PANOECONOMICUS, 2019, Vol. 66, Issue 1, pp. 41-50
Received: 27 February 2016; Accepted: 02 August 2017.

UDC 336.761:338.2
https://doi.org/10.2298/PAN160227008L
Original scientific paper

Jong-Eun Lee

Sejong University,
Seoul,
Republic of Korea
✉ LJONGEUN@sejong.ac.kr

Another Reason for Non-Neutrality of Financial Liquidity

Summary: This paper reinterprets the non-neutrality of financial liquidity under a general equilibrium model with multiple financial liquidities, but without price stickiness. Non-neutrality opens the possibility of effective monetary or financial policy on the crisis-prone real economy and thus revisiting its nature is worthwhile. We find that models with only one asset and money limit our perspectives to see the nature of financial liquidities interacting with real economy. Departing from abstracting an economy with only one interest rate allows us to see the underlying reason of non-neutrality of financial liquidities, that is, industry-specific rates of return distinguishable from the representative rate of return. Without the assumption of price stickiness but with a wider frame of multiple liquidities, this paper offers another reason for non-neutrality of financial liquidity and naturally clarifies the meaning of money neutrality. We incorporate complicated reality of multiple financial liquidities in a theoretical model, which is a way of deepening our understanding of financial market.

Key words: Financial liquidity, Non-neutrality, Dichotomy.

JEL: E44, E51.

Acknowledgement: I appreciate the Editor of *Panoeconomicus*, three anonymous referees, and Professor Katsushi Tabata for valuable comments. The usual disclaimer applies.

This paper presents a model with multiple financial liquidities linked with multiple industries in the real sector, reflecting industry-specific productivities. Many of the general equilibrium models usually have one aggregate capital, and thus, it is inconvenient to consider various financial liquidities. Only one aggregate capital is found to be one of the reasons there has been a history-long dichotomy between financial and real sectors. Further, a model with only one aggregate capital is more suitable for analyzing developing countries where responses in financial markets are relatively delayed due to various reasons like information deficiency and relatively small capacity of production systems that is not able to properly respond to increases in money supply as shown in Fakhri Issaoui, Talel Boufateh, and Mourad Guesmi (2015). On the other hand, Issaoui, Boufateh, and Guesmi (2015) argue that in developed countries, the capacity of production systems reacts to excessive money supply by creating more wealth and that developed countries tend to be more responsive to monetary transmission mechanisms. Certainly, it would be controversial to praise the production capacity in developed countries given the subprime mortgage crisis and delinked financial sector from the real sector, but it is worth explaining what the responses in financial markets really mean and how they are related to neutrality or non-neutrality.

From this study, we can learn what really makes money or liquidity neutral, from drawing the first order conditions and demand functions for money and liquidity without depending on market imperfection. It can easily extend to comparison of financial environments between developing and developed countries, or to interpret the meaning of quantitative easing as a way of resolving a crisis. Section 1 will discuss the previous literature on non-neutrality. We lay out a dynamic optimization model in Section 2 and Section 3 concludes.

1. Literature Survey

The theme of money or liquidity non-neutrality has been an age-long discussion in economics and essentially, it is about reality *versus* illusion. It has been shaping our way of looking at an economy such as price stickiness *versus* price flexibility, interaction between real and financial sectors, market failure *versus* government failure, creating controversies among various economic schools. By and large, neutrality is matched with policy ineffectiveness proposition while non-neutrality is to policy interventionism. For example, money neutrality based on rational expectation hypothesis has been discussed by Robert E. Lucas (1972) and Thomas J. Sargent and Neil Wallace (1975), which naturally leads to policy ineffectiveness proposition. In contrast, non-neutrality is ascribed to imperfect markets like asymmetric information which could generate price stickiness and channels of policy effectiveness. In an effort to reconcile them, one corresponds neutrality to the long-run phenomenon while non-neutrality to the short-run one, which business cycle models would like to reproduce.

Neutrality and non-neutrality issue appears to be an academic subject, but in fact, it is a practical and operational issue in making a policy, dominating our way of thinking. For instance, policy effectiveness is especially of interest under the depression and debt deflation of the 1930s and the 1980s (Ben S. Bernanke 1983; Hyman P. Minsky 1993) that still command great attention since the global financial crisis came to the surface in 2008.

