**The management of financial risk knowledge in the international conditions**

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**Abstract**

An innovation in finance, as well as investment in the research and development (R&D) in different financial instruments is a fundament of financial knowledge management. A wide literature has shown that there is a high positive correlation between financial markets (instruments), knowledge (information) and company performance (good investment choices). This chapter analyzes the importance of knowledge management in making financial decisions (the choice of financial instruments) in order to reduce risks in international conditions. According to BIS bank (Bank for International Settlements) data (2018), the most developed financial derivatives markets are analyzed. The novelty of this chapter lies in the fact that companies operate in conditions of international financial risks and that innovations and best practices in this issue provide solutions for such risk reduction. Conclusion is that financial innovations based on the best practice aimed to risk protection contribute to the stability of financial flows. Such instruments represent a cost to companies but also reduce risks.

**Keywords**: financial knowledge management, innovatives, derivatives, financial markets, crisis, financial decision-making, instruments, international conditions, world crisis.

**Indexing keywords**: financial knowledge management, knowledge, innovatives, derivatives, financial markets, crisis, international conditions, instruments, investements, financial decision-making, credit default swaps, mortgage-backed securities, BIS bank data, financial strategies, world crisis, interest rates, international factors.

**Introduction**

Knowledge management is not directly close as a discipline to finance. However, today is not possible to imagine any decision making in financial institution without strategic orientations, new knowledge and innovations supported by knowledge management. The benefits from decision-making based on knowledge management are twofold: from one side, corporations (financial institutions) want to maximize their returns and from the other side, they want to reduce their risks. In both cases, there is a need for new knowledge and experience that will help financial decision-making in the strategic orientations. This situation is even more significant when it comes to international markets. Exposure to international competition, foreign exchange rates, different international regulation and systemic risks of different countries impacts on far greater risks of companies. One of the most important results of the use of knowledge management are new financial instruments that minimize exposure to these risks.

The absence of knowledge management has caused one of the biggest global crisis in 2008-2009. Many of the largest financial corporations and institution (Bear Stearns, Lehman Brothers, AIG; Goldman Sachs, Morgan Stanley, GMAC, CIT Group, etc.) have made their strategy and decisions based on markets historical data and a similar methodology for calculating risks and returns. Their strategy, based on the high yields of the real estate market since 2004, brought high returns on issued instruments for the several years (mostly derivatives like mortgage-backed securities (MBS), credit default swaps (CDS), etc.). However, the profit declined in the real estate markets has multiple generated risks of instruments issued by such financial players. Driven by greed for high returns and neglecting the newly emerging situation or her late detection, this situation influenced that all these companies experience a failure and cause the greatest crisis of global proportions. In fact, it's a far greater number of companies from financial markets that have caused the crisis, not only these six or seven, but they were the most famous and biggest losers. By words of management discipline, it could be expained as organizational routine which led them to the such situation. As a matter of fact, organizational routine can be viewed as a double-edged sword: first contributes to the conversion of resources into capabilities (as a main organizational function) and second, if it does not changed according to the requirements of the market it can lead to poor business strategies (in this case to bankruptcy).

Would knowledge management save them from failure? Surely there would be far greater chances to protect themselves from the risk of falling prices on the real estate market. As much as they were guided by greed, none of these players would want to go bankrupt. In the case that their strategic decisions were based on systematization of knowledge and best practices their investment strategy would be more or less different. Moreover, rating agencies Standard & Poor’s, Moody’s, Fitch Group, etc.) would downgrading credit rating of these companies and their derivatives instruments before started problems with the realization of such assets. This would mean that companies would be alerted to consider new strategic orientation and new instruments that would more protect them from risks. In other words, to consider new information and new methodology of risks and yields calculations. That's why knowledge management would save them from failure. However, it is not consider moral hazard which probably existed before giving credit ratings of some of companies.

This chapter analyzes the importance of knowledge management in making financial decisions (the choice of financial instruments) in order to reduce risks in international conditions. According to BIS bank (Bank for International Settlements) data (2018), the most developed financial derivatives markets are analyzed. The novelty of this chapter lies in the fact that companies operate in conditions of international financial risks and that innovations and best practices in this issue provide solutions for such risk reduction. More importantly, numerous literature deals with the pure knowledge management, while the literature on the financial knowledge management is very rare (more indirect on some similar researches). Therefore, the theoretical contribution is even greater.

