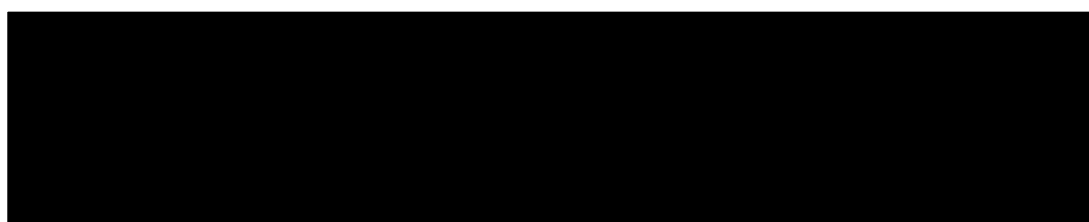


**Shadow Banking System: A complement to other
regular financial systems?
Evidence from International Data***



Shadow Banking System: A complement to other financial systems?

Evidence from International Data

Abstract

We examine empirically the linkage of the shadow banking system and other financial systems using a sample of 29 countries over the period 1990 to 2013. Even though the shadow banking system is different across these countries, the linkage between the financial systems is generally common across most of the countries studied. We use one of the main growth drivers of the shadow banking system which is “shadow banking as a complement” to account for the linkage between the shadow banking system and other financial systems. Our results confirm the complementary theory of the shadow banking system. Moreover, these results endorse the fact that banks’ sponsorship of shadow banking activities increased the linkage. Banks are not the only main actors in the financial system anymore; shadow banks are also playing an essential role in raising funds as well. Hence, the shadow banking system should be considered as the new parallel system; a system which is a complement to and not a substitute for other financial systems.

Key words: *Shadow banking system, Traditional banking, Insurance corporations and pension funds, Bank regulation, International banking*

JEL: *E51, G21, G23*

1. Introduction

“A further worry is the migration of new market and liquidity risks to the “shadows” of the financial world. This is part of the less-regulated, nonbank sector, which is growing rapidly in some countries. In the United States, for example, shadow banking is now considerably larger than the traditional banking system; in Europe, it is roughly half the size; and in China, at 25-35 percent, it is the fifth largest shadow banking sector in the world. Of course, nonbank activities can complement the banking sector in financing the economy in important ways. Yet, the opaqueness of these activities warrants heightened vigilance.”

Christine Lagarde, Managing Director of the IMF (Oct 2014)

Traditional banks fund their loans with deposits they collect from their depositors. However, the demand for funds has increased; subsequently, banks started to issue bonds. By increasing their resources and lending capacity, banks became more capable of meeting their costumers' needs. Moreover, after banks' engagement in maturity transformation; where their credits are made for longer maturities than their resources, the banking system became fragile and unstable. To ensure the stability of the banking system, many rules have been established such as deposit insurance, governmental last resort support, discount window lending, and prudential supervision.

The last global financial crisis has revealed the existence of an unordinary system which is participating in financing the global economy. This system is called the shadow banking system. The shadow banking system can be defined as the unregulated financial intermediation outside the traditional banking system. It consists of all non-bank financial institutions and activities. Unlike the traditional banking system, they do not have a direct access to deposit insurance or governmental last resort support. The shadow banking is also not subject to prudential supervision like banks. The shadow credit intermediation process is different from the regular process of the traditional banking system. In banks, the entire process of credit intermediation takes place within the walls of one single institution. Conversely, shadow credit intermediation is performed through a chain of many non-bank

financial intermediaries in a multistep procedure. Shadow banking mainly relies on securitization and wholesale money markets (Pozsar et al. 2010).

Despite its role as a funding source in the financial system, it has also played an essential part in the last financial crisis. In details, these institutions don't take deposits from the public; accordingly they are not treated by authorities as banks. Henceforth, they are not subject to traditional banking regulations and their activities are not protected by central banks. This lack of regulations encouraged the shadow banking system to undertake excessive risks. In time of distress, the shadow banking system is considered fragile. Due to its fragile nature, the shadow banking collapsed in the last financial crisis. During the crisis, most of the shadow banking activities stopped (Tobias et al 2012). Gorton et al. (2012) believed that the last financial crisis was nothing but a run in the repo market. As of 2008, regulatory authorities tried to implement new financial reforms. These financial reforms were mainly related to monitoring the shadow banking system. According to these authorities, the adoption of new regulations is necessary to control this new banking system and reduce, as much as possible, the risks associated with it.

The growth of the shadow banking outside the formal and regulated known sector has exploded, and will still explode as long as the public bought the notion that such funding instruments were just "as good as" bank deposits (McCullay, 2009). The size of the global shadow banking system has reached about \$80 trillion in 2014 (FSB, 2015). That is a 5 trillion more than its size in 2014. However, this number is only a proxy for the size of the global shadow banking system. As this system works in the shadows, it is very difficult to find a single precise definition of the shadow banking system. Consequently, we can only have a proxy for its size and not a very accurate one. Before regulating this shadow banking system, it is very important to know what contributes to this rapid growth of the shadow

banking system. Without a better understanding of what has fueled the growth the shadow banking, however, it is hard to control this system. The literature suggests three main drivers for the growth of the shadow banking system; 1) shadow banking as a complement to the financial system; 2) shadow banking as a result of search-for-yield effect and 3) shadow banking as a result of regulatory arbitrage.

In this study, we focus on the first driver of the shadow banking system which is “shadow banking as a complement to the financial system”. We examine empirically the linkage of the shadow banking system and other financial systems in 29 developed and emerging countries. On one side, we have the shadow banking system and on the other side, we have both the traditional banking system and institutional investors. We find that across most of the countries there exists a significant and positive relationship between the growth rate of the shadow banking system and the growth rate of traditional banks and insurance corporations and pension funds. This indicates that the shadow banking system is not replacing the activities of banks and the rest of the financial system. However, it can be considered as a complement. An important explanation of our results is that; in addition to their regular activities, banks are sponsoring most of the shadow banking activities. Hereafter, the shadow banking system can be viewed as an additional source of diversification in the financial system.

This paper is organized as follows; section 2 offers a review on the literature related to the shadow banking topic in general and to the linkage between the shadow banking system and other financial systems. Section 3 discusses the methodology, database, and variables used. The obtained results are discussed in section 4. Finally, section 5 concludes.

2. Related Literature

2.1. About the shadow banking system

The term “shadow banking system” has been used extensively after the global financial crisis in 2007/2008. The term was first introduced by Paul McCulley, a former managing director at PIMCO, in August 2007 at the Fed’s annual symposium in Jackson Hole. He described the shadow banking system as "the whole alphabet soup of levered up non-bank investment conduits, vehicles, and structures." (McCullay, Teton Reflections, 2007, p. 1)

In the literature, many definitions of the shadow banking system were introduced. However, a single unique definition has not been settled yet. Pozsar et al. (2010) defined shadow banks as “the financial intermediaries that conduct maturity, credit, and liquidity transformation without access to central bank liquidity or public sector credit guarantees”. (Zoltan Pozsar, Tobias Adrian, Adam Ashcraft, & Hayley Boesky, 2010, p. 1).

Financial stability board (FSB) is considered one of the main developers of the new reform plans and frameworks for regulating the shadow banking system. In their first shadow banking report (April 2011) in response to the request of G20 (FSB, 2011), FSB categorized the possible areas that should be covered by regulations. FSB defined the shadow banking system as the system that includes all entities outside the regulated banking system that perform credit intermediation. Moreover, FSB then provided a narrower definition whereby they focused on the ability of the shadow banking system to raise systemic risk and regulatory arbitrage concerns. (Shadow Banking: Scoping the Issues; A Background Note of the Financial Stability Board, 2011).

