy. Mixes in the industrial sector are relevant because of the "interest rate channel", while the firms' and the banks' size have an effect through the "credit channel".[8]

Following the formation of the European Monetary Union (EMU), a robust understanding of how monetary policy affects regional economies became a "hot issue" for many European economists. Arnold's (1999) contribution focuses directly on the regional impact of monetary policy by simply measuring the correlation between regional GDP growth and interest rate changes across European countries. Even with the many caveats noted by the author (limited sample, annual frequency, non-homogeneity of the business cycle phase across regions), the results strongly suggest a negative relationship between interest rate increases and regional growth.

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[8] Quoted from McPherson and Waller (2000).

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De Lucio and Izquierdo (2002) focus on the intensity of the reaction of Spanish regional economies to a common monetary shock using a vector autoregression (VAR) methodology. The endogenous variable used in the second step of their analysis is the long-run response in employment. The set of potential determinants of asymmetries is very similar to the one used by Carlino and DeFina (1999) for states in the USA.

Similarly, by using Spanish regional data, Ramos et al. (1999) have analysed the asymmetric response of regional economies to a national monetary shock. They provide support for the hypothesis that the distribution of industrial sectors such as manufacturing and construction across regions has been a main driving force behind asymmetric responses to the national monetary policy. Average firm size also played a key-role in explaining regional differences. They also consider the importance of 'firm size', since it could also be an indicator of credit constraints, since larger firms are more likely to use, for example, retained profits and find it easier to receive loans in the capital market. c

Table 1. Taxonomy of differential impacts of regional monetary transmissions

Classification of Factors	Key Variables	Type of Region with respect to Monetary Policy Changes	
		More Sensitive	**Less sensitive**
Compositional	Sectoral mix	Manufacturing industries, Property	Non-manufacturing industries (Agriculture, Services, etc.)
	Demand mix	High Investment, Consumption	Low Investment, Export-Import oriented, Consumption demand
	Degree of openness	Low degree of Export-Import intensity	High degree of Export-Import intensity
	Firm size	Small-Medium Enterprises (SMEs),household businesses	Big companies /enterprises
	Bank size	Small banks	National banks, Foreign banks
Behavioural	Bank health	Poor/lack of soundness	Sound/healthy
	Source of fund (for borrowers)	Highly bank-dependent	Availability of non-banks as alternative sources
	Banking concentration	Retail banking	Corporate and international banking
Institutional	Labour structure	Wage earners-income type / Industrial labor	Profit/rent earners
	Availability of financial market centre	Many and various type of financial institutions are available (bank, stock exchange, venture capital, etc)	Limited alternatives in financial markets, mostly rural banks

Source: Extracted various studies .

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Table 1 above attempts to extract some underlying sources that explain regional variation of the impacts of monetary policy that have been studied empirically across countries. Regional differences in the industrial mix, the structure of the financial sector, and firm size are most frequently cited as potential sources of this variation. In addition, some studies provide other sources of regional heterogeneity besides those mentioned here, such as: the degree of wage and price rigidity (Holmes, 2000); the regional housing market (Fratantoni and Schuh, 2003); the institutional features of the labour market (Arnold, 1999); the share of state exports and fluctuations of the real exchange rate (Weber, 2003).

3.2. Empirical Methodology

The recent empirical literature on regional monetary transmission mostly employs VARs (*vector autoregressions*), whereas previously they used "large" econometric models.[9] The VAR approach is capable of exploring transmission mechanisms of monetary policy as well as making a dynamic evaluation of its impact on the economy. Another advantage of using VAR is that it is rather neutral to the endogeneity problem, since the method can itself determine the identification of the variables. Compared with the former large models, the VAR approach is able to shed light on the propagation process of a non-anticipated impulse on the economic system (exogenous shock) without estimating the overall effects of monetary policy. Therefore, it clearly isolates the exogenous component from its endogenous response to the economy.

Sims (1972, 1980) developed the first generation of VAR models that basically fall under the heading of *atheoretical macroeconometrics*. These early models were "unrestricted" VAR model in which each current variable is regressed on all the variables in the model lagged a certain number of periods. His approach basically "let[s] the data speak themselves". It thus solely aims to minimize errors.

The pioneering work of using VAR modelling in the estimation of regional asymmetric reactions to shocks can be found in Carlino and DeFina (1999). They studied the dynamic behaviour of regional (state) covariance stationary vectors defined as:

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[9] For example, Fishkind (1977), Miller (1978) and Garrison and Chang (1978).

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$$Z_{s,t} = (\Delta x_{s,t}, \Delta x_{r-s,t}, \Delta x_{r2t}, \dots \Delta x_{r8,t}, \Delta c_{1t}, \Delta c_{2t}, \Delta c_{3t}, \Delta m_t)' \qquad (1)$$

where Δx_s denotes real income growth in state s, Δx_{r-s} is growth of real income in the region containing the state, excluding the state's own income; $\Delta x_{r2}, \dots \Delta x_{r8}$ denote the other macroregion's real income; Δc's are three macroeconomic control variables; and Δm is a measure of monetary policy actions.

The dynamics of Z_{st} is represented by:

$$A\, Z_{s,t} = B(L)\, Z_{s,t-1} + \varepsilon_{s,t} \qquad (2)$$

where A is a square matrix of dimensionality, equal to the number of regions in the system, which describes the contemporaneous correlations among the variables; $B(L)$ is a square matrix of polynomials in the lag operators (L); and $\varepsilon_{s,t}$ is a vector of structural disturbances for each region, which shows the way each regional variable of the system is influenced by its own regional shock, as well as by shocks to all other variables.