**Literature Review**

Accoridng to Darroch (2005), knowledge management support most important coordinating mechanism to enhance the conversion of resources into capabilities. The findings of this author are based on research Nelson and Winter’s (1982) concept of a knowledge management coordinating mechanism. The same author (2005) emphasizes that knowledge management represents a matter of which scarcely has been written and researched because of difficulties in identifying and measuring knowledge. Moreover, Preiss (1999) argue that is new management discipline and that management may add a quantitative dimension to qualitative (knowledge management) approaches. Darroch (2005) in her model explain knowledge management through organizational routine that includes: knowledge acquisition, knowledge dissemination and responsiveness to knowledge. There is a positive relationship between these organizational routine components.

Their inputs are:

a) tangible knowledge: profile of human capital, data and explicite information (financial reports, marketing reserach reports, productivity reports and customer databases) and

b) intagible or tacit knowledge: information knowledge, skills and experiences of employees.

As a results of organizational routines are outputs - innovations and outcomes - superior financial perfomance. Organizations uses capabilities underpin the long run survival. If their behaviours and practices of knowledge management is more effective, they will have more chances of better use of resources (Darroch, 2005). It just means that they will achieve superior outcomes such as more innovation and superior financial performance (returns). Precisely this model explains how knowledge management is important in making financial decisions. Good organizational routines generate innovations that are used as a competitive advantage in the financial markets. Many authors linking knowledge management and innovation with superior perfomance of organization (Griffin and Hauser, 1996; Anderson and West, 1998; Capon *et al*., 1992; Tang, 1999; Darroch, 2005).

Innovations in finance, as well as investment in the research and development (R&D) in different financial instruments is a fundament of financial knowledge management. They are not a new phenomenon, as they have been accompanying the technological innovations from the very beginning (Michalopoulos *et al*., 2009). The research in this issue was conducted by Gennaioli, Shleifer, and Vishny (2012). These authors, in their model claim that financial innovations increase the efficiency of firms and reinvesting profits in R&D positively affects results. Similar analysis had Amore, Schneider and Zaldokas (2013), Laeven, Levine, and Michalopoulos (2015) claiming that innovation and knowledge in technology is positively correlated with financial markets and also Blanco and Wehrheim (2017) companies that use more financial instruments have a greater impact on the development of innovation and knowledge. For similar claims it can be mentioned authors Hsu, Li and Nozava (2018). Managers often use knowledge and financial innovation to take higher risks and thus achieve higher return on investment (Gao, 2010; Gennaioli *et al*., 2012; Hsu *et al*., 2018). According to Błach (2011), financial innovations are linked to technological innovations. They always follow each other and they evolve together over a time. The first reason is that innovative technological processes are very expensive and companies do not have their own resources to fund them due to high investment risk. The other reason is that economic and technological processes are facing a new dynamic business environment and higher complexity of business processes with a number of risks. Such risks force the financial system and financial markets to adopt to the changes.

Moreover, knowledge management can also be used to create investment and financial strategies. According to expectations about the markets in question, Damodaran (2003) refer that it is possible to classify investment strategies in 3 groups:

* Momentum Strategies (dynamic) – Based on the hypothesis that, what happened in the recent past can happen in the future. One should include most of the technical indicators that deal with momentum, like trend lines, relative robustness, as well as the growth investment, based on the momentum that the news about the company’s profit generated.
* Contrarian strategies – Assume that there is a tendency for all aspects that are behind the company’s performance, to get closer to historical averages (like Net Income, several Multiples, etc.), even though, the figures may be, at a given point in time, far from those historical averages.
* Opportunistic strategies – In this investment strategy, one assumes that the market makes mistakes, which lead to price fluctuations (without the justification from fundamentals - contrarian). Other times, there may be a short price fluctuation (without the justification from fundamentals – momentum). Notice that the main arbitrage strategies, and some based in technical analysis (price pattern and cycles), can also be stated within this group).