In the 19th century, the veil of money concept was criticized by Johan Gustaf Knut Wicksell (1898). Departing from money's dependent role as a veil, Wicksell (1898) did a pioneering work on interest rate. The natural rate reflecting real profit or return on capital and the money rate reflecting the loan rate play a role to generate inflation dynamics. He created the early form of endogenous money supply and economic agents' reaction to money supply without money illusion. His novelty lies in the recognition of the relative conditions of the financial and real sectors.

Susanto Basu and Alan M. Taylor (1999) divide the international economic history into four segments: 1870-1914 with the classical gold standard; 1919-1939 when the world economy, destroyed by wars, turns autarkic and suffered from the Great Depression; 1945-1971 when the global economy was rebuilt under the Bretton Woods fixed exchange rate system with capital controls; and early 1970s to today when floating exchange rates with much less capital controls are prevailing. It reviews the vast literature, strongly claiming that money is not always neutral on the grounds that real exchange rates have not adjusted to changes in economic fundamentals and that the nominal exchange rate has not moved with inflation.

Zhixiong Zeng (2013) provides a theoretical framework that the non-neutrality of money is associated with an agency problem between banks and depositors.

From microscopic analysis to meta-narrative, there are numerous issues to investigate financial liquidity. One can meet heterogeneous liquidities in finance, naturally being under the risk and return analysis. In particular, securitization, one of the key words after the global financial crisis, is also a way of repackaging and transferring risks even if risk is always with us.

In Kyuil Chung et al. (2015), money becomes the counterpart of other financial liquidities and finds that monetary aggregates reflect the activities of non-financial corporations influencing funding conditions.

Under the frictionless world like classical dichotomy in Economics, Finance has the celebrated Modigliani-Miller theorem, under which recapitalization is ineffective and neutral (Franco Modigliani and Merton H. Miller 1958). In reality, financial liquidity is exposed to almost every form of market imperfections such as uncertainty, asymmetric information, and network externality. Consequently, the financial market is subject to regulations (Michele Fratianni and John C. Pattison 2015) and thus, probability and statistical theories are employed to measure market risks or to tackle imperfect information problems (Tobias Adrian and Hyun Song Shin 2014; Samia Ben Messaoud and Chaker Aloui 2015). The practices and issues in the financial market are signs of market imperfection.

The impact of liquidity is accentuated particularly during a crisis. For example, market turmoil during the global financial crisis is well analyzed and described as a series of low interest rate, securitization, liquidity dry-ups, defaults, bailouts by liquidity injection and recapitalization of banks in Markus K. Brunnermeier (2009) and Stephen G. Cecchetti (2009).

Interconnectedness and network effects are mentioned as precipitating causes of fire sales that also belong to market imperfections. Interconnected banks tend to share a similar lending strategy that amplifies shocks, thus making us bump against the irony of globalization (Maiko Koga and Koichi Yoshino 2016). The international vehicle currency is also one of the major issues causing tension and repercussion between the real and financial sectors (Jong-Eun Lee 2014; Thorsten Janus and Daniel Riera-Crichton 2015; Daqing Yao and John Whalley 2015; Adrien Faudot and Jean-Francois Ponsot 2016) admitting the benefits from capital flows liberalization (Rajmund Mirdala 2006).

Thus, with the extension from money to financial liquidity or financial assets, one finds that the topic becomes even more elusive to comprehend, which requires an explicit model to deal with financial liquidities.

So far, most of the existing literatures have dealt with financial liquidity on the ground of market imperfection.

However, this study approaches the non-liquidity of financial liquidity from different perspectives. We focus on the relativity of multiple liquidities in touching upon the essence of non-neutrality, which leads to successful reconciliation of the two extremes of neutrality and non-neutrality by showing both in one model.

2. The Dynamic Optimization Model

We revisited the general equilibrium money-in-utility model in Carl E. Walsh (2010) and extended the model with multiple financial liquidities. Initially, the money-in-utility function model was attempted by Miguel Sidrauski (1967) on the grounds that it yields valued services, that is, facilitating transactions even if paper money is useless itself. On the similar grounds that financial liquidity facilitates trading industry-specific productivities, it enters the utility function in its own rights.