In 2013, Acharya et al. proposed a simple definition, where “shadow banking is that part of the intermediation sector that performs several functions that we traditionally associate with commercial and investment banks, but which runs in the “shadow” of the regulated banks in that it is off-balance sheet and less regulated”. Harutanyan et al. (2015)

introduced the noncore liabilities definition. According to this study, the shadow banking system constitutes financing of banks and non-bank financial activities through non-core liabilities. For example, securitization; which is creating new financial instruments by combining many financial assets together and the selling different tiers of this newly-created instrument to different investors, is considered a shadow banking activity no matter where it is conducted. Hence, based on this definition, we can define the shadow banking system as all non-traditional financial intermediation with non-traditional funding sources.

The literature and studies performed on the shadow banking topic suggest that the shadow banking as a complement to the financial system, shadow banking as a result of the search-for-yield effect, and shadow banking as a result of regulatory arbitrage contributes to the growth of the shadow banking system. First, the growth of the shadow banking system can be driven by the markets' requirement of new players in the financial system. In other terms, this means that the existing systems need a complementary to meet higher demands.

The second factor that drives the growth of the shadow banking is the search-for-yield effect. The investments made by the shadow banking system often offer attractive returns, but they also have higher risks for investors. When investors are not satisfied with the existing yields offered in the market, they will start searching for other sources. In other terms, the search-for-yield arises when government bond yields are often low and investors are seeking more profitable assets, it is the shadow banking system that provides higher yielding assets (IMF, 2014). In the US, Goda et al. (2013) explained that from 2002 till the time of the crisis the US bond yields reached very low levels. This explains the rapid growth of the shadow banking system around that time.

Third, severe bank regulations encourage financial institutions to avoid it by going through non-bank intermediation. In the context of regulatory arbitrage, it is considered one

of the dominant factors that have fed the rise of the shadow banking system. Arbitrage is usually defined as the simultaneous buying and selling of certain asset for a risk-free profit. However, regulatory arbitrage refers to changing the structure of an activity without altering the risk of that certain activity. In addition to this previous feature, this new activity must generally generate a higher cash flow due to the reduced costs of regulation on this activity (Adrian, 2014). The phenomenon of regulatory arbitrage, as a factor that drives the growth of shadow banking, has been demonstrated by many researchers in this field. Acharya et al. (2011) shows that regulatory arbitrage is considered as the main driver for setting up ABCP conduits. Indeed, this paper argues that banks used shadow banking to securitize the assets without transferring risks. Finally, Plantin (2014) has recently pointed out that tighter capital requirement that spur the shadow banking activity is a clear example of the regulatory arbitrage effect. Thus, we can contribute the development of shadow banks to the increased possibility of regulatory arbitrage. Originally, banks are regulated and monitored to ensure the stability of the financial system and the economy. To escape the high costs of regulation, credit intermediation has rapidly moved to the shadow banks. As they are not regulated, the development of shadow banking increases systemic risk and threatens the financial stability in the economy.

A recent paper by Lysandrou et al. (2015) also demonstrates that the above factors drove the growth of the shadow banking before the crisis. According to the author, there exist two main reasons for the sparking growth of the shadow banking system. The first reason consists of two endogenous factors; regulatory arbitrage and financial innovation. The second one consists of an exogenous factor which is the search-for-yield effect.

2.2 Linkage between shadow banking and other financial systems

[Insert Figure 1 & 2 about here]

The linkage between the shadow banking system and the regular banking system is considered one of the main issues studied by researchers in this field. On one side there is the traditional banking system, a strictly regulated sector. On the other side, there is the shadow banking system which is supposed to consist of unregulated non-bank activities outside the regular banking sector. However, it appears that there exists a linkage between both systems. Regular banking played an important part in the growth of the shadow banking system by sponsoring it. Large financial institutions have fueled the growth of the shadow banking system by being the first purchasers of the securitized products (Rajan (2006) and Acharya et al. (2010))

Many researchers demonstrated the role played by commercial banks in sponsoring securitization activities (Cetorelli et al., (2012), Mendel et al. (2012)). However, this sponsorship may also occur indirectly. For example, Adrian et al. (2012) indicate that most of the shadow banking activities was conducted under the sponsorship of bank holding companies, which in turn own the regular commercial banks. In addition, the authors provide many examples of different components of the shadow banking system such as money market mutual funds, repo, and ABCP conduits. Avraham, Selvaggi, and Vickery (2012) indicated that six of the seven largest banking holding companies had over 1,000 subsidiaries each. Although some of these mentioned subsidiaries are domestic and foreign banks, nearly most of them are nonbank branches in the US. These non-bank subsidiaries consist mainly of funds, trusts, and other financial vehicles.

Jeffers et al. (2013) discussed the deep interconnectedness between the shadow banking system and the regular banking system. This paper analyzes the linkage between both systems within the euro area, pre and post-crisis. According to the authors, these two systems are linked through several channels. The main channels between both systems are: (1)

Financing provided by regular banks to the shadow banking system, and the opposite is true; (2) Origination of securitized loans by the traditional banks; and (3) Regular banks investing in products issued by the shadow banking system. The massive linkage between both systems may increase systemic risks; which in turn will definitely affect the stability of financial markets.

Fein (2013) considered that shadow banking exists as a fundamental part of the conventional banking system. In addition, without the help and guidance of regular banks; there would be no shadow banking system. Banks played a very important part (directly and indirectly) in creating the shadow banking system. Most of the shadow banking activities and entities are either sponsored or originated by the conventional banking system.

2.3. Shadow Banking as the new parallel banking system

Shadow banking as a complement is considered as a main driver for the growth of the shadow banking system. According to this theory, shadow banking is not substituting but complementing other systems in the financial system. When the supply of the traditional banking system is not enough; a new source arises to meet additional demands. Thus, the shadow banking system is not growing at the expense of banking activities. In fact, it is growing to meet markets' extra and new demand. In other terms, the need for the economical role played by this system along with other financial sectors drove its growth. (IMF, 2014, Sunderam 2013, Batchvarov, 2013, Arquie 2013). Duca (2015) examined empirically how the shadow banking system is supplying credit. However, this study only focused on providing short and medium term credit to one type of business (non-financial corporations).

FSB (2012) declared that the shadow banking system is providing all market participants and firms with an additional source of funding that can be added to bank loans. Furthermore, the shadow banking system is increasing the liquidity available in the market.

(Global Shadow Banking Monitoring Report, 2012, p. 1). Mandel et al. (2012) provided a proof that the traditional banking system is subsidizing the shadow banking system. In particular, they explain the role played by banks in the securitization market. Likewise, European Systemic Risk Board (ESRB), in their reply to the Green paper of the European Commission, has also highlighted on the importance of services provided by shadow banking sector. The ESRB considers that this shadow banking zone is a source of financial innovation, which will increase efficiency and complete the financial markets. Moreover; there are some specific services that traditional banks cannot and don't offer, and it's only offered by the shadow banking sector. (ESRB, 2012).

In addition to previous studies, the Finance Ministry of the United Kingdom (HMT, 2012) considered that the shadow banking completes the traditional banking sector and plays as an important role in credit intermediation. Hence, the shadow banking system can be viewed as a central source of diversification in the financial world, which should be encouraged instead of trying to eliminate. The UK Finance Ministry added that it would be a mistake to interpret shadow banking activities as overly risky and overlook all their benefits. Batchvarov (2013) argues that the term “the shadow banking system” should be changed into “the parallel banking system”. It indicates that the shadow banking system is working in parallel to the traditional banking sector. According to the author, it is very important not to underestimate the part this parallel banking system is playing along with the traditional banking system. The shadow banking system belongs to the complement part rather than the substitute one.

Finally, Gornicka (2016) proposed a theoretical model that explains the complementarity of the shadow banking system. This paper suggests that an important subsystem of the shadow banking system, which is off-balance sheet special finance vehicles

(SPVs), can become complements to the regular banking system under certain circumstances. Normally, bank managers have the choice of buying risky assets through regulated banks or through SPVs. However, their proposed theoretical model suggests that; even with higher capital requirements, bank managers chose to buy some of their risky assets through SPV and not through regulated banks. Yet, the bank must guarantee SPV returns through the deposit insurance advantage offered by government. To take advantage of these guarantees, bank managers must conduct activities through regulated banks too. In this case, banks and shadow banks can be considered as complements.