The system can thus be written as:

$$Z_{s,t} = C(L)\, Z_{s,t-1} + u_{s,t} \qquad (3)$$

where $C(L) = A^{-1}B(L)$ describes how contemporaneous and subsequent effects of shocks to each variable combine; and $u_{s,t} = A^{-1}\varepsilon_{s,t}$ describes the relationship between reduced-form and structural residuals. The impacts of policy shocks are summarized by using the impulse-response functions that are calculated from Equation 3 as

$$Z_{s,t} = [I - C(L)L]^{-1} + A^{-1}\varepsilon_{s,t} \quad = \quad \phi(L)\,\varepsilon_{s,t} \qquad (4)$$

whereas

$$\phi(L) = \sum_{l=0}^{L} \phi_l L^l$$

in which ϕ_l is a k x k matrix of structural parameters (for further details, see Enders, 2004).

By using US regional (state) experience as a benchmark, Carlino and DeFina (1999) were able to simulate the possible sensitivity of each EMU nation to a common monetary shock. In particular, they calculated an index using some European national variables and the coefficients obtained from cross-section regressions for the US linking the long-run effects of monetary policy (within eight quarters) to the same state-level variables for the US. When the US analysis was applied to European nations, the authors

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found that reactions are more pronounced in EMU countries, and particularly so in the more peripheral ones.

4. Capital Mobility as an Adjustment Mechanism

Having shed light on how monetary policy may differently affect regions or countries which share the same currency (or which have fixed exchange rates), this section looks further into capital mobility and the literature on optimum currency areas (OCA).[10] One of the most important adjustment mechanisms that is put forward in this research area is flexible factor markets characterized by a high degree of factor mobility and adjustable factor prices.

We will therefore now turn to a further discussion of interregional capital mobility as one of the critical mechanisms identified in most of the studies.[11] This issue is of particular interest for our review since most relevant studies within this area focus on the international dimension instead of the regional dimension.

4.1. Is Capital Freely Mobile Across Regions?

As postulated by the classical approaches, differences in rates of return to capital among regions will not be sustained in the long run when financial markets are integrated. The mechanism behind this is illustrated in Figure 3. The figure assumes a peripheral region (left axis) which initially experiences a high interest rate (R_0), while the interest rate in the core region (right axis) is low (R_0^*). As a consequence, the rate of return on capital is relatively high in Region 1 and it will attract capital in the presence of capital mobility, until equilibrium is achieved in point E (see Baldwin and Wyplosz, 2004).

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[10] The theory of optimum currency areas originated from the article by Mundell (1961). The theory attempts to explain the desirability for a group of countries to adopt the same currency and be ruled under a single monetary policy. Those countries with a common monetary policy may expect it will enhance economic integration amongst them, through lowering transaction costs by using the same currency and fixing their exchange rates.

[11] Several studies highlight interregional labour mobility across regions in the USA and European countries (see e.g. Barro and Sala-i-Martin, 1991; Barro et al., 1995; Nijkamp and Poot, 1998; Duczynski, 2000). Although conventional theory proposes labour mobility as a main adjustment factor, Beetsma and Vermeylen (2005) argue that such a mechanism may work at best imperfectly in the EMU, since there are still barriers to labour mobility in its member countries due to differences of language, culture and institutions. Alternatively, adjustment mechanisms may rely upon a well-functioning redistribution system that can equalize across the regions/countries (see, for example, Von Hagen, 1992, 1999).

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The empirically relevant question is, of course, to what extent capital is truly mobile. The seminal contribution in this area of research is Feldstein and Horioka (1980). They showed that there was a high correlation between the national saving rates and domestic investment rates among OECD countries in the 1960s and early 1970s. They posit that savings and investments would be perfectly correlated in a closed economy, but should be unrelated in an open economy since savings would be directed to countries with the highest rate of return (Coakley et al., 1998).
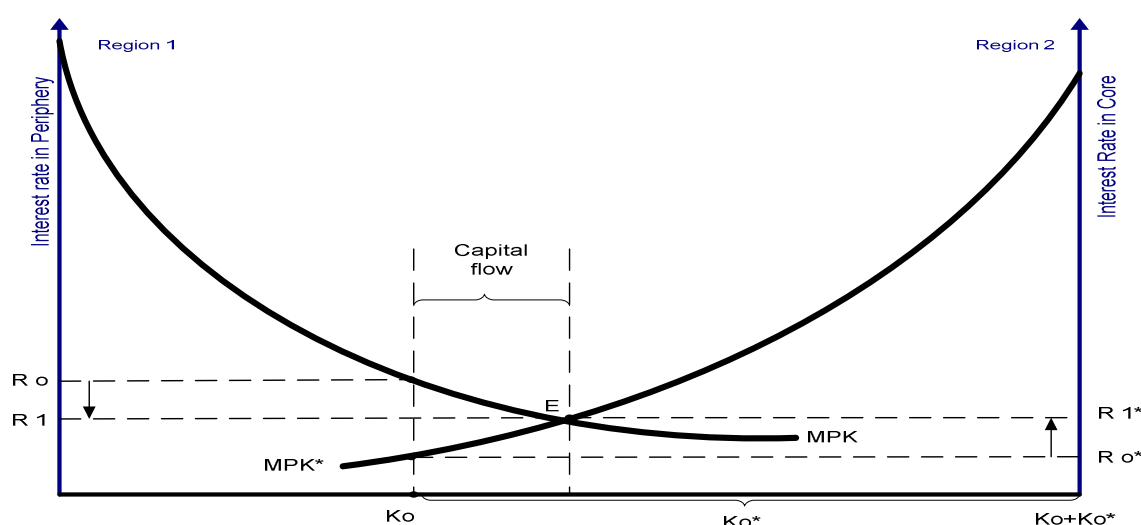

Figure 3. Perfect capital flow and interest-rate equalization

Bayoumi and Rose (1993) use UK regional data from 1971-1985 to study intra-national capital mobility and found that capital in those regions is perfectly mobile (because saving and investment rates were not strongly correlated). Related studies also confirm their findings of perfect capital mobility at the sub-national level (e.g. Dekle (1996) based on Japanese prefectures; Bayoumi and Sterne (1993) based on Canadian provinces; and Asdrubali et al. (1996) based on the US states).