Damodaran (2003) states that, after the investor defines his preferences and personal needs, find a philosophy that suits his own personality, should be straightforward. However, he has two options:

- Best Unique strategy – The investor chooses the strategy that best fits his ambitions. This way, if a long-term investor believes that the market overreacts, he can adopt a strategy of Passive Value Investing.

- Combination of strategies – The investor can also adopt a combination of strategies in a way to maximize the return on investment. For example, the investor can mix between a long-term strategy, with a medium-term strategy, when buying shares with a significant relative strength.

In truth, when combining these strategies, the investor should have the following two points in mind:

1) He should use strategies that contradict one another, regarding the market’s behavior during a certain period.

2) When he is combining strategies, he should separate between the dominant strategy and the secondary strategy. This way, if the investor has to decide regarding a specific investor, he will know which strategy is the main one.

A wide literature has shown that there is a high positive correlation between financial markets (instruments), knowledge (information) and company performance (good investment choices). In long-term investments, knowledge (information) influence on stock prices more efficient (Cao, 1999; Chakravarty *et al*., 2004; Grubisic *et al*., 2011; 11. Vyklyuk *et al*., 2013; He and Tian, 2013; Pan and Poteshman, 2006; Hu, 2014; Vukovic *et al*. (a), 2017; Blanco and Wehrheim, 2017). However, survey evidence by Graham, Harvey, and Rajgopal (2005) as also Blanco and Wehrheim (2017) analysis shows that management can misuse knowledge for their personal short-term goals in companies (mostly personal wealth). According to the same authors, such examples are the most common in technology-intensive industries (R&D industries). Moreover it is not only one financial risk in such industry. Price volatility influence strongly on financial risk decissions. According to Hagstrom (2005), in Modern Investment Theory, risk is defined as the price volatility of assets. Buffett has always considered that price drops are a great opportunity to buy an asset. Buffett has a different definition for risk: The possibility of damaging. This means that the opportunity cost, when calculating a company’s projected cash flows in the future and estimating the expected return on the investment, can be extremely damaging when done wrongly, especially if there are better alternatives in the market. On top of that, the author also considers that risk is related to the timeframe of the investment. For example, if the investor buys a share today, with the intention of selling it tomorrow, then he performed a risky transaction. This way, it is extremely difficult to prove if, in a very short timeframe, shares will go up or down in a very short timeframe, and it results on the impossibility of having good, and positive, returns. However, Buffett mentions that, if we broaden the timeframe for several years, (assuming *t* is a rational investment), the probability of having an upside on the investment increases significantly (Hagstrom, 2005).

There is not much literature dealing with knowledge and innovations in financial instruments. Among more systematic authors which deal with this issue can be distinguished Blanco and Wehrheim (2017). The largest number of authors research other variables that influence on knowledge and innovation, like analyst coverage (He and Tian, 2013), credit supply (Amore *et al*., 2013), stock liquidity (Fang *et al*., 2014), the development stage of financial markets (Hsu *et al*., 2014) and etc. The reason for the weaker link between financial instruments and knowledge management is mostly in completely different researches of these disciplines. Authors usually specialize in financial or management discipline. On the other hand, the management of financial operations also requires skills of knowledge management. Therefore, it is important to analyze both issues. Considering that knowledge management implies both a tangible and intangible resources (Hall, 1993), in financial operations means that human capital (financial experts) and financial reports are tangible resources and experts skills and experiences of employees are intangible resources.

Finally, derivative instruments are closely related to the risks arising in the international conditions. Under these risks are considered exposure to international payments (transactions) as also risk of the credit rating of foreign organizations (default risks). The first one is interest rate risk and the second is credit (or default risk). Numerous studies have confirmed a positive correlation between interest rate risk and credit risk with use of derivatives (Li, 2015; Vukovic *et al*. (b), 2017). Mayordomo, Rodriguez-Moreno and Peña (2014) consider that there is a high level of correlation between derivatives and systematic risk. In research of Norden, Buston, and Wagner (2011) was proved high connection between credit risks and derivatives. There is also strong relationship between use of derivatives and interest rate exposure (Froot *et al*., 1993; Chaudhry *et al*., 2000; Morisson, 2005; Acharya and Yorulmazer, 2008; Boot, 2014; Li, 2015). Lastly, international risks have great impact not only on countries or groups of countries (markets) (Jovanovic *et al*., 2012), but also on the regions (Vukovic *et al*., 2016; Vukovic *et al*., 2017 (c)), industries (Petrovic *et al*., 2017, Kochetkov *et al*., 2017) and specific companies.