3. Data and Methodology

3.1. Data

The previous literature on the shadow banking topic discussed the existing relationship between the shadow banking system and the traditional banking system. The question then arises; “Is the shadow banking system substituting or complementing other systems in the financial system?” We specifically aim at providing a better understanding of the nature of the relationship between the shadow banking system and the traditional banking sector.

This study is mainly based on an overall study done in the Global Financial Stability Report of IMF (2014). In this report, IMF studied the growth drivers of the shadow banking. They used an empirical model that examines how some factors contribute to the growth of shadow banking. In particular, it studies the extent to which shadow banking as a complement, search-for-yield effect and regulatory arbitrage contribute to the growth of the shadow banking system. We are most interested in the factor that account for the linkage between the shadow banking and other financial systems which is “shadow banking as a complement for other financial institutions”. This factor is important to account for linkage

between the shadow banking system and the traditional banking sector. Moreover, it also accounts for possible connections between shadow banking products and institutional investors (insurance companies and pension funds). To make sure that the general results can be adopted by most of the countries studied, we conduct a country-by-country regression for the 29 countries. Afterward, we examine the linkage for the Eurozone. Finally, we examine the linkage for the whole sample.

We use a database collected by IMF staffs. Data on the shadow banking system comes from Haver Analytics and the national flow of funds data over the period 1990 to 2013 for each country. The sample 29 countries are as follows: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Ireland, Japan, Korea, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, the United Kingdom, and the United States. The Eurozone sample includes the above mentioned countries except these 12 countries: Australia, Canada, Czech, Denmark, Hungary, Japan, Korea, Norway, Poland, Sweden, the UK, and the US.

3.2. Methodology

We use country-by-country regressions to capture the linkage between the shadow banking and other systems in the financial system for each country. However, we use pooled regressions to account the same linkage for Eurozone and the whole sample.

In both, separation and pooled, methods; each set of regressions include three models. Moreover, to ensure the robustness of the results; we then add control variables. The first set of regressions includes no control variables (A³), whereas the other three sets comprise

³ No control Variables

of the first set in addition to different control variables (B⁴, C⁵, & D⁶). Some of the control variables are highly correlated, that is why we add them separately.

The regression models are as follows:

Country-by-country Regression (Separation Method) and *Europe/Whole-sample regression (Pooled Method)*:

i. $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 BANKS_{jt} + \text{Control Variables} + \varepsilon_{jt}$ (Model 1)

ii. $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 IP_{jt} + \text{Control Variables} + \varepsilon_{jt}$ (Model 2)

iii. $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 BANKS_{jt} + \alpha_{3j}/\alpha_3 IP_{jt} + \text{Control Variables} + \varepsilon_{jt}$ (Model 3)

To account for links between traditional banks and shadow banks, the first model includes the growth of the size of banks (Model 1). On the other side, the growth of insurance companies and pension funds was used to control for the demand for shadow banking products from them (Model 2). The last model includes both, the growth rates of banks and institutional investors (Model3).

In these models; the dependent variable is the shadow banking growth rate SBS, while the explanatory variables are primarily the growth rates of other financial systems. *BANKS* is used to examine the linkage between the shadow banking system and banks. Simultaneously, *IP* (insurance companies and pension funds) is used to account for the linkage between the shadow banking system and institutional investors.

As mentioned earlier, we add control variables to account for variables that might have an impact on the linkage between the shadow banking system and other financial

⁴ Crisis dummy, RGDP, and short term interest rates as control variables

⁵ Banks' Capital stringency as a control variable

⁶ Official Supervisory Power as a control variable

systems. The control variables are as follows: crisis dummy, real gross domestic product, short term interest rate, and banks' capital stringency and official supervisory power. Crisis dummy (Laeven et al. 2012) takes the value of 1 when there is a systemic banking crisis in a certain country in a certain quarter, 0 otherwise. A banking crisis is considered systemic if there is a significant sign of banking distress and banking policy interventions. Banks' capital stringency and official supervisory power (Barth et al. 2013) are control variables used to capture the regulatory arbitrage effect.

4. Results and Comments

4.1. Main Results

Table 1 shows the results of Model 3 regressions. We observe that higher traditional banking sector and institutional investors' growth rates are accompanied by higher growth rates of the shadow banking system. This indicates that "shadow banking as a complement to other financial systems" plays an important role in the growth of the shadow banking system. *BANKS* and *IP* are commonly positive and significant across the four sets of regressions. *BANKS* is only negative and significant for Slovenia in set B. *IP* shows no negative and significant results across all the countries. Out of 29 countries, only 7 countries show insignificant results for both *banks* and *IP* (Czech, Estonia, Finland, Ireland, Malta, Netherland, & Poland). For the other 22 countries, at least one of these variables is significant once.

This indicates that across most of the countries, the growth of banks and institutional investors is either driving the growth of the shadow banking system or is not important at all. For the pooled regressions, results fully support the country-by-country separated

regressions. Our four sets of regressions generally support the shadow banking as a complement to the financial system theory.

Table 1

Impact of “shadow banking as a complement to other factors” on the growth of the shadow banking system

This table shows the results of *BANKS/IP* of Model 3 regressions

A: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 BANKS_{jt} \alpha_{3j}/\alpha_3 IP_{jt} + \epsilon_{jt}$

B: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 BANKS_{jt} \alpha_{3j}/\alpha_3 IP_{jt} + CRISIS_{jt} + RGDP_{jt} + STR_{jt} + \epsilon_{jt}$

C: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 BANKS_{jt} \alpha_{3j}/\alpha_3 IP_{jt} + CAPSTR_{jt} + \epsilon_{jt}$

D: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 BANKS_{jt} \alpha_{3j}/\alpha_3 IP_{jt} + SUPPOW_{jt} + \epsilon_{jt}$