Ozcan et al. (2006) use a different approach to study inter-state capital flows in the USA. Because of the lack of capital income flows data at the state level, they develop an approach using output/income ratios as a proxy for the relative magnitude of net inter-state capital income flows to a state. Using a simple neoclassical model, they found that,

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in the states where there are no barriers to movement of capital, capital should flow to states that experience a relative increase in capital productivity. In addition, they found evidence that net capital income flows between US states are consistent with the predictions of a simple "frictionless" neoclassical model.

Despite those conventional beliefs of perfect capital mobility at the subnational level, subsequent studies have arrived at different findings. The recent studies reviewed below have found that locational (spatial) effects should be incorporated in analysing mobility of capital in particular, which is neglected by the traditional approach.

4.2. Barriers to Capital Mobility and the Locational Effect

As mentioned above, the standard theory, which is supported by several empirical studies for developed countries, such as the USA, Canada, UK and Japan, points out that intranational financial markets are fully integrated and that capital is thus perfectly mobile. However, some recent studies have contradicted these the results by showing that capital may not be freely mobile, not even at the subnational level, resulting in segmentation of markets.

One of the important gaps in the conventional view may be caused by ignorance or simplification of the role of spatial factors in shaping economic behaviour. Such view could be noted at least from Van Wincoop's study (2001) that simplifies the key barrier of capital mobility to: "….. *asymmetric information that is closely related to language, cultural and regulatory barriers, [and which] … is likely to be less relevant for regions within a country*." Later he asserts that intranational capital will be perfectly mobile.

In the remainder of this paper, we will discuss the role of spatial factors in influencing economic (financial) behaviour. This sheds some interesting light on factors that may result in capital being imperfectly mobile, even at the subnational level.

4.2.1. Market Imperfections and Financial Sector across Space

Despite the conventional belief that capital flows are perfectly mobile across regions within a single country, the information gaps and asymmetries[12] between investors and

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[12] Standard theory postulates that asymmetric information is relevant when information between borrower and lender is unbalanced. The former party can observe closely what the outcomes of a project are, while

borrowers that are separated in different locations may be substantial. Apart from stressing the information problems, Keynesian approaches also shed light on other types of market imperfections such as "home-bias" problems that also render financial (equity) markets to function suboptimally as an intermediary.[13]

For the **banking** system in particular, a bank's reluctance to channel its credit to peripheral regions results in a concentration of its business in the core region.[14] In turn, such common information problems may result in an uneven distribution of financial capital across regions and persistent differences in rates of return with the associated welfare losses.[15]

The theoretical literature has two underlying rationales for why distance should serve as a deterrent to lending. First, commercial loans to small businesses (typically borrowers in regions, including households)[16] concern the advantage that geographical proximity may give lenders in screening perspective borrowers and monitoring loans (see Stiglitz and Weiss, 1981). As argued by Petersen and Rajan (2000) and Berger et al. (2002), lenders lack the "hard" information provided by detailed public financial statements typically available for large firms. As a consequence, they have to rely on "soft" information which is informally collected through relationships between the lender and the borrower. The collection of this soft information is costly to the lender, as it may require multiple site visits by a loan officer to the small business, or specialized knowledge of the local market in which the firm operates.[17]

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the lender has to rely on the information submitted by borrowers and must incur costs to verify such information. Variations of information asymmetry problems in financial markets are adverse selection and moral hazard (see Mishkin, 2001).

[13] Standard finance literature also documents other variants of imperfections in financial markets, such as agency problems, fundamental uncertainity, and interdependence. However, these variants are beyond the scope of this study.

[14] This notion is consistent with the previous ones, and thus we continue to use core- and periphery-regions, city/urban/rich- and rural/remote/poor- area interchangeably in order to highlight differences in economic structures, and especially the role of geographical distance in the lending decision between those regions.

[15] Myrdal (1957) has examined the 'backwash' effect of polarizing regional developments, according to which banks potentially siphon the savings of people in the poor region and reinvest them in the rich region. Accordingly, he contends that continuous growth in one region may occur at the expense of other regions or locations.

[16] Credit to small businesses is an important driver for job creation and macroeconomic growth, both for regions and for the nation as a whole.

[17] In addition, Berger *et al*. (2002) found that distance and the mode of interaction (preferably personal communication) between banks and borrowers may be at the advantage of small (local) banks that are better at using soft information than large banks that operate at a distance. Such kind of information is very

Secondly, in the traditional approach of spatial competition models, borrower travel costs are emphasized. Prospective borrowers must incur travel costs to do business with a lender, and pretty much the same also applies to depositors who want to deposit their money in one depository institution rather than others. Several studies have been conducted to understand this rationale (see, e.g. Chiappori et al., 1995; and Park and Pennacchi, 2003). Based on the two rationales above, the main implications of distance to lending disbursements are spatial price discrimination and limited credit supply faced by small firms, particularly those in remote regions.