The *raison d'être* of financial assets in the utility lies in the presence of different industries and sectors. For instance, the food industry and aerospace industry are known to have different risk and return profiles. This fundamental recognition leads to the financial spectrum of return-risk profiles, and the spectrum of short- and long-term horizons for portfolio investments. In particular, the recognition of different industries in the real economy paves the way for the presence of financial assets in the utility from a consumer's viewpoints, that is, distinctive degrees of value storage or value growth, and of safe conversion into consumption goods. This step appears to be a primitive attempt but an important channel to link macroeconomics and finance.

Financial liquidity in this paper can be debt security or equity security in general. The differences in stock and bond are often said to be the ownership, the way of trading, and the risk involved, but these distinctive characteristics between the two are inessential in defining the main function of financial liquidity and thus, unimportant in our discussion.

Suppose that the utility function of the representative household is, $U_t = u(c_t, m_t,\ x_{1t}, \dots, x_{nt})$ where $c_t = \frac{C_t}{H_t}$ is *per capita* consumption, $m_t = \frac{M_t}{P_t H_t}$ is *per capita* real money, H_t is the population size that is constant, P_t is the overall price level of an economy, $x_{j,t} = \frac{X_{j,t}}{P_t H_t}$ is *per capita* real financial asset, subscript *j* represents industry or sector *j*, and subscript *t* denotes time *t*. Therefore, consumption goods, money, and financial assets enter the utility function that is increasing and strictly concave in each argument. The representative household seeks to maximize lifetime utility is in Equation (1):

$$\max_{c_t, k_t, m_t, x_{1,t}, \dots, x_{n,t}} E_0 \sum_{t=0}^{\infty} \beta^t u(c_t, m_t, x_{1t}, \dots, x_{nt}), \tag{1}$$

where $x_{1t}, \dots, x_{nt},\ j = 1, \dots, n$ are financial liquidities representing each industry *j* at time *t*, and k_t is physical capital at time *t*. For example, $x_{j,t}$ can be a financial security issued by industry *j* and it is channeled into an industry *j*. The expanded range of financial liquidities apart from money could be an element of expressing financialization, an increase in the size and importance of a financial sector relative to its economy. In this context, the Post Keynesian School often regards aggregate liquidity rather than narrowly defined money as an important object of examination (Photis Lysandrou 2014). Thus, the effort to emulate the reality of financial markets is needed.

At the macroeconomic level, budget constraint is:

$$Y_t + \tau_t H_t + (1-\delta)K_{t-1} + \frac{M_{t-1}}{P_t} + \frac{i_{1,t-1}X_{1,t-1}}{P_t} + \cdots + \frac{i_{n,t-1}X_{n,t-1}}{P_t} = \\ = C_t + K_t + \frac{M_t}{P_t} + \frac{X_{1,t}}{P_t} + \cdots + \frac{X_{n,t}}{P_t}. \quad (2)$$

We are looking at real and financial sectors *via* Equation (2). Financial liquidities are present in the budget constraint and utility function as assets while physical capital functions as a factor in production that is being formed through portfolio investments and financialization.

Physical capital produces output according to a standard neoclassical production function. The production function is $Y_t = F(K_{t-1}, H_t)$ with constant returns to scale with respect to capital K_{t-1}, that is, capital at the start of period *t*, and human resources, H_t. The term $\tau_t H_t$ is the aggregate real value of any lump-sum transfers or taxes. In the *per capita* form, the production function is $y_t = f(k_{t-1})$ and the usual Inada conditions hold.

Households earn income that can be spent on consumption and saving in the form of financial liquidities or kept as money. The *per capita* real budget constraint is then:

$$f(k_{t-1}) + \tau_t + (1-\delta)k_{t-1} + \frac{1}{\pi_t + 1}\left(m_{t-1} + i_{1,t-1}x_{1,t-1} + \cdots + i_{n,t-1}x_{n,t-1}\right) = \\ c_t + k_t + m_t + x_1 + \cdots + x_n, \quad (3)$$

where the overall inflation rate is $\pi_t = \frac{P_t - P_{t-1}}{P_{t-1}}$, and $\tau_t = \frac{M_t - M_{t-1}}{HP_t}$ is the net transfers received by the government.