	A						B					
	BANKS		IP		R2	N	BANKS		IP		R2	N
Australia	0.251	(1.44)	0.318	(2.82)***	0.13	94	0.33	(0.61)	1.951	(2.02)*	0.36	30
Austria	0.649	(1.48)	2.467	(2.87)***	0.28	30						
Belgium	-0.131	(0.48)	2.669	(6.51)***	0.36	82						
Canada	-0.323	(1.33)	0.729	(5.18)***	0.23	94	-0.2	(0.70)	2.625	(6.13)***	0.37	82
Czech	0.188	(0.50)	-0.081	(0.18)	0.01	38						
Denmark							-0.23	(1.20)	0.374	(2.05)**	0.26	59
Estonia	0.43	(1.26)	0.049	(0.20)	0.11	19						
Finland	-0.281	(1.39)	0.121	(0.33)	0.04	62						
France	0.333	(2.08)**	2.189	(10.18)***	0.66	71	0.298	(1.81)*	2.177	(9.27)***	0.68	71
Germany	1.294	(3.72)***	0.361	(1.44)	0.19	83	1.224	(2.72)***	0.5	(1.83)*	0.23	72
Greece	0.464	(1.37)	0.926	(9.61)***	0.67	63	0.429	(1.12)	0.912	(9.30)***	0.7	63
Hungary	1.666	(3.37)***	0.211	(0.86)	0.15	89	1.042	(6.62)***	-0.105	(1.47)	0.66	58
Italy	0.047	(0.17)	0.301	(1.29)	0.03	74	0.031	(0.11)	0.261	(1.05)	0.04	74
Ireland	-0.099	(0.76)	0.386	(1.46)	0.19	15						
Japan							-0.15	(0.37)	0.645	(1.66)	0.15	63
Korea	0.235	(2.30)**	0.932	(3.21)***	0.23	43						
Lithuania	0.647	(2.13)**	0.467	(1.41)	0.3	39						
Luxembourg	0.384	(1.30)	0.504	(2.00)*	0.13	34	0.485	(1.35)	0.537	(1.93)*	0.24	34
Malta	-0.283	(0.81)	0.215	(1.10)	0.05	38						
Netherlands	0.283	(1.67)	-0.134	(0.66)	0.09	33	-0.067	(0.43)	-0.043	(0.26)	0.47	33
Norway	0.356	(2.49)**	1.205	(4.13)***	0.26	71						
Poland	0.131	(0.31)	0.274	(0.77)	0.04	39						
Portugal	0.717	(2.39)**	0.084	(0.38)	0.13	63	0.716	(2.19)**	0.015	(0.07)	0.23	63
Slovak	0.509	(1.84)*	0.109	(0.84)	0.14	30						
Slovenia	0.419	(1.43)	0.071	(0.29)	0.06	38	-0.552	(2.35)**	-0.258	(1.52)	0.64	38
Spain	1.419	(4.41)***	0.397	(1.17)	0.21	94	1.143	(3.16)***	0.385	(0.88)	0.24	94
Sweden	0.294	(1.28)	0.656	(2.43)**	0.11	70	0.385	(1.63)	0.519	(1.81)*	0.16	70
UK	0.774	(10.51)***	0.507	(4.91)***	0.58	94	0.778	(10.32)***	0.516	(4.86)***	0.59	94
US	0.187	(1.08)	0.237	(1.50)	0.03	94	0.172	(1.47)	0.008	(0.07)	0.64	94
Europe	0.273	(3.20)***	0.61	(2.89)***	0.18	868	0.198	(2.33)**	0.592	(2.73)***	0.19	861
All	0.432	(7.38)***	0.559	(3.64)***	0.17	1716	0.358	(7.16)***	0.513	(3.07)***	0.18	1669

* p < 0.1; ** p < 0.05; *** p < 0.01

	C						D					
	BANKS		IP		R2	N	BANKS		IP		R2	N
Australia	0.361	(1.44)	0.313	(2.33)**	0.21	59	0.441	(1.78)*	0.288	(2.12)**	0.19	59
Austria	0.631	(1.30)	2.448	(2.73)**	0.29	30	0.631	(1.30)	2.448	(2.73)**	0.29	30
Belgium	0.067	(0.30)	2.742	(5.73)***	0.38	59	0.041	(0.18)	2.65	(5.34)***	0.35	59
Canada	-0.352	(1.04)	0.751	(3.67)***	0.23	59	-0.352	(1.02)	0.76	(3.65)***	0.21	59
France	0.282	(1.67)	2.258	(9.00)***	0.66	59	0.283	(1.67)	2.266	(8.83)***	0.66	59
Germany	1.134	(2.13)**	0.355	(1.13)	0.15	59	1.291	(2.43)**	0.333	(1.03)	0.12	59
Greece	0.361	(0.88)	0.945	(9.38)***	0.68	59	0.53	(1.37)	0.933	(9.24)***	0.68	59
Hungary	1.267	(8.83)***	-0.032	(0.48)	0.61	58	1.247	(8.41)***	-0.053	(0.76)	0.61	58
Italy	-0.067	(0.21)	0.599	(1.79)*	0.08	59	-0.078	(0.24)	0.576	(1.72)*	0.09	59
Ireland	-0.113	(0.83)	0.282	(0.92)	0.22	15	-0.113	(0.83)	0.282	(0.92)	0.22	15
Japan							-0.299	(0.71)	0.221	(0.57)	0.12	48
Korea	0.243	(2.32)**	0.939	(3.19)***	0.23	43	0.249	(2.41)**	0.935	(3.21)***	0.25	43

Lithuania	0.618	(2.14)**	0.56	(1.76)*	0.38	39	0.546	(1.86)*	0.571	(1.78)*	0.37	39
Luxembourg							0.441	(1.57)	0.601	(2.49)**	0.25	34
Malta	-0.266	(0.72)	0.218	(1.09)	0.05	38	-0.266	(0.72)	0.218	(1.09)	0.05	38
Netherlands	0.213	(1.27)	-0.087	(0.44)	0.19	33	0.262	(1.64)	-0.216	(1.11)	0.22	33
Norway	0.157	(1.20)	0.868	(2.78)***	0.17	47	0.196	(1.41)	1.323	(4.68)***	0.31	59
Poland	0.101	(0.24)	0.195	(0.56)	0.11	39	0.088	(0.20)	0.185	(0.50)	0.06	39
Portugal	0.57	(1.91)*	-0.039	(0.16)	0.15	59	0.539	(1.93)*	-0.166	(0.69)	0.21	59
Slovak	0.489	(1.75)*	0.089	(0.66)	0.16	30	0.489	(1.75)*	0.089	(0.66)	0.16	30
Slovenia	0.446	(1.51)	0.104	(0.42)	0.08	38	0.259	(0.93)	0.117	(0.52)	0.22	38
Spain							1.664	(6.88)***	0.651	(1.94)*	0.58	59
Sweden	-0.132	(0.49)	0.454	(1.48)	0.07	48	-0.124	(0.46)	0.447	(1.48)	0.08	48
UK	0.772	(10.00)***	0.427	(2.88)***	0.66	59	0.78	(8.62)***	0.476	(2.85)***	0.64	48
US	0.287	(1.22)	0.118	(0.65)	0.21	59	0.339	(1.38)	0.16	(0.84)	0.13	59
Europe	0.268	(3.00)***	0.607	(2.68)***	0.21	747	0.266	(3.01)***	0.607	(2.70)***	0.21	747
All	0.378	(8.65)***	0.506	(2.79)***	0.19	1352	0.365	(7.45)***	0.515	(2.86)***	0.19	1353

* p <0.1; ** p <0.05; *** p <0.01

4.2. Robustness Checks

To ensure the robustness of our results, we then add control variables to account for variables that we believe might have an impact on the linkage between the shadow banking system and other financial systems. Before adding any control variables (set A), the independent variable (*BANKS/IP*) is generally positive and significant (table 2). Out of 27 countries, results of model 1 show that *BANKS* is positive and significant for 11 countries. Similarly, *IP* is positive and significant for 17 countries as shown in model 2. We observe that none of the countries show negative and significant results. As for model 3, results confirm the prior obtained results from model 1 &2. Both dependent variables are mostly positive and significant. In addition, we also observe an absence of negative and significant results. When adding the control variables, the general results are not changed. The number of significant countries decreased; however, the percentage of significance remained the same. For model 1, the percentage of significance increased from 41% in set A to 44%, 41.7%, and decreased to 38% in sets B, C, and D respectively. Likewise, for model 2; the percentage decreased from 63% to 44%, 50%, and 54%. For model 3, there is no noticeable change in the percentages. Results of sets B, C, &D indicate the robustness of the results obtained in the main set of regressions. However, for some countries, the linkage between

the shadow banking system and other financial systems is affected by the control variables added.