However, it is crucial to differentiate between asymmetric information and transportation cost models of lending. In pure transportation-cost models, spatial discrimination only takes place through loan pricing because all borrowers who are deemed creditworthy obtain credit from the closest bank and never switch lenders. In an asymmetric-information setting, banks can strategically use proprietary information to create a threat of adverse selection for their rivals, thereby softening price competition. At the periphery of a bank's market, however, the informational advantage is smaller so that competitors attempt to poach customers more aggressively (see Agarwal and Hauswald, 2006; Porteous, 1995).

There are an increasing number of empirical studies that seek to explain the role of distance (information asymmetries) in lending decisions. A study by Degryse and Ongena (2005) established on the basis of Belgian data that distance is an important determinant of lending decisions and that banks actually engage in spatial price discrimination. Similarly, DeYoung et al. (2008) show that the probability of default on small-business loans increases with the distance between borrower and lender, although the adoption of credit-scoring techniques reduces this effect. Previously, Faini et al. (1993) previously also discussed the information asymmetries problem that has induced banks to discriminate between the Northern and Southern part of Italian regions in their pricing strategy.

Using a unique data set of loan applications by small businesses in US states, Agarwal and Hauswald (2006) have studied the determinants of lending decisions and,

helpful in evaluating how to allocate their credits. This implicitly suggests that small local banks that operate in rural areas are better at disentangling such opaque information.

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especially, the roles of private information and physical distance between a bank and its borrowers. They found that the likelihood of obtaining credit and the loan rate decrease with the bank-borrower distance and increase with the borrower-competitor distance, while controlling for a wide range of other aspects of the lending relationship.[18]

In **equity** markets, several studies have shown that investors earn higher returns on investments in local companies than on investments in more distant companies. In other words, being located far from a company puts an investor at an information disadvantage that is clearly measurable. Other studies show that security analysts who are located closer to a company produce more accurate earnings forecasts than analysts who are located at a greater distance.

Analysing informational asymmetries as revealed by proprietary equity trading, Hau (2001) using Germany data finds that traders located near a company's headquarters outperform their competitors in intraday trading. Similarly, Coval and Moskowitz (1999, 2001) analysed a large sample of managed mutual funds in the USA and found that fund managers earn abnormal returns from investments made within geographical proximity. They use as their vicinity measure a cut-off distance of 100 kilometres of a fund's headquarters. In addition, Ivkovich and Weisbenner (2003) examine the stock investments of over 30,000 households in continental USA from 1991 to 1996. They find that the average household invests 31 percent of its portfolio in stocks located within 250 miles. Loughran and Schultz (2006) have also used location as a proxy for information asymmetries and found that information asymmetries between rural firms and investors are particularly large, so that firms avoid issuing equity in the presence of these asymmetries. Rural firms also wait significantly longer when they finally decide to go public.

The above mentioned studies are based on a seminal paper by Myers and Majluf (1984), who observed that information asymmetries between managers and outside investors can make it expensive to raise funds through equity offerings and may lead some financially constrained firms to forego valuable projects rather than sell stock.

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[18] In contrast, using Swedish data, Carling and Lundberg (2002) find no evidence that distance is a determinant of a loan's default probability. The effect of physical distance on financial decision making has also attracted attention in other areas. Similarly, Petersen and Rajan (2000) assert that the role of distance in the banking market tends to diminish due to technological factors .

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Myers (1984) takes this observation further and develops a *pecking order theory* of capital structure. In this theory, firms issue equity only as a last resort, and capital structure is determined in large part by the firms' ability to finance internally. Alternatively, wherever possible, it is argued that firms prefer to raise investment capital through debt financing rather than share issues. But then, as a result, as mentioned above, local or opaque firms may face an expensive source of financing. Again, greater distance implies a clear disadvantage in obtaining information.

Next, let us consider the effect of physical distance on an equity market that relates to information asymmetries and *home-bias,* which is defined simply as 'a preference for investing locally'.[19] Numerous studies have been done to identify home-bias effects. Grinblatt and Keloharju (2001) showed that investors tend to have more active and frequent transactions with stocks from Finnish firms that are located close to investors and also share the same language and culture rather than with foreign firms.

Similarly, Goetzmann et al. (2008) study the behaviour of portfolio investors over the period 1995 to 2000, and reveal that urban investors are less diversified (focus on certain stocks) in managing their portfolio, contrary to standard portfolio theory that suggests diversification. Indeed, their behaviour is biased toward urbanism compared with rural investors.[20] They furthermore collect some figures to explain the portfolio focus motivation, focusing on behavioral biases (bounded rationality and skewness preference), real and perceived informational advantage, local social competition, and hedging of non-tradable risk.

In fact, the role of distance as an "informational barrier" in financial investment has been historically considered by the founding father of economics, Adam Smith (1976), who noted that "*... in the home trade, his capital is never so long out of his sight as it frequently is in the foreign trade of consumption. He can know better the character*

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[19] Even though there is a bulk of literature discussing the home-bias effect internationally either in the equity or the goods market, at the intranational level the literature is scarce. However, it is necessary to distinguish between information asymmetries and home-bias.

[20] In other areas, such as the trade in goods, Wolf (2000) found that home bias is present within the US states, and the preferred explanation for such a trade barrier is a long distance relationship between seller and buyer region. In commercial real-estate markets, Garmaise and Moskowitz (2004) find strong evidence in their analysis that buyers tend to be local when information asymmetries between the parties are severe, and more remote otherwise.

and situation of the persons whom he trusts, and if he should happen to be deceived, he knows better the laws of the country from which he must seek redress….." [21]

4.2.2. Spatial Agglomeration in Equity Markets

Besides the aforementioned information problem that may deter interregional fund arbitrage from working perfectly, security markets especially also have an interesting feature, since investors like to trade in places where markets are big . The reason is that the bigger the size of the market, the more liquid the market is, which in turn will guarantee more security and possibilities of portfolio diversification.