Fundamentally, it is assumed that the presence of multiple assets, $x_{1,t} \ldots x_{n,t}$ relies on the presence of multiple industries that perform differently, and thus, yield distinctive rates of return. In turn, this logic requires each industry to have the core capital, $k_{1,t} \ldots k_{n,t}$. It is a departure from previous models that usually contain one aggregate physical capital and one equilibrium interest rate. We assume that k_t is the weighted average of industrial core capitals, that is, $k_t = k_{1,t} + \cdots + k_{n,t}$.

The *per capita* wealth, w_t is the sum of industrial capital k_t, consumption goods c_t, financial liquidities, and money, that is, $w_t = k_t + c_t + \left(x_{1,t} + \cdots + x_{n,t}\right) + m_t$, and thus Equation (4) expresses it as follows:

$$k_t = w_t - c_t - m_t - \left(x_{1,t} + \cdots + x_{n,t}\right). \quad (4)$$

In reality, $k_{j,t}$ can be the function of financial liquidity, $x_{j,t}$, that is:

$$k_{j,t} = k_{j,t}\left(x_{j,t}\right). \quad (5)$$

In fact, portfolio investment decisions influence investment and capital formation in the industries in question. Equation (5) is in line with the study of Hak K. Pyo and Saerang Song (2015) that discusses the role of liquidity distribution in the gross domestic product (GDP) growth for the Organisation for Economic Co-operation and Development (OECD) countries. It shows that the growth of liquidity held by non-financial corporations increases the GDP growth rate from the results of panel regressions and of dynamic stochastic general equilibrium simulations. Raghuram G. Rajan and Luigi Zingales (1996) also empirically found the effect of financial developments on industries. At crisis, the role of liquidity is particularly dramatic when the firms are on the verge of bankruptcy, that is, timely injected public fund sometimes could save a moribund firm.

Per capita real constraint in Equation (3) can be fully written as:

$$\begin{aligned} s.t.\, c_t + k_t + m_t + \sum_{j=1}^{n} x_{j,t} = w_t = f(k_{t-1}) + \tau_t + (1-\delta)k_{t-1} + \\ + \frac{1}{1+\pi_t}\left(m_{t-1} + x_{1,t-1} + \cdots + x_{n,t-1}\right) = f\left(k_{1,t-1} \ldots k_{n,t-1}\right) + \tau_t + \\ +(1-\delta)\left(k_{1,t-1}\left(x_{1,t-1}\right) + \cdots + k_{n,t-1}\left(x_{n,t-1}\right)\right) + \\ + \frac{1}{1+\pi_t}\left(m_{t-1} + i_{1,t-1}x_{1,t-1} + \cdots + i_{n,t-1}x_{n,t-1}\right). \end{aligned} \tag{6}$$

The household's problem is then to choose paths for $c_t, m_t, x_{1t}, \ldots, x_{nt}, k_t$ to maximize utility. Equation (7) is expressing the value function with treating k_t as $w_t - c_t - m_t - \left(x_{1,t} + \cdots + x_{n,t}\right)$:

$$\begin{aligned} V(w_t) = \underset{c_t, m_t, x_{1t}, \ldots, x_{nt}}{Max} \{u(c_t, m_t, x_{1t}, \ldots, x_{nt}) + \beta V(w_{t+1})\} = \\ Max\left\{u(c_t, m_t, x_{1t}, \ldots, x_{nt}) + V\left(f\left(k_{1,t} \ldots k_{n,t}\right) + \tau_{t+1} + (1-\delta)\left(k_{1,t} + \cdots + \right.\right.\right. \\ \left.\left.\left. k_{n,t}\right) + \frac{1}{1+\pi_{t+1}}\left(m_{t-1} + i_{1,t-1}x_{1,t-1} + \cdots + i_{n,t-1}x_{n,t-1}\right)\right)\right\}. \end{aligned} \tag{7}$$

The first order condition with respect to consumption is in Equation (8):

$$\frac{\partial V(w_t)}{\partial c_t} = 0 \Leftrightarrow \frac{du(c_t, m_t, x_{1t}, \ldots, x_{nt})}{dc_t} = \beta \frac{\partial V(w_{t+1})}{\partial w_{t+1}} \{f_k(k_t) + 1 - \delta\}. \tag{8}$$

It implies that marginal utility of consumption is equal to marginal loss, i.e., discounted value of future capital.