Table 2:

The percentage of significance obtained from the regression of the three models (sets A, B, C, &D)

A		Separated			Pooled			
		Country-by-country			Europe		Whole sample	
		positive	negative	Total	Positive	Negative	Positive	Negative
1	Banks	11 (100%)	0 (0%)	11 (41%)	1	0	1	0
2	IP	17 (100%)	0 (0%)	17 (63%)	1	0	1	0
3	Banks	10 (100%)	0 (0%)	10 (37%)	1	0	1	0
	IP	11 (100%)	0 (0%)	11 (41%)	1	0	1	0
B		Separated			Pooled			
		Country-by-country			Europe		Whole sample	
		positive	negative	Total	Positive	Negative	Positive	Negative
1	Banks	7 (87.5%)	1 (12.5%)	8 (44%)	1	0	1	0
2	IP	8 (100%)	0 (0%)	8 (44%)	1	0	1	0
3	Banks	6 (85.7%)	1 (14.3%)	7 (39%)	1	0	1	0
	IP	9 (100%)	0 (0%)	9 (50%)	1	0	1	0
C		Separated			Pooled			
		Country-by-country			Europe		Whole sample	
		positive	negative	Total	Positive	Negative	Positive	Negative
1	Banks	10 (100%)	0 (0%)	10 (41.7%)	1	0	1	0
2	IP	12 (100%)	0 (0%)	12 (50%)	1	0	1	0
3	Banks	7 (100%)	0 (0%)	7 (29%)	1	0	1	0
	IP	11 (100%)	0 (0%)	11 (46%)	1	0	1	0
D		Separated			Pooled			
		Country-by-country			Europe		Whole sample	
		positive	negative	Total	Positive	Negative	Positive	Negative
1	Banks	10 (100%)	0 (0%)	10 (38%)	1	0	1	0
2	IP	14 (100%)	0 (0%)	14 (54%)	1	0	1	0
3	Banks	9 (100%)	0 (0%)	9 (35%)	1	0	1	0
	IP	13 (100%)	0 (0%)	13 (50%)	1	0	1	0

4.3. Additional Comments and Limitations

Comment 1: In this study, we are not interested in knowing the country-by-country growth drivers of the shadow banking system. However, we use one of the main growth drivers of the shadow banking system which is “shadow banking as a complement” to account for the linkage between the shadow banking system and the other financial systems.

Comment 2: As the shadow banking system differs across countries, we use a country-by-country examination of the shadow banking system. We aim to confirm that the general conclusion of IMF (2014) can be adopted by most of the countries studied.

Comment 3: Our results confirm that for most of the studied countries, shadow banking system is a complement to the rest of financial systems. *BANKS* appears to be negative and significant one time only. This indicates that when taking into account the banking crises and RGDP and short-term rates, shadow banking can be considered as a substitute for banks in Slovenia. However, this could be explained by other factors.

Comment 4: In the last two set of regressions (C &D), we use banking capital stringency and official supervisory power as control variables. As previously said, these variables are used to capture the regulatory arbitrage phenomenon. According to it; due to higher regulations and stringency, banks are substituting their traditional banking activities with shadow banking activities. However, our results do not support the regulatory arbitrage phenomenon. Even with higher regulatory control, the shadow banking system can also be a complement to other financial systems.

5. Conclusion

The last financial crisis has shed the light on the shadow banking system. This system is defined as all unregulated non-bank financial institutions and activities outside the

traditional banking system. Moreover, shadow banks are not subject to banking regulations, as they do not receive deposits. Although being outside the traditional banking system is considered a main characteristic of the shadow banking system, there exist important connections between shadow banking system and other financial systems. Literature suggests a number of factors that drive the growth of the shadow banking system. In this study, we use one of the main drivers which is “shadow banking as a complement” to account for the linkage between the shadow banking system and the other financial systems. Our results confirm the complementarity theory of the shadow banking system. An important explanation of these results is the fact that banks and institutional investors are not substituting their traditional activities with shadow banking activities. Instead, they are using the shadow banking for their supplementary demand. In addition to their regular activities, traditional banks’ sponsorship of shadow banking activities increased the linkage between both systems.

To conclude, the shadow banking system can be recognized as a parallel banking system. This parallel system should be considered as a complement to and not a substitute for other financial systems. However, not being regulated as other sectors raises many systemic risks. The main issue is to identify and mitigate these risks. If not controlled, country by country, the shadow banking system may be harmful to the financial system in particular and the entire economy in general. However, before controlling it, a better understanding of this shadow banking system is essential to help decision makers. This study indicates that the shadow banking is working in parallel with other financial systems. Hence, it needs to be regulated like those other systems. Nevertheless, this shadow banking system, although it can be a complement to the conventional banking system, it is not an identical system. It is important not to apply the regulations, which are designed for banks, to the shadow banking system.

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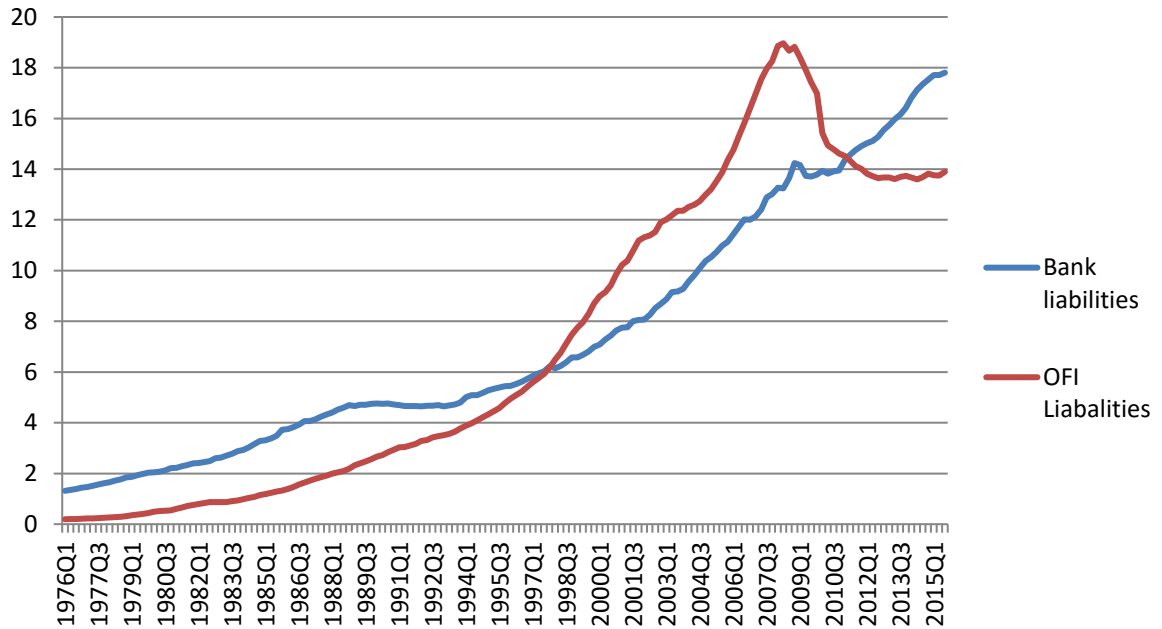
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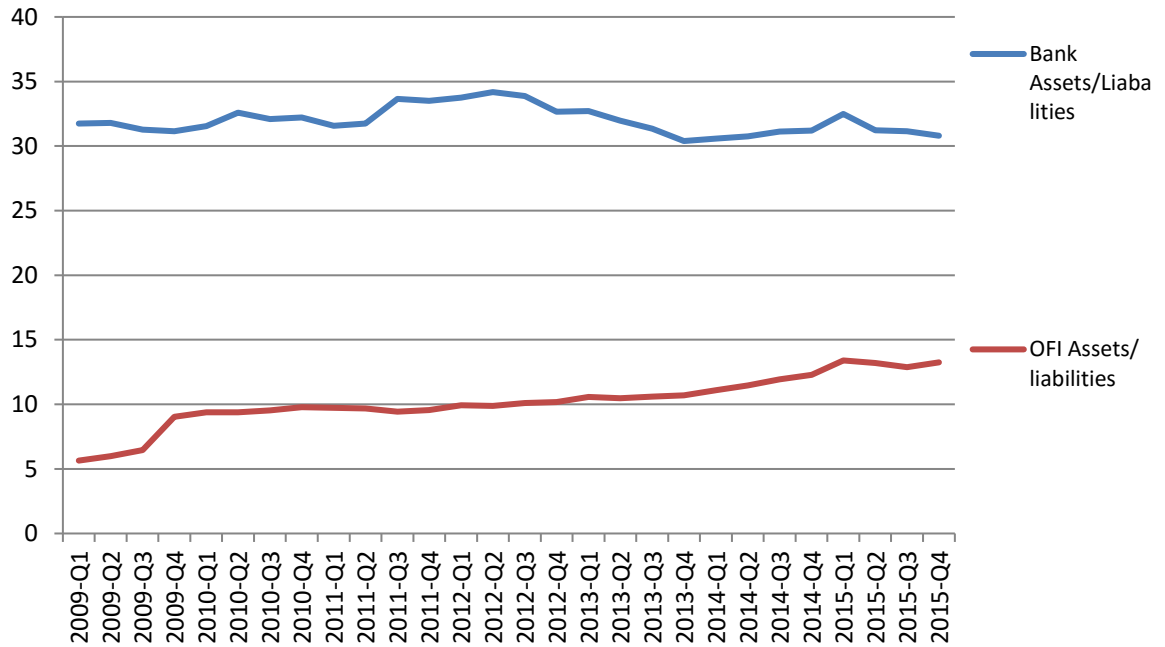
Appendices