The important role of the 'big caps' market can also be approached from the market price. As already pointed out by Samuelson (1965), financial markets are efficient because prices will follow a 'martingale process', which results from the high level of transactions.[22]

With regard to the noticeable feature of the financial sector in that if displays a strong degree of spatial agglomeration in particular locations, usually large cities, the following observation by Glaeser (2005) is interesting: *"…there are two major agglomeration economies at work. First, the role of the dense city as a center for idea flows. The high value of knowledge meant that being in the city was particularly valuable. It may even be that New York's high density levels… helped New York finance continue to thrive because those high density levels are particularly conducive to chance meetings, regular exchanges of new ideas and the general flow of information…. (Second,) The costs of delivering manufactured goods depends only on transportation technology, but the cost of delivering services depends both on technology and on the value of the time involved by the participants in the transaction. Because services are by definition face-to-face, during an era of rising wages, there is an increased incentive to agglomerate these activities."* [23]

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[21] Quoted from Gordon and Bovenberg (1996).

[22] A martingale process is one in which the price of a good varies randomly about a constant mean. Prices will conform to such a process if, on average, these remain stable. Since financial-asset prices include elements of risk and transactions costs, these will oscillate continually around a bid–ask price which becomes lower with larger volumes of transactions (Parr and Budd, 2000).

[23] Quoted from Becker (2006).

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A theoretical underpinning of such spatial agglomeration phenomena in the financial sector has been provided by Porteous (1995). He emphasises the importance of path-dependent processes. These provide the reason why financial centres which had located early in a certain place may then well be sustained in the long run because of their early set-up, as happened in Amsterdam, New York City, London, Tokyo, Hongkong and in other big cities around the world. Some sources of economies of scales that can be exploited by financial industry clusters located in urban areas are information spillovers (including tacit information), immediate access to the market (timing factor), the market for high-skilled labour, and good Information and Communication Technology infrastructures.

Becker (2006), amongst others has supported this theory by providing evidence that majority of the stock markets around the world are located in the largest cities, since much of the economic activity relating to the stock market takes place in these large cities. Therefore, countries with larger cities will have better developed stock markets because they can benefit from stronger agglomeration economies surrounding the stock market.

4.3. Where is Capital Flowing To?

The role of this subsection is to bring together the previous insights regarding information asymmetries and spatial agglomeration of capital that provide an important explanation for where capital tends to locate. However, because there is only a limited number of studies at the regional level, we need to further enhance our understanding of the destination of capital flows.

Lucas (1990) posits that eventually capital will flow from poor to rich countries, because of differences in human capital and capital market imperfections. This pioneering work has become known as the Lucas paradox. Tornell and Velasco (1992) also support the argument that capital flows from poor to rich countries. They found that both the lack of property rights (law enforcement) and institutions have been main driving forces behind this paradox, which they call "the Tragedy of the Commons". The argument is also supported by Krugman (1993), who asserts capital tends to flow asymmetrically from the poor to the rich countries.

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Alfaro et al. (2005) emphasize that the Lucas paradox[24] challenges the standard neoclassical theory that predicts that capital should flow from rich to poor (countries) or from countries with low return of capital to countries with high return of capital. The sources of paradox can be separated into two categories. First, there are fundamental aspects such as technological differences, lack of institutional structure, lacking factors of production, and unreliable government policies. Second, there are capital market imperfections that stem from asymmetric information and sovereign risk. Previously, Gordon and Bovenberg (1996) also confirmed the lack of capital mobility internationally, because of the lack of international portfolio diversification, real interest differentials across countries, and the high correlation between domestic savings and investment.

If we were to project these studies that were carried out for the international level to the regional level, then we might end up with a similar conclusion, that capital tends to be imperfectly mobile, and that it may be asymmetrically mobile from the periphery to the core region. One crucial element to explain this phenomenon is that geographical proximity may play a role in affecting economic behavior.

Moreover, the advent of the New Economic Geography that was developed by Krugman (1991) based on Marshall (1890) has pointed out the importance of the economies of scale in explaining the clustering of particular industries. In such industries (including the Financial industry), the rate of return on capital is not necessarily a declining function of previous investments, but may well be an increasing function of the amount of capital which has been invested previously in a particular industry in a particular region. For this kind of industry, the integration of markets can lead to agglomeration and concentration in centres where the economies of large-scale operation can be best achieved.

All in all, this case may undermine the integration of regional financial markets. Combined with imperfections of capital mobility, this may have substantial effects on the growth prospects of regional economies, particularly in less developed countries. In other words, a large country with a core-periphery structure may well face problems of financial market segmentation.

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[24] The notion of Lucas paradox is related to a subject that is listed as one out of six major "puzzles"in international macroecoomics (Obstfeld and Rogoff, 2000).

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5. Conclusions

We have discussed how monetary policy can have real impacts on regional development especially through the interest rate and the bank lending channels, by using both theoretical and empirical approaches. Consistent with our simple diagrammatic analysis, most empirical studies also report heterogeneity of regional responses with respect to a common monetary shock. The main driving forces behind the asymmetric effects are inherent differences in the structures of the economic and the financial markets.