**Financial Risks, Knowledge Management and Financial Derivatives in the International conditions**

There is strong positive and significant relationship between financial risks and the use of financial derivatives. In research of Li (2015), it was prove that higher utilization of interest rate derivatives, exchange rate derivatives and credit derivatives corresponds to the higher systematic interest rate risk, exchange rate risk, and credit risk. This higher utilization of financial derivatives is for both, hedging and speculative strategies. However, how much financial innovation and information technology have an impact on the behaviour of financial organizations? According to Boot and Thakor (2010), Thakor (2012), Marinč (2013), Boot (2014) and Li (2015), financial organizations use innovations and technological advantages to increase their competitive position in the market. These authors believe that the banks due to the use of derivatives have promoted market-driven behavior.

Forwards

Collateralized Debt Obligations

SYSTEMATIZATION OF KNOWLEDGE, DECISION-MAKING AND BEST PRACTICES

Chicago Mercantile Exchange

S&P 500

Options

Futures

Collars

Warrants

Floors

Caps

Collateralized Loans

The New York Stock Exchange

Over the Counter (OTC)

Swaps

DERIVATIVE INSTRUMENTS

FINANCIAL

RISKS

Nonsystematic risk

(firm-specific)

Exchange

Rate Risk

Volatility

Risk

Technology Risk

Risk

Political

Risk

Legal

Risk

Human

Risk

Model

Risk

Operational Risk

Asset Liquidity Risk

Liquidity risk

Reinvestment

Rate Risk

Settlement

Risk

Sovereign

Risk

Credit Event Risk

Recovery Rate Risk

Exposure Rate Risk

Credit Risk

Funding Liquidity Risk

Cost Inflation

Risk

Demand Inflation

Risk

Price risk

Non- directionalRisk

DirectionalRisk

Relative Risk

Market risk

Absolute Risk

Interest rate risk

Inflationary risk

Systematic risk

(non-diversifiable risk)

Figure 1. Link between Financial Risks, Knowledge Management and Financial Derivatives

<FIGURE x.x HERE>

Such researches are great support to the thesis that the management of financial knowledge is the generator and the promoter of financial innovations. From other side, financial innovations create different financial derivatives. Innovations are the result of the application of knowledge management and the need for this process lies in the protection of financial risks (hedging) or the desire to achieve high yields (speculation). Protection against financial risk is greatest nearly before or in times of crisis. Figure 1 shows the relationship between financial risks, knowledge management and financial derivatives. Among them, exchange rate risk is especially separate because affects on both non-diversifiable risks and firm specific risks. In first case, exchange rate risk affects price risk, reinvestment rate risk, market risk and and the macroeconomic situation of a country. Secondly, changes in exchange rates have a major impact on individual companies operating in international flows. Therefore, companies use different financial derivatives to protect themselves against these risks (options, forward, futures, etc.). Financial derivatives represent an expense for the company, who's on the other hand protects them from the risks.

Also, the risks of changing interest rates are not the only risks that affect companies in the international environment. Companies are also exposed to various types of credit risks such as: exposure rate risk, credit event risk, sovereign risks, etc. With all this in mind, we often could see hybrid derivatives that include protection from several types of risks. Creating such derivatives is a process of innovation created as a result of experience and best practice in the management of financial capital. In other words, the emergence of a derivative can be attributed to the management of financial knowledge. These instruments can be traded on some of the largest stock exchanges of derivatives like the New York Stock Exchange, Standard & Poor’s or Chicago Mercantile Exchange. It can be easily seen that the largest derivatives markets are in the United States, which have the most developed financial markets in the world. How other countries are involved in the global flows of derivatives we will see in the next section.