Marginal utility with respect to financial asset $x_{j,t}$ is in Equation (9):

$$\frac{\partial V(w_t)}{\partial x_{j,t}} = 0 \Leftrightarrow \frac{du(c_t, m_t, x_{1t}, \ldots, x_{nt})}{dx_{j,t}} = \beta \frac{\partial V(w_{t+1})}{\partial w_{t+1}} \left[\{f_k(k_t) + 1 - \delta\} - \frac{i_{j,t}}{1+\pi_{t+1}}\right]. \tag{9}$$

Marginal utility from holding security x_j is equal to the discounted value of capital minus discounted value of utility from its real return that could be materialized after liquidation.

Marginal utility from keeping money, m_t is equal to the discounted value of aggregate capital net of the discounted value of foregone utility due to inflation. Equation (10) is about marginal utility with respect to money:

$$\frac{\partial V(w_t)}{\partial m_t} = 0 \Leftrightarrow \frac{du(c_t, m_t, x_{1t}, \ldots, x_{nt})}{dm_t} = \beta \frac{\partial V(w_{t+1})}{\partial w_{t+1}} \left[\{f_k(k_t) + 1 - \delta\} - \frac{1}{1+\pi_{t+1}}\right]. \tag{10}$$

Transversality conditions are:

$$\lim_{t\to\infty} \beta^t u_c(c_t, m_t)\, k_t = 0,$$
$$\lim_{t\to\infty} \beta^t u_c(c_t, m_t)\, m_t = 0,$$
$$\lim_{t\to\infty} \beta^t u_c(c_t, m_t)\, x_{1,t} = 0,$$
$$\vdots$$
$$\lim_{t\to\infty} \beta^t u_c(c_t, m_t)\, x_{n,t} = 0.$$

From the first order conditions, we have:

$$\frac{u_j(c_t, m_t, x_{0,t}, \ldots, x_{n,t})}{u_c(c_t, m_t, x_{0,t}, \ldots, x_{n,t})} = 1 - \frac{1}{1+\pi_{t+1}} \frac{1}{1+r_t} = 1 - \frac{i_{j,t}}{1+R_t}, \tag{11}$$

where R_t is a nominal interest rate of an economy by the Fisher relationship after Irving Fisher (1896).

Also, we have the same result as in Walsh (2010) by rearranging the first order conditions:

$$\frac{u_m(c_t, m_t, x_{0,t}, \ldots, x_{n,t})}{u_c(c_t, m_t, x_{0,t}, \ldots, x_{n,t})} = 1 - \frac{1}{1+R_t}. \tag{12}$$

Equation (12) is about real money holding, m_t that is exactly the same result as in Walsh (2010). It implies that any change in the nominal quantity of money that is matched by a proportional change in the price level has little effect on the economy's real equilibrium. Money is said to be neutral if a change in money has no effect on real variables.

On this point, Nilss Olekalns (1996) empirically reports that narrowly defined money is neutral but a broader measure of the money stock is not. In the case of developing countries, Issaoui, Boufateh, and Guesmi (2015) emphasize the absence of the production capacity rather than price flexibility in explaining why the increase in money supply is completely channeled into inflation. On the contrary, in developed countries, non-neutrality can appear because of the interactions of money and production.

One can use it in interpretation of Equation (11), that is, as long as sector *j*'s nominal interest rate $i_{j,t}$ is different from the economy-wide nominal interest rate, R_t, each financial asset has different impact on consumer's decisions. As Issaoui, Boufateh, and Guesmi (2015) claims, relative abundance of information in developed countries can render each sector's real rate of return visible and distinguishable from each other, which leads to the non-neutrality of liquidity, a possible theoretical and financial background behind the capacity of production systems in Issaoui, Boufateh, and Guesmi (2015).

The Federal Reserve Board have purchased national bonds and mortgage backed bonds under the title of Large Scale Asset Purchase programs that is often said as the quantitative easing (QE henceforth) for three times since the global financial crisis occurred in 2008. Our result suggests that injecting liquidity into the market by purchasing bonds can be effective when the nominal interest rates of those bonds are different from the economy-wide nominal interest rate.