Conventional studies have reported that, over time, regional financial markets especially in the USA have become more integrated, thus enhancing capital mobility. However, our own study argues that the generalization of such a hypothesis is problematic, especially if one takes into account some recent findings in Europe. Moreover, in huge less developed countries like Indonesia, India and China in where strong regional disparities are apparent, the extent of market segmentation could become more pronounced, resulting in limits to capital mobility. Barriers to mobility can be related to distance, culture, language and institutions, which tend to give rise to substantial information asymmetries.

Furthermore, even though technological advances such as electronic banking services seem to have reduced the importance of distance substantially, there is still much evidence in both the USA and Europe suggesting that local banks still have a strong position in controlling local financial markets because they have superior information about their local markets.

To conclude, this survey study of the literature shown that traditional approaches that tend to neglect the role of money, monetary policy or, more broadly, financial markets in affecting growth, including regional economies may be too simplistic. This argument is based on empirical evidence that capital is imperfectly mobile because of information asymmetries. We underlined the potentially important role of monetary policy in spurring regional development especially in emerging economies. Future research will focus on the role of the exchange rate channel in affecting regional development, as well as, on the role of fiscal policy as an alternative way to absorb asymmetric shocks.

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References

Agarwal, S. and Hauswald, R. (2006) Distance and information asymmetries in lending decisions. Mimeo, American University.

Alfaro, L., Kalemli-Ozcan, S. and Volosovych, V. (2005) Why doesn't capital flow from rich to poor countries. National Bureau of Economic Research Working Paper, No. 11901.

Arnold I.J.M. (1999) The regional effects of monetary policy in Europe. Mimeo, Universiteit Nyenrode.

Asdrubali, P., Sorensen, B.E. and Yosha, O. (1996) Channels of interstate risk-sharing: US 1963-1990. *Quarterly Journal of Economics*, 144, 1081-1110.

Bailly, A.S. and Coffey, W.J. (1994). Regional science in crisis: A plea for a more open and relevant approach. *Papers in Regional Science* 73, 1, 3-14

Baldwin, R. E. and Wyplosz, C. (2004) The Economics of European Integration. Berkshire, McGraw-Hill,

Barro, R. J., Mankiw, N.G. and Sala-I-Martin, X. (1995) Capital mobility in neoclassical models of growth. *The American Economic Review* 85, 1, 103-115.

Bayoumi, T., and Rose, A. (1993) Domestic savings and intra-national capital flows. *European Economic Review* 37, 1197-1202.

Bayoumi, T. and B. Eichengreen. (1993) Shocking Aspects of European Monetary Integration. In: Torres, F. and Giavazzi, F. (eds), *Adjustment and Growth in the European Monetary Union*. Cambridge: Cambridge University Press.

Bayoumi, T. and Sterne, G. (1993) Regional trading blocs, mobile capital and exchange rate co-ordination. Mimeo, Bank of England.

Beetsma, R.M.W.J. and Bovenberg, A.L. (2001) The optimality of a monetary union without a fiscal union. *Journal of Money, Credit and Banking*, 33, 2, 179-204.

Beetsma, R and Vermeylen K. (2005) Clustering, optimum currency areas and macroeconomic policy. In: Brakman, S. and Garretsen, H. (eds). *Location and Competition*. Studies in Global Competition. New York: Routledge.

Becker, B. (2006) City size and financial development. Mimeo, Swedish Institute for Financial Research.

Berger, A., Miller, N., Petersen, M., Rajan, R. and Stein, J. (2002) Does function follow organizational form? Evidence from the lending practices of large and small banks. National Bureau of Economic Research Working Paper, No. 8752.

Bernanke, B.S. and Gertler, M. (1995) Inside the black box, the credit channel of monetary policy transmission. *Journal of Economic Perspectives* 9, 4, 27-48.

Blanchard, O.J. and Kiyotaki, N. (1987) Monopolistic competition and the effects of aggregate demand. *American Economic Review* 77, 4, 647-666.

Blanchard, O. J. and Kiyotaki, N. (1989) Monopolistic competition, aggregate demand externalities and real effects of nominal money. National Bureau of Economic Research Working Paper, No. 1770.

Carling, K. and Lundberg, S. (2002) Bank lending, geographical distance, and credit risk: An empirical assessment of the church tower principle. Sveriges Riksbank Working Paper, No. 144.

Chiappori, P.-A., Perez-Castrillo, D. and Verdier, T. (1995) Spatial competition in the banking system: Localization, cross-subsidies, and the regulation of deposit rates. *European Economic Review* 39: 889-918.

Carlino, G. and DeFina, R.H. (1998) The differential regional effects of monetary policy. *Review of Economics and Statistics* 80, 572-587.

Carlino, G. and DeFina, R.H. (1999) The differential regional effects of monetary policy: evidence from the U.S. States. *Journal of Regional Science* 39, 2, 339-358.

Coakley, J., Kulasi, F. and Smith, R. (1998) The Feldstein-Horioka puzzle and capital mobility: a review. *International Journal of Finance & Economics,* 3, 169-188

Cottrell, A. (1986) The endogeneity of money and money-income causality. *Scottish Journal of Political Economy*, 33, 2–27.

Coval, J. and Moskowitz, T. (1999) Home bias at home: local equity preference in domestic portfolios. *The Journal of Finance,* 54, 2045-2073.

Coval, J. D. and Moskowitz, T.J. (2001) The geography of investment: Informed trading and asset prices. *Journal of Political Economy* 109, 811–841.

Cutler, H., England, S. and Weiler, S. (2007) Urban and regional distinctions for aggregating time series data. *Papers in Regional Science*, 86 , 4, 575-595.

Dekle, R. (1996) Savings-Investment associations and capital mobility: On the evidence from regional data. *Journal of International Economics* 41, 53-72.