**Financial derivatives and international risks**

According to Figure 2, strong growth in risk begins in 2005 and reaches a peak in 2009. The highest increase in risk exist interest rate categories of derivatives. More specifically, the risks associated with changing interest rates have influenced the change in the price of derivative instruments. Even more, a certain signs of crisis were seen in 2005-2006, but at that time it was not known in what proportion will be. The peak is in 2009 (world financial crisis). Although there was a slight recovery in 2010, the crisis continues and increases since 2011 (sovereign debt crisis). The situation has improved after 2014. This OTC derivatives capture the outstanding positions of derivatives dealers which are mainly banks. Global OTC markets cover the outstanding notional value, market value and credit exposure of OTC foreign exchange, interest rate, equity, commodity and credit derivatives. Any increase in risk increases the value of derivative instruments since the derivatives are used by speculators and hedgers. Therefore, the total risk value is covered (measured) by 700 trillion dollars in 2012-2014. Most of the risks are related to interest rate risk (caused by a fall in the real estate markets in 2007 and interest rates in 2009), while the risk of foreign exchange is steadily increasing (even today).

Figure 2. Notional amount outstanding by risk category on Over-the-counter (OTC) derivatives markets. Source: Retrieved from BIS (27.07.2018).

Another important feature is that interest rates are exposed to international risks (due to the international integration of financial market). Therefore, international risks can not only be viewed as foreign exchange risk, they are much more complex. Bearing in mind previous, derivatives are nothing but innovations in the management of financial capital with the aim of protecting against risk (hedging) or taking risks to obtain extra profits (speculation). These derivatives are formed on the experience and knowledge of financial experts to use them as instruments of capital management. Therefore we can say that derivatives are a product of knowledge management. Any successful exit from the crisis or acquiring extra profits is an additional experience in financial knowledge management and which is the greatest precisely in the most risky situation. Financial knowledge management is the most sensitive part of the knowledge management, because the mistakes end up usually by bankruptcy or takeover process.

Figure 3. Derivatives divided by risk category. Source: Retrieved from BIS (27.07.2018)

On the Figure 3 we can see the importance of international conditions in financial risks. The crisis in the global financial market has influenced the rise in the value of derivatives to 1500 trillion of US dollars. The same was repeated in early 2012 and 2014, and after the value of derivatives began to decline. Most of the funds relate to interest rate and credit derivatives, whose values are also indirectly influenced by international factors. Direct risks associated with international conditions are related to foreign exchange derivatives which make up a fifth of the total funds. The process can be viewed doubly. First, the figure clearly shows a large impact of the crisis on financial flows. For 20 years flows have increased 10-fold. Second, the same process can be viewed as the influence of financial knowledge management on the development and use of financial derivatives. According to the data in Table 1, we can see that in this process dominate the currencies of the developed countries.