From Equations (11) and (12), the demand functions for money or financial liquidities can be drawn as a utility function is specified. The result is summarized in Table 1 that confirms the liquidity non-neutrality and money neutrality in our model. Money neutrality holds if price is flexible as in Walsh (2010).

Table 1 Money and Liquidity Demand Functions

	Log utility function	**Constant elasticity of substitution (CES) utility function**
	$U_t = u(c_t, m_t, x_{1t}, \dots, x_{nt}) = \ln c_t + \ln m_t + \ln x_{1,t} + \cdots + \ln x_{n,t}$	$U_t = u(c_t, m_t, x_{1t}, \dots, x_{nt}) = \left[a_c c_t^{1-b} + a_m m_t^{1-b} + a_1 x_{1,t}^{1-b} + \cdots + a_n x_{n,t}^{1-b}\right]^{\frac{1}{1-b}}$, where $0 < a_j < 1, \sum_j a_j = 1, b > 0, b \neq 1$
Asset demand	$x_{j,t} = \frac{c_t(1+R_t)}{(1+R_t) - i_{j,t}}$	$x_{j,t} = \left(\frac{a_j}{a_c}\right)^{\frac{1}{b}} c_t \left(1 - \frac{i_{j,t}}{1+R_t}\right)^{-\frac{1}{b}}$
Money demand	$m_t = \frac{c_t(1+R_t)}{R_t}$	$m_t = \left(\frac{R_t}{1+R_t}\right)^{-\frac{1}{b}} c_t \left(\frac{a_m}{a_c}\right)^{\frac{1}{b}}$

Source: Author's calculation.

3. Conclusion

This study finds that liquidity non-neutrality lies in the distinguishable rate of return from the economy-wide rate of return even under the price flexibility. Financial liquidity demand depends on three factors, i.e., industry-specific nominal rate of return, the economy-wide nominal interest rate whereas money demand depends on the economy-wide nominal interest rate only. The QE is likely to have an impact if the financial asset to be purchased by a central bank has the real rate of return that deviates from the overall rate of return in an economy. This paper reveals relativism and non-neutrality among financial liquidities in the era of financialization and securitization, which leads us to more generalized model departed from the classical dichotomy. This is the starting point to broaden our perspectives to look into multiplicity and relativism among financial assets by highlighting the moments of selecting financial assets by households. Future research may incorporate the long-term aspect of price equalizations.

References

Adrian, Tobias, and Hyun Song Shin. 2014. "Procyclical Leverage and Value-at-Risk." *Review of Financial Studies*, 27(2): 373-403. http://dx.doi.org/10.1093/rfs/hht068

Basu, Susanto, and Alan M. Taylor. 1999. "Business Cycles in International Historical Perspective." *Journal of Economic Perspectives*, 13(2): 45-68. http://dx.doi.org/10.1257/jep.13.2.45

Bernanke, Ben S. 1983. "Non-Monetary Effects of the Financial Crisis in the Propagation of the Great Depression." *The American Economic Review*, 73(3): 257-276. http://dx.doi.org/10.3386/w1054

Brunnermeier, Markus K. 2009. "Deciphering the Liquidity and Credit Crunch 2007-2008." *Journal of Economic Perspectives*, 23(1): 77-100. http://dx.doi.org/10.1257/jep.23.1.77

Cecchetti, Stephen G. 2009. "Crisis and Responses: The Federal Reserve in the Early Stages of the Financial Crisis." *Journal of Economic Perspectives*, 23(1): 51-75. http://dx.doi.org/10.1257/jep.23.1.51

Chung, Kyuil, Jong-Eun Lee, Elena Loukoianova, Hail Park, and Hyun Song Shin. 2015. "Global Liquidity through the Lens of Monetary Aggregates." *Economic Policy*, 30(82): 231-290. http://dx.doi.org/10.1093/epolic/eiv002

Faudot, Adrien, and Jean-Francois Ponsot. 2016. "The Dollar Dominance: Recent Episode of Trade Invoicing and Debt Issuance." *Journal of Economic Integration*, 31(1): 41-64. http://dx.doi.org/10.11130/jei.2016.31.1.41

Fisher, Irving. 1896. *Appreciation and Interest*. New York: Macmillan.