De Grauwe, P. (1994) The Economics of Monetary Integration. Oxford: Oxford University Press.

DeYoung, R., Glennon, D. and Nigro, P. (2008) Borrower–lender distance, credit scoring, and loan performance: Evidence from informational-opaque small business borrowers. *Journal of Financial Intermediation* 17, 113–143.

Degryse, H. and Ongena, S. (2005) Distance, lending relationships, and competition. *The Journal of Finance* 40, 1, 231-266.

De Lucio, J.J. and Izquierdo, M. (2002) Local responses to a global monetary policy – the regional structure of financial system. *Journal of Economic Studies* 29, 3, 205-221.

Dow, S. C. (1982) The regional composition of the money multiplier process. *Scottish Journal of Political Economy,* 29,1, 22-44.

Dow, S.C. and Rodriguez-Fuentes, C.J. (1997) Regional finance: A Survey. *Regional Studies* 31, 903–920.

Dow, S.C. and Montagnoli, A. (2007) The regional transmission of UK monetary policy. *Regional Studies* 41, 6, 797-808.

Duczynski, P. (2000) Capital Mobility in Neoclassical Models of Growth: Comment. *American Economic Review* 90, 687-694.

Enders, W. (2004). Applied Econometrics Time Series. United States of America: John Wiley and Sons.

Faini, R., Galli, G. and Giannini, C. (1993) Finance and development: the case of Southern Italy. In Giovannini, A. (ed.), *Finance and Development: Issues and Experiences*. London: Centre for Economic Policy and Research.

Feldstein, M. and Horioka, C. (1980) Domestic saving and international capital flows. *Economic Journal*, 90, 314–329.

Fishkind, H. H. (1977) The regional impact of monetary policy: an economic simulation study of Indiana (1958-1973). *Journal of Regional Science* 17, 1, 77-88.

Florio, A. (2004) The asymmetric effects of monetary policy. *Journal of Economic Surveys* 18, 3, 409-425.

Fontana, G. and Venturino, E. (2003) Endogenous money: an analytical approach. *Scottish Journal of Political Economy* 50, 4, 398-416.

Frantantoni, M. and Schuh, S. (2003) Monetary policy, housing, and heterogeneous regional markets. *Journal of Money, Credit and Banking* 35, 4, 557–589.

Garmaise, M. J. and Moskowitz, T.J. (2004) Confronting information asymmetries: evidence from real estate markets. *Review of Financial Studies*, 17, 2, 405-37.

Garrison, C.B. and Chang, H.S. (1979) The effect of monetary and fiscal policies on regional business cycles. *International Regional Science Review* 4, 2, 167-80.

Glaeser, E. (2005) Urban Colossus: Why is New York America's Largest City? National Bureau of Economic Research Working Paper, No. 11398.

Goetzmann, W. N. and Kumar, A. (2008) Equity Portfolio Diversification. *Review of Finance,* 1-31.

Grinblatt, M. and Keloharju, M. (2001) How distance, language, and culture influence stockholdings and trades. *Journal of Finance* 56, 3, 1053-1073.

Gordon, R.H. and Bovenberg, A.L. (1996) Why is capital so immobile internationally? possible explanations and implications for capital income taxation. *The American Economic Review* 86, 5, 1057-1075.

Greenwald, B. C., Levinson, A. and Stiglitz, J.E. (1993) Capital market imperfections and regional economic development. In: Giovannini, A. (ed.), *Finance and Development: Issues and Experiences*. London: Centre for Economic Policy and Research.

Hau, H. (2001) Location matters: An examination of trading profits. *Journal of Finance* 56, 1959-1983.

Hayo, B. and Uhlenbrock, B. (2000) Sectoral effects of monetary policy in Germany. In: von Hagen, J. and Waller, C. (eds), *Regional Aspects of Monetary Policy in Europe*. Dordrecht: Kluwer Academic.

Holmes, M. J. (2000) Monetary shocks, inflation and the asymmetric adjustment of UK industrial output. *Applied Economics Letters,* 7, 3, 159-63.

Ivkovich, Z. and Weisbenner, S. (2003) Local does as local is: Information content of the geography of individual investors' common stock investments. National Bureau of Economic Research Working Paper, No. 9685.

Kalemli-Ozcan, S., Reshef, A., Sorensen, B.E., and Yosha, O. (2006) Why does capital flow to rich states? Centre for Economic Policy and Research Discussion Paper, No. 5635.

Krugman (1991) Increasing Returns and Economic Geography. *Journal of Political Economy* 99, 3, 483-499.

Krugman, P. (1993) International finance and economic development. In Giovannini, A. (ed), *Finance and Development: Issues and Experience*. London: Centre for Economic Policy Research.

Levine, R. (1997) Financial Development and Economic Growth: Views and Agenda. *Journal of Economic Literature* 35, 2, 688-726.

Loughran, T and Schultz, P. (2006) Asymmetric information, firm location, and equity issuance. Mimeo, University of Notre Dame.

Lucas Jr., R. E. (1972) Expectations and the Neutrality of Money. *Journal of Economic Theory* 4,2, 103-24.

Lucas, R. E. (1990) Why doesn't capital flow from rich to poor countries? *American Economic Review* 80, 92-96.

Mahadeva, L. and Sinclair, P. (2001) The Transmission Mechanism of Monetary Policy. Mimeo, Center of Central Banking Studies, Bank of England.

Mankiw, N.G. (1997) Macroeconomics. New York: Worth Publishers.

Marshall, A. (1890). Principles of Economics. London: Macmillan.