Table 1. Exchange-traded futures and options, by currency (notional principal, in billions of US dollars)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Dec.  2016 | Dec.  2017 | Mar.  2018 | 2016. | 2017. | Nov.  2017 | Dec.  2017 | Jan.  2018 | Feb.  2018 | Mar.  2018 |
| Interest rate | [66,898](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.TO1.8A?t=d2&c=&p=20164&i=1.1) | [80,572](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.TO1.8A?t=d2&c=&p=20174&i=1.2) | [105,157](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.TO1.8A?t=d2&c=&p=20181&i=1.3) | [6,535](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.TO1.8A?t=d2&c=&p=2016&i=1.4) | [7,444](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.TO1.8A?t=d2&c=&p=2017&i=1.5) | [6,706](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.TO1.8A?t=d2&c=&p=201711&i=1.6) | [6,082](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.TO1.8A?t=d2&c=&p=201712&i=1.7) | [8,911](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.TO1.8A?t=d2&c=&p=201801&i=1.8) | [12,480](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.TO1.8A?t=d2&c=&p=201802&i=1.9) | [10,534](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.TO1.8A?t=d2&c=&p=201803&i=1.10) |
| Australian Dollar | [1,197](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.AUD.8A?t=d2&c=&p=20164&i=2.1) | [1,379](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.AUD.8A?t=d2&c=&p=20174&i=2.2) | [1,517](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.AUD.8A?t=d2&c=&p=20181&i=2.3) | [147](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.AUD.8A?t=d2&c=&p=2016&i=2.4) | [139](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.AUD.8A?t=d2&c=&p=2017&i=2.5) | [126](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.AUD.8A?t=d2&c=&p=201711&i=2.6) | [154](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.AUD.8A?t=d2&c=&p=201712&i=2.7) | [152](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.AUD.8A?t=d2&c=&p=201801&i=2.8) | [151](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.AUD.8A?t=d2&c=&p=201802&i=2.9) | [191](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.AUD.8A?t=d2&c=&p=201803&i=2.10) |
| Brazilian Real | [1,043](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.BRL.8A?t=d2&c=&p=20164&i=3.1) | [1,595](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.BRL.8A?t=d2&c=&p=20174&i=3.2) | [1,543](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.BRL.8A?t=d2&c=&p=20181&i=3.3) | [42](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.BRL.8A?t=d2&c=&p=2016&i=3.4) | [59](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.BRL.8A?t=d2&c=&p=2017&i=3.5) | [59](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.BRL.8A?t=d2&c=&p=201711&i=3.6) | [51](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.BRL.8A?t=d2&c=&p=201712&i=3.7) | [66](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.BRL.8A?t=d2&c=&p=201801&i=3.8) | [57](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.BRL.8A?t=d2&c=&p=201802&i=3.9) | [70](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.BRL.8A?t=d2&c=&p=201803&i=3.10) |
| Canadian Dollar | [915](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.CAD.8A?t=d2&c=&p=20164&i=4.1) | [724](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.CAD.8A?t=d2&c=&p=20174&i=4.2) | [700](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.CAD.8A?t=d2&c=&p=20181&i=4.3) | [87](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.CAD.8A?t=d2&c=&p=2016&i=4.4) | [98](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.CAD.8A?t=d2&c=&p=2017&i=4.5) | [73](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CAD.8A?t=d2&c=&p=201711&i=4.6) | [94](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CAD.8A?t=d2&c=&p=201712&i=4.7) | [96](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CAD.8A?t=d2&c=&p=201801&i=4.8) | [98](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CAD.8A?t=d2&c=&p=201802&i=4.9) | [100](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CAD.8A?t=d2&c=&p=201803&i=4.10) |
| Swiss Franc | [216](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.CHF.8A?t=d2&c=&p=20164&i=5.1) | [252](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.CHF.8A?t=d2&c=&p=20174&i=5.2) | [404](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.CHF.8A?t=d2&c=&p=20181&i=5.3) | [22](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.CHF.8A?t=d2&c=&p=2016&i=5.4) | [25](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.CHF.8A?t=d2&c=&p=2017&i=5.5) | [20](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CHF.8A?t=d2&c=&p=201711&i=5.6) | [19](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CHF.8A?t=d2&c=&p=201712&i=5.7) | [42](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CHF.8A?t=d2&c=&p=201801&i=5.8) | [26](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CHF.8A?t=d2&c=&p=201802&i=5.9) | [29](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CHF.8A?t=d2&c=&p=201803&i=5.10) |
| Renminbi | [12](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.CNY.8A?t=d2&c=&p=20164&i=6.1) | [17](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.CNY.8A?t=d2&c=&p=20174&i=6.2) | [10](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.CNY.8A?t=d2&c=&p=20181&i=6.3) | [5](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.CNY.8A?t=d2&c=&p=2016&i=6.4) | [9](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.CNY.8A?t=d2&c=&p=2017&i=6.5) | [11](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CNY.8A?t=d2&c=&p=201711&i=6.6) | [6](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CNY.8A?t=d2&c=&p=201712&i=6.7) | [7](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CNY.8A?t=d2&c=&p=201801&i=6.8) | [6](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CNY.8A?t=d2&c=&p=201802&i=6.9) | [6](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.CNY.8A?t=d2&c=&p=201803&i=6.10) |