Fratianni, Michele, and John C. Pattison. 2015. "Basel III in Reality." *Journal of Economic Integration*, 30(1): 1-28. http://dx.doi.org/10.11130/jei.2015.30.1.1

Issaoui, Fakhri, Talel Boufateh, and Mourad Guesmi. 2015. "Money Neutrality: Rethinking the Myth." *Panoeconomicus*, 62(3): 287-320. http://dx.doi.org/10.2298/pan1503287i

Janus, Thorsten, and Daniel Riera-Crichton. 2015. "Real Exchange Rate Volatility, Economic Growth and the Euro." *Journal of Economic Integration*, 30(1): 148-171. http://dx.doi.org/10.11130/jei.2015.30.1.148

Koga, Maiko, and Koichi Yoshino. 2016. "Boom and Bust of Foreign Assets under Integrated Banking Systems." *Journal of Economic Integration*, 31(1): 166-182. http://dx.doi.org/10.11130/jei.2016.31.1.166

Lee, Jong-Eun. 2014. "Defending an Emerging Economy from Global Financial Turbulences." *Review of International Money and Finance*, 4(1): 1-20.

Lucas, Robert E. 1972. "Expectations and the Neutrality of Money." *Journal of Economic Theory*, 4(2): 103-124. http://dx.doi.org/10.1016/0022-0531(72)90142-1

Lysandrou, Photis. 2014. "Financialisation and the Limits of Circuit Theory." http://www.postkeynesian.net/downloads/events/PL300514.pdf.

Messaoud, Samia Ben, and Chaker Aloui. 2015. "Measuring Risk of Portfolio: GARCH-Copula Model." *Journal of Economic Integration*, 30(1): 172-205. http://dx.doi.org/10.11130/jei.2015.30.1.172

Minsky, Hyman P. 1993. "On the Non-Neutrality of Money." *Federal Reserve Bank of New York Quarterly Review*, 18(1): 77-82.

Mirdala, Rajmund. 2006. "Macroeconomic Aspects of Financial Liberalization." *Panoeconomicus*, 53(4): 439-456. http://dx.doi.org/10.2298/PAN0604439M

Modigliani, Franco, and Merton H. Miller. 1958. "The Cost of Capital, Corporation Finance and the Theory of Investment." *The American Economic Review*, 48(3): 261-297.

Olekalns, Nilss. 1996. "Some Further Evidence on the Long-Run Neutrality of Money." *Economics Letters*, 50(3): 393-398. http://dx.doi.org/10.1016/0165-1765(95)00773-3

Pyo, Hak K., and Saerang Song. 2015. "The Distribution of Optimal Liquidity for Economic Growth and Stability." Korea Institute for International Economic Policy Working Paper 15-02. http://dx.doi.org/10.2139/ssrn.2773354

Rajan, Raghuram G., and Luigi Zingales. 1996. "Financial Dependence and Growth." National Bureau of Economic Research Working Paper 5758.

Sargent, Thomas J., and Neil Wallace. 1975. "Expectations, the Optimal Monetary Instrument, and the Optimal Money Supply Rule." *Journal of Political Economy*, 83(2): 241-254. http://dx.doi.org/10.1086/260321

Sidrauski, Miguel. 1967. "Rational Choice and Patterns of Growth in a Monetary Economy." *The American Economic Review*, 57(2): 534-544.

Walsh, Carl E. 2010. *Monetary Theory and Policy*. Cambridge, M.A.: MIT Press.

Wicksell, Johan Gustaf Knut. 1898. *Interest and Prices*. London: Macmillan and Co. Ltd.

Yao, Daqing, and John Whalley. 2015. "The Yuan and Shanghai Pilot Free Trade Zone." *Journal of Economic Integration*, 30(4): 591-615. http://dx.doi.org/10.11130/jei.2015.30.4.591

Zeng, Zhixiong. 2013. "A Theory of the Non-Neutrality of Money with Banking Frictions and Bank Recapitalization." *Economic Theory*, 52(2): 729-754. http://dx.doi.org/10.1007/s00199-011-0662-2