Figure 1: US Traditional bank liabilities vs Shadow bank liabilities, 1976Q1-2015Q3 (\$ trillion)



Based on Pozsar et al.(2012) data source : Flow of Funds Financial Accounts of the United states, Federal Reserve Statistical Release (1976Q1-2015Q3)

Figure 2: Euro Area Traditional bank liabilities vs Shadow bank liabilities, 2009Q1-2015Q4 (€ trillion)



Based on Arque et al. (2013) data source: European Central Bank statistical Data Warehouse (2009Q1-2015Q4)

Appendix 1

Summary of the size of the financial systems

This table shows the mean value of the size of financial sectors variables for the 29 countries and Eurozone (1990–2013)

nbr	Countries	OFl	Banks	IP	Obs
1	Australia	1.777	2.451	2.468	94
2	Austria	1.205	1.338	0.875	43
3	Belgium	3.456	1.013	2.171	83
4	Canada	2.150	1.841	1.957	94
5	Czech	1.459	1.674	2.090	38
6	Denmark	1.521	1.700	1.801	59
7	Estonia	0.991	1.569	5.937	39
8	Finland	1.511	2.554	1.800	63
9	France	2.274	1.520	2.019	75
10	Germany	4.020	0.950	1.479	90
11	Greece	4.694	1.869	2.701	63
12	Hungary	7.683	3.585	5.017	93
13	Italy	2.503	1.595	2.257	74
14	Ireland	3.981	-2.841	2.012	46
15	Japan	0.672	0.142	0.406	63
16	Korea	1.836	1.932	2.816	43
17	Lithuania	4.229	3.717	4.696	39
18	Luxembourg	3.927	0.202	2.868	34
19	Malta	4.067	2.919	3.558	39
20	Netherland	1.967	0.944	1.514	34
21	Norway	3.837	2.514	2.102	71
22	Poland	3.479	3.026	3.843	39
23	Portugal	2.766	1.523	1.509	63
24	Slovak	2.893	0.870	5.341	38
25	Slovenia	1.901	1.776	2.408	83
26	Spain	5.232	2.133	2.932	94
27	Sweden	2.949	2.357	2.609	70
28	UK	3.925	2.408	1.920	94
29	US	1.786	1.287	1.582	94
	Europe	3.212	1.580	2.546	942
	All	3.071	1.842	2.466	1790

Appendix 2

Description of variables used in regressions

Variable	Label	Description	Source
Growth of shadow banking system	SBS	Sum of financial liabilities of other financial intermediaries	
Growth of banks	BANKS	Size of traditional depository institutions (aka banks)	Flow of Funds (Haver, central bank webpage, ECB warehouse)
Growth of institutional investors	IP	Size of institutional investors that includes insurance corporations and pension funds	
Crisis dummy	CRISIS	Takes the value of 1 in case of systemic banking crisis, 0 other wise	Luc Laeven and Fabian Valencia, 2013. "Systemic Banking Crises Database, "IMF Economic Review, Palgrave Macmillan, vol. 61(2), pages 225-270, June.
RGDP	RGDP	Real gross domestic product	WEO
short term rates	STR	3-month interest rates on Treasury bills	IFS, Bloomberg
Banking Capital Stringency	CAPSTR	Scaled index of overall capital stringency	Barth, James R., Caprio, Gerard, Jr., and Ross Levine. 2013. "Bank Regulation and Supervision in 180 Countries from 1999 to 2011." National Bureau of Economic Research Working Paper 18733.
Official Supervisory Power	SUPPOW	Scaled index of possible interventions by supervisory authorities	

Appendix 3

Impact of “shadow banking as a complement to other financial sectors” on the growth of the shadow banking system

This table shows the results of regressions (Model 1, 2, &3) for set A

Model 1: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 BANKS_{jt} + \varepsilon_{jt}$; Model 2: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 IP_{jt} + \varepsilon_{jt}$

Model 3: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 BANKS_{jt} + \alpha_{3j}/\alpha_3 IP_{jt} + \varepsilon_{jt}$

A	1				2				3					
	BANKS		R2	N	IP		R2	N	BANKS		IP		R2	N
Australia	0.381	(2.19)* *	0.05	94	0.361	(3.31)***	0.11	94	0.251	(1.44)	0.318	(2.82)***	0.13	94
Austria	0.696	(1.42)	0.07	30	2.515	(2.87)***	0.23	30	0.649	(1.48)	2.467	(2.87)***	0.28	30
Belgium	0.309	(0.96)	0.01	82	2.608	(6.67)***	0.35	83	-0.131	(0.48)	2.669	(6.51)***	0.36	82
Canada	-0.222	(0.81)	0.01	94	0.714	(5.07)***	0.22	94	-0.323	(1.33)	0.729	(5.18)***	0.23	94
Czech	0.189	(0.51)	0.01	38	-0.085	(0.19)	0	38	0.188	(0.50)	-0.081	(0.18)	0.01	38
Estonia	0.452	(1.44)	0.11	19	0.172	(1.05)	0.03	38	0.43	(1.26)	0.049	(0.20)	0.11	19
Finland	-0.302	(1.58)	0.04	62	0.277	(0.80)	0.01	63	-0.281	(1.39)	0.121	(0.33)	0.04	62
France	0.819	(3.43)***	0.14	75	2.318	(11.00)***	0.64	71	0.333	(2.08)**	2.189	(10.18)***	0.66	71
Germany	1.398	(4.08)***	0.17	83	0.49	(1.91)*	0.04	90	1.294	(3.72)***	0.361	(1.44)	0.19	83
Greece	1.69	(3.40)***	0.16	63	0.976	(10.85)***	0.66	63	0.464	(1.37)	0.926	(9.61)***	0.67	63
Hungary	1.777	(3.73)***	0.14	89	0.426	(1.71)*	0.03	89	1.666	(3.37)***	0.211	(0.86)	0.15	89
Italy	0.226	(0.94)	0.01	74	0.32	(1.61)	0.03	74	0.047	(0.17)	0.301	(1.29)	0.03	74
Ireland	-0.108	(0.79)	0.05	15	0.504	(2.21)**	0.1	46	-0.099	(0.76)	0.386	(1.46)	0.19	15
Korea	0.126	(1.19)	0.03	43	0.711	(2.47)**	0.13	43	0.235	(2.30)**	0.932	(3.21)***	0.23	43
Lithuania	0.895	(3.59)***	0.26	39	0.879	(3.12)***	0.21	39	0.647	(2.13)**	0.467	(1.41)	0.3	39
Luxembourg	0.248	(0.82)	0.02	34	0.429	(1.73)*	0.09	34	0.384	(1.30)	0.504	(2.00)*	0.13	34
Malta	-0.236	(0.68)	0.01	38	0.806	(2.68)**	0.16	39	-0.283	(0.81)	0.215	(1.10)	0.05	38
Netherland	0.259	(1.58)	0.07	33	-0.045	(0.22)	0	34	0.283	(1.67)	-0.134	(0.66)	0.09	33
Norway	0.372	(2.35)**	0.07	71	1.226	(4.05)***	0.19	71	0.356	(2.49)**	1.205	(4.13)***	0.26	71
Poland	0.314	(0.90)	0.02	39	0.335	(1.15)	0.03	39	0.131	(0.31)	0.274	(0.77)	0.04	39
Portugal	0.775	(3.01)***	0.13	63	0.348	(1.77)*	0.05	63	0.717	(2.39)**	0.084	(0.38)	0.13	63
Slovak	0.539	(1.98)*	0.12	30	0.148	(1.27)	0.04	38	0.509	(1.84)*	0.109	(0.84)	0.14	30
Slovenia	0.436	(1.54)	0.06	38	0.139	(0.57)	0.01	38	0.419	(1.43)	0.071	(0.29)	0.06	38
Spain	1.49	(4.71)***	0.19	94	0.684	(1.87)*	0.04	94	1.419	(4.41)***	0.397	(1.17)	0.21	94
Sweden	0.381	(1.61)	0.04	70	0.709	(2.64)**	0.09	70	0.294	(1.28)	0.656	(2.43)**	0.11	70
UK	0.743	(9.06)***	0.47	94	0.416	(2.73)***	0.08	94	0.774	(10.51)***	0.507	(4.91)***	0.58	94
US	0.115	(0.68)	0.01	94	0.19	(1.26)	0.02	94	0.187	(1.08)	0.237	(1.50)	0.03	94
Europe	0.455	(3.56)***	0.04	872	0.671	(3.37)***	0.17	937	0.273	(3.20)***	0.61	(2.89)***	0.18	868
All	0.561	(7.04)***	0.07	1720	0.637	(4.25)***	0.14	1785	0.432	(7.38)***	0.559	(3.64)***	0.17	1716