Martin, R.L. ed., (1999) *Money and the Space Economy*. London: Wiley.

McCann, P. (2001) Urban and Regional Economics. Oxford: Oxford University Press.

McPherson, S.H. and Waller, C.J. (2000) Do local banks matter for the local economy? in search of regional credit channel. In: Hess, G. and van Wincoop, E. (eds.), *Intranational Macroeconomics*. New York: Cambridge University Press, 1-43.

Miller, R.J. (1978) The Regional Impact of Monetary Policy in the United States. Lexington, MA: Lexington Books.

Mishkin, F. (1995) Symposium on the Monetary Transmission Mechanism. *Journal of Economic Perspectives* 9, 3–10.

Mishkin, F.S. (2001) The Economics of Money, Banking, and Financial Markets. Boston: Addison-Wesley Longman.

Mundell, R.A. (1961). A theory of optimum currency areas. *American Economic Review*, 51, 509-517.

Myers, S. (1984) The capital structure puzzle. *Journal of Finance* 39, 575-592.

Myers, S. and Majluf, N. (1984) Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics* 13, 187-221.

Myrdal, G. (1957) Economic Theory and Underdeveloped Regions. London: Duckworth,

Neely, M. C. and Wheelock, D.C. (1997) Why does bank performance vary across states? Federal Reserve Bank of St. Louis Working Paper, No. 79.

Nijkamp, P. and Poot, J. (1998) Spatial perspectives on new theories of economic growth. *The Annals of Regional Science* 32,1, 7-37.

Obstfeld, M. and Rogoff, K. (2000) The six major puzzles in International Macroeconomics: Is there a common cause? In: Bernanke, B. and Rogoff, K. (eds.), *NBER Macroeconomics Annual 2000.* Cambridge: The MIT Press.

Owyang, M.T. and Wall, H.J. (2004) Structural breaks and regional disparities in the transmission of monetary policy. Federal Reserve Bank of St. Louis Working Paper, No. 2003-008C.

Parr, J.B. and Budd, L. (2000) Financial Services and the Urban System: An Exploration. *Urban Studies* 37, 3, 593–610,

Park, K. and Pennacchi, G. (2003) Why does institution size matter for banking market competition? Mimeo, University of Illinois, Urbana.

Petersen, and Rajan R. (2000) Does distance still matter? the information revolution in small business lending. National Bureau of Economic Research Working Paper, No. 7685.

Phelps, E. S. (1970) Introduction: the new microeconomics in employment and inflation theory. In: Phelps. E.S. et al. (eds.) *Microeconomic Foundations of Employment and Inflation Theory*. New York: Norton.

Porteous, D. J. (1995) The Geography of Finance. Gower, Aldershot.

Ramos, R., M. Clar, and J. Surinach. (1999) EMU: Some Unanswered Questions. ERSA Proceeding Conference, Dublin.

Rotemberg, J.J. (1987) The New Keynesian Microfoundations. Cambridge, Massachussets: MIT Press.

Rodriguez-Fuentes, C.J.. (2005) Regional Monetary Policy. Routledge, London.

Rodriguez-Fuentes, C.J. and Dow, S.C. (2003) EMU and the regional impact of monetary policy. *Regional Studies* 37, 9, 969–980.

Romer, D. (1996). Advanced Macroeconomics. United States of America: McGraw-Hill Companies-Inc.

Samolyk, K. A. (1991) A regional perspective on the credit view. *Federal Reserve Bank of Cleveland Economic Review* 27, 27-38.

Samolyk, K.A. (1994) Banking conditions and regional economic performance: evidence of a regional credit channel. *Journal of Monetary Economics* 34, 259–278.

Samuelson, P. (1965) Proof that properly anticipated prices fluctuate randomly. *Industrial Management Review*, 6, 41–49.

Sims, C.A. (1972) Money, income and causality. *American Economic Review*, 62.

Sims, C.A. (1980) Macroeconomics and reality. *Econometrica*, 48, 1, 1-48.

Stiglitz, J.E. and Weiss, A. (1981). Credit rationing in markets with imperfect information. *American Economic Review*, *71*, 393–410.

Taylor, J. (1995), The monetary transmission mechanism: an empirical framework. *Journal of Economic Perspectives*, 9, 4, 11-26.

Tobin, J. (1991). On the endogeneity of money supply. In: Nell, E. and Semmler, W. (eds), *Nicholas Kaldor and Mainstream Economics*. London: Macmillan.

Tornell, A. and Velasco, A. (1992) Why does capital flow from poor to rich countries? The tragedy of the commons and economic growth. *Journal of Political Economy* 100, 1208-1231.

van Wincoop, E. (2000) Intranational versus international saving-investment co-movements. In: Hess, G. and van Wincoop, E. (eds), *Intranational Macroeconomics*. New York: Cambridge University Press.

von Hagen J. (1992) Fiscal arrangements in a monetary union - some evidence from the US. In: Fair, D. and de Boissieux, C. (eds), *Fiscal Policy, Taxes and the Financial System in an Increasingly Integrated Europe*. Deventer: Kluwer Academic Publishers.

von Hagen, J. (1999) A Fiscal Insurance for the EMU? In: Beetsma, R.M.W.J. and Oudshoorn, C. (eds). *Tools for Regional Stabilisation*. Dutch Ministry of Economic Policy Discussion Paper, No. 9903.

Weber, E. J. (2006) Monetary policy in a heterogeneous monetary union: the Australian experience. *Applied Economics,* 38, 21, 2487-95.

Wolf, H. C. (2000) Intranational home bias in trade. *The Review of Economics and Statistics* 82, 4, 555-63.

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