Appendix 4

Impact of “shadow banking as a complement to other financial sectors” on the growth of the shadow banking system

This table shows the results of regressions (Model 1, 2, &3) for set B

Model 1: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 BANKS_{jt} + CRISIS_{jt} + RGDP_{jt} + STR_{jt} + \varepsilon_{jt}$;

Model 2: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 IP_{jt} + CRISIS_{jt} + RGDP_{jt} + STR_{jt} + \varepsilon_{jt}$

Model 3: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 BANKS_{jt} + \alpha_{3j}/\alpha_3 IP_{jt} + CRISIS_{jt} + RGDP_{jt} + STR_{jt} + \varepsilon_{jt}$

B	1				2				3					
	BANKS	R2	N		IP	R2	N	BANKS	IP	R2	N			
Austria	0.248	(0.43)	0.25	30	1.907	(2.01)*	0.35	30	0.33	(0.61)	1.951	(2.02)*	0.36	30
Belgium	0.057	(0.16)	0.07	82	2.579	(6.22)***	0.37	83	-0.2	(0.7)	2.625	(6.13)***	0.37	82
Denmark	-0.072	(0.4)	0.2	59	0.286	(1.70)*	0.24	59	-0.23	(1.2)	0.374	(2.05)**	0.26	59
France	0.674	(2.81)***	0.24	75	2.281	(9.85)***	0.66	71	0.298	(1.81)*	2.177	(9.27)***	0.68	71
Germany	1.334	(2.93)***	0.19	72	0.598	(2.12)**	0.15	72	1.224	(2.72)***	0.5	(1.83)*	0.23	72
Greece	1.633	(2.89)***	0.24	63	0.949	(10.26)***	0.69	63	0.429	(1.12)	0.912	(9.30)***	0.7	63
Hungary	1.04	(6.54)***	0.65	58	-0.099	(1.04)	0.38	58	1.042	(6.62)***	-0.105	(1.47)	0.66	58
Italy	0.174	(0.68)	0.03	74	0.273	(1.26)	0.04	74	0.031	(0.11)	0.261	(1.05)	0.04	74
Japan	-0.114	(0.28)	0.11	63	0.637	(1.66)	0.14	63	-0.15	(0.37)	0.645	(1.66)	0.15	63
Luxembourg	0.285	(0.79)	0.13	34	0.429	(1.59)	0.19	34	0.485	(1.35)	0.537	(1.93)*	0.24	34
Netherland	-0.078	(0.52)	0.47	33	-0.07	(0.44)	0.47	34	-0.067	(0.43)	-0.043	(0.26)	0.47	33
Portugal	0.722	(2.30)**	0.23	63	0.142	(0.62)	0.16	63	0.716	(2.19)**	0.015	(0.07)	0.23	63
Slovenia	-0.561	(2.34)**	0.62	38	-0.268	(1.48)	0.58	38	-0.552	(2.35)**	-0.258	(1.52)	0.64	38
Spain	1.181	(3.29)***	0.23	94	0.551	(1.21)	0.15	94	1.143	(3.16)***	0.385	(0.88)	0.24	94
Sweden	0.453	(1.91)*	0.12	70	0.594	(2.07)**	0.13	70	0.385	(1.63)	0.519	(1.81)*	0.16	70
UK	0.752	(8.93)***	0.48	94	0.438	(2.80)***	0.09	94	0.778	(10.32)***	0.516	(4.86)***	0.59	94
US	0.169	(1.55)	0.64	94	-0.049	(0.46)	0.63	94	0.172	(1.47)	0.008	(0.07)	0.64	94
Europe	0.315	(2.41)**	0.06	865	0.664	(3.35)***	0.27	918	0.198	(2.33)**	0.592	(2.73)***	0.19	861
All	0.428	(6.52)***	0.08	1673	0.573	(3.49)***	0.16	1731	0.358	(7.16)***	0.513	(3.07)***	0.18	1669

Appendix 5

Impact of “shadow banking as a complement to other financial sectors” on the growth of the shadow banking system

This table shows the results of regressions (Model 1, 2, &3) for set C

Model 1: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 BANKS_{jt} + CAPSTR_{jt} + \varepsilon_{jt}$;

Model 2: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 IP_{jt} + CAPSTR_{jt} + \varepsilon_{jt}$

Model 3: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 BANKS_{jt} + \alpha_{3j}/\alpha_3 IP_{jt} + CAPSTR_{jt} + \varepsilon_{jt}$

C	1			2			3							
	BANKS	R2	N	IP	R2	N	BANKS	IP	R2	N	BANKS	IP	R2	N
Australia	0.576	(2.38)**	0.13	59	0.384	(3.05)***	0.18	59	0.361	(1.44)	0.313	(2.33)**	0.21	59
Austria	0.569	(1.06)	0.08	30	2.393	(2.64)**	0.24	30	0.631	(1.3)	2.448	(2.73)**	0.29	30
Belgium	0.238	(0.86)	0.02	59	2.762	(5.87)***	0.38	59	0.067	(0.3)	2.742	(5.73)***	0.38	59
Canada	-0.324	(0.86)	0.04	59	0.747	(3.65)***	0.21	59	-0.352	(1.04)	0.751	(3.67)***	0.23	59
Czech	0.371	(1.35)	0.08	27	-0.046	(0.13)	0.01	27	0.373	(1.31)	0.017	(0.05)	0.08	27
Finland	-0.284	(1.4)	0.05	58	0.254	(0.68)	0.02	59	-0.266	(1.23)	0.102	(0.26)	0.05	58
France	0.816	(3.30)***	0.17	59	2.405	(10.07)***	0.65	59	0.282	(1.67)	2.258	(9.00)***	0.66	59
Germany	1.196	(2.25)**	0.13	59	0.425	(1.31)	0.08	59	1.134	(2.13)**	0.355	(1.13)	0.15	59
Greece	1.837	(3.03)***	0.16	59	0.979	(10.54)***	0.67	59	0.361	(0.88)	0.945	(9.38)***	0.68	59
Hungary	1.25	(9.05)***	0.61	58	0.112	(1.13)	0.04	58	1.267	(8.83)***	-0.032	(0.48)	0.61	58
Italy	0.181	(0.61)	0.03	59	0.569	(1.90)*	0.08	59	-0.067	(0.21)	0.599	(1.79)*	0.08	59
Ireland	-0.126	(0.94)	0.16	15	0.439	(1.89)*	0.13	46	-0.113	(0.83)	0.282	(0.92)	0.22	15
Korea	0.131	(1.2)	0.03	43	0.71	(2.44)**	0.13	43	0.243	(2.32)**	0.939	(3.19)***	0.23	43
Lithuania	0.914	(3.78)***	0.32	39	0.957	(3.52)***	0.3	39	0.618	(2.14)**	0.56	(1.76)*	0.38	39
Malta	-0.227	(0.62)	0.01	38	0.805	(2.61)**	0.16	39	-0.266	(0.72)	0.218	(1.09)	0.05	38
Netherlands	0.195	(1.22)	0.18	33	-0.019	(0.1)	0.15	34	0.213	(1.27)	-0.087	(0.44)	0.19	33
Norway	0.154	(1.1)	0.03	47	0.866	(2.76)***	0.15	47	0.157	(1.2)	0.868	(2.78)***	0.17	47
Poland	0.228	(0.66)	0.11	39	0.242	(0.84)	0.11	39	0.101	(0.24)	0.195	(0.56)	0.11	39
Portugal	0.555	(1.99)*	0.15	59	0.114	(0.49)	0.1	59	0.57	(1.91)*	-0.039	(0.16)	0.15	59
Slovak	0.509	(1.85)*	0.15	30	0.148	(1.26)	0.04	38	0.489	(1.75)*	0.089	(0.66)	0.16	30
Slovenia	0.468	(1.62)	0.08	38	0.169	(0.68)	0.02	38	0.446	(1.51)	0.104	(0.42)	0.08	38
Sweden	-0.08	(0.3)	0.03	48	0.434	(1.44)	0.07	48	-0.132	(0.49)	0.454	(1.48)	0.07	48
UK	0.74	(9.12)***	0.61	59	0.219	(0.9)	0.05	59	0.772	(10.00)***	0.427	(2.88)***	0.66	59
US	0.247	(1.10)***	0.21	59	0.058	(0.33)	0.19	59	0.287	(1.22)	0.118	(0.65)	0.21	59
Europe	0.433	(3.24)***	0.04	747	0.674	(3.19)***	0.2	808	0.268	(3.00)***	0.607	(2.68)***	0.21	747
All	0.478	(7.35)***	0.07	1352	0.585	(3.41)***	0.15	1413	0.378	(8.65)***	0.506	(2.79)***	0.19	1352

Appendix 6

Impact of “shadow banking as a complement to other financial sectors” on the growth of the shadow banking system

This table shows the results of regressions (Model 1, 2, &3) for set C

Model 1: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 BANKS_{jt} + SUPPOW_{jt} + \varepsilon_{jt}$; Model 2: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 IP_{jt} + SUPPOW_{jt} + \varepsilon_{jt}$

Model 3: $SBS_{jt} = \alpha_{1j}/\alpha_1 + \alpha_{2j}/\alpha_2 BANKS_{jt} + \alpha_{3j}/\alpha_3 IP_{jt} + SUPPOW_{jt} + \varepsilon_{jt}$

D	1				2				3					
	BANKS	R2	N		IP	R2	N		BANKS	IP	R2	N		
Australia	0.632	(2.66)**	0.13	59	0.376	(2.92)***	0.15	59	0.441	(1.78)*	0.288	(2.12)**	0.19	59
Austria	0.569	(1.06)	0.08	30	2.393	(2.64)**	0.24	30	0.631	(1.30)	2.448	(2.73)**	0.29	30
Belgium	0.201	(0.73)	0.02	59	2.662	(5.46)***	0.35	59	0.041	(0.18)	2.65	(5.34)***	0.35	59
Canada	-0.328	(0.86)	0.01	59	0.756	(3.63)***	0.19	59	-0.352	(1.02)	0.76	(3.65)***	0.21	59
France	0.788	(3.21)***	0.19	59	2.411	(9.83)***	0.65	59	0.283	(1.67)	2.266	(8.83)***	0.66	59
Germany	1.344	(2.55)**	0.1	59	0.409	(1.22)	0.03	59	1.291	(2.43)**	0.333	(1.03)	0.12	59
Greece	1.938	(3.45)***	0.18	59	0.988	(10.56)***	0.67	59	0.53	(1.37)	0.933	(9.24)***	0.68	59
Hungary	1.232	(8.42)***	0.6	58	0.024	(0.23)	0.1	58	1.247	(8.41)***	-0.053	(0.76)	0.61	58
Italy	0.154	(0.52)	0.04	59	0.541	(1.80)*	0.09	59	-0.078	(0.24)	0.576	(1.72)*	0.09	59
Ireland	-0.126	(0.94)	0.16	15	0.406	(1.74)*	0.15	46	-0.113	(0.83)	0.282	(0.92)	0.22	15
Japan	-0.318	(0.77)	0.12	48	0.242	(0.63)	0.11	48	-0.299	(0.71)	0.221	(0.57)	0.12	48
Korea	0.139	(1.29)	0.05	43	0.704	(2.42)**	0.14	43	0.249	(2.41)**	0.935	(3.21)***	0.25	43
Lithuania	0.856	(3.51)***	0.32	39	0.924	(3.46)***	0.31	39	0.546	(1.86)*	0.571	(1.78)*	0.37	39
Luxembourg	0.273	(0.93)	0.1	34	0.509	(2.12)**	0.19	34	0.441	(1.57)	0.601	(2.49)**	0.25	34
Malta	-0.227	(0.62)	0.01	38	0.805	(2.61)**	0.16	39	-0.266	(0.72)	0.218	(1.09)	0.05	38
Netherland	0.226	(1.44)	0.18	33	-0.15	(0.77)	0.14	34	0.262	(1.64)	-0.216	(1.11)	0.22	33
Norway	0.201	(1.24)	0.03	59	1.327	(4.65)***	0.28	59	0.196	(1.41)	1.323	(4.68)***	0.31	59
Poland	0.197	(0.54)	0.05	39	0.224	(0.71)	0.06	39	0.088	(0.20)	0.185	(0.50)	0.06	39
Portugal	0.48	(1.82)*	0.21	59	-0.021	(0.09)	0.16	59	0.539	(1.93)*	-0.166	(0.69)	0.21	59
Slovak	0.509	(1.85)*	0.15	30	0.101	(0.87)	0.12	38	0.489	(1.75)*	0.089	(0.66)	0.16	30
Slovenia	0.289	(1.08)	0.22	38	0.161	(0.73)	0.2	38	0.259	(0.93)	0.117	(0.52)	0.22	38
Spain	1.86	(8.28)***	0.55	59	1.619	(3.93)***	0.22	59	1.664	(6.88)***	0.651	(1.94)*	0.58	59
Sweden	-0.069	(0.26)	0.03	48	0.428	(1.44)	0.07	48	-0.124	(0.46)	0.447	(1.48)	0.08	48
UK	0.761	(7.84)***	0.58	48	0.369	(1.37)	0.04	48	0.78	(8.62)***	0.476	(2.85)***	0.64	48
US	0.285	(1.20)	0.12	59	0.092	(0.49)	0.1	59	0.339	(1.38)	0.16	(0.84)	0.13	59
Europe	0.432	(3.22)***	0.04	747	0.673	(3.19)***	0.19	808	0.266	(3.01)***	0.607	(2.70)***	0.21	747
All	0.474	(6.88)***	0.07	1353	0.595	(3.48)***	0.16	1414	0.365	(7.45)***	0.515	(2.86)***	0.19	1353