| EUR | [6,738](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.EU1.8A?t=d2&c=&p=20164&i=8.1) | [12,341](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.EU1.8A?t=d2&c=&p=20174&i=8.2) | [16,517](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.EU1.8A?t=d2&c=&p=20181&i=8.3) | [900](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.EU1.8A?t=d2&c=&p=2016&i=8.4) | [1,238](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.EU1.8A?t=d2&c=&p=2017&i=8.5) | [846](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.EU1.8A?t=d2&c=&p=201711&i=8.6) | [1,203](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.EU1.8A?t=d2&c=&p=201712&i=8.7) | [1,812](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.EU1.8A?t=d2&c=&p=201801&i=8.8) | [1,548](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.EU1.8A?t=d2&c=&p=201802&i=8.9) | [1,519](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.EU1.8A?t=d2&c=&p=201803&i=8.10) |
| Pound Sterling | [4,745](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.GBP.8A?t=d2&c=&p=20164&i=9.1) | [6,137](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.GBP.8A?t=d2&c=&p=20174&i=9.2) | [6,378](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.GBP.8A?t=d2&c=&p=20181&i=9.3) | [533](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.GBP.8A?t=d2&c=&p=2016&i=9.4) | [621](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.GBP.8A?t=d2&c=&p=2017&i=9.5) | [725](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.GBP.8A?t=d2&c=&p=201711&i=9.6) | [494](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.GBP.8A?t=d2&c=&p=201712&i=9.7) | [657](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.GBP.8A?t=d2&c=&p=201801&i=9.8) | [958](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.GBP.8A?t=d2&c=&p=201802&i=9.9) | [683](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.GBP.8A?t=d2&c=&p=201803&i=9.10) |
| Yen | [215](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.JPY.8A?t=d2&c=&p=20164&i=13.1) | [225](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.JPY.8A?t=d2&c=&p=20174&i=13.2) | [282](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.JPY.8A?t=d2&c=&p=20181&i=13.3) | [41](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.JPY.8A?t=d2&c=&p=2016&i=13.4) | [38](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.JPY.8A?t=d2&c=&p=2017&i=13.5) | [40](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.JPY.8A?t=d2&c=&p=201711&i=13.6) | [51](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.JPY.8A?t=d2&c=&p=201712&i=13.7) | [43](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.JPY.8A?t=d2&c=&p=201801&i=13.8) | [42](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.JPY.8A?t=d2&c=&p=201802&i=13.9) | [58](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.JPY.8A?t=d2&c=&p=201803&i=13.10) |
| Won | [23](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.KRW.8A?t=d2&c=&p=20164&i=14.1) | [29](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.KRW.8A?t=d2&c=&p=20174&i=14.2) | [34](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.KRW.8A?t=d2&c=&p=20181&i=14.3) | [14](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.KRW.8A?t=d2&c=&p=2016&i=14.4) | [12](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.KRW.8A?t=d2&c=&p=2017&i=14.5) | [10](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.KRW.8A?t=d2&c=&p=201711&i=14.6) | [13](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.KRW.8A?t=d2&c=&p=201712&i=14.7) | [12](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.KRW.8A?t=d2&c=&p=201801&i=14.8) | [12](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.KRW.8A?t=d2&c=&p=201802&i=14.9) | [16](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.KRW.8A?t=d2&c=&p=201803&i=14.10) |
| Mexican Peso | [3](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.MXN.8A?t=d2&c=&p=20164&i=15.1) | [1](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.MXN.8A?t=d2&c=&p=20174&i=15.2) | [1](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.MXN.8A?t=d2&c=&p=20181&i=15.3) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.MXN.8A?t=d2&c=&p=2016&i=15.4) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.MXN.8A?t=d2&c=&p=2017&i=15.5) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.MXN.8A?t=d2&c=&p=201711&i=15.6) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.MXN.8A?t=d2&c=&p=201712&i=15.7) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.MXN.8A?t=d2&c=&p=201801&i=15.8) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.MXN.8A?t=d2&c=&p=201802&i=15.9) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.MXN.8A?t=d2&c=&p=201803&i=15.10) |
| Norwegian Krone | [14](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.NOK.8A?t=d2&c=&p=20164&i=16.1) | [14](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.NOK.8A?t=d2&c=&p=20174&i=16.2) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.NOK.8A?t=d2&c=&p=20181&i=16.3) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.NOK.8A?t=d2&c=&p=2016&i=16.4) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.NOK.8A?t=d2&c=&p=2017&i=16.5) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.NOK.8A?t=d2&c=&p=201711&i=16.6) | [1](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.NOK.8A?t=d2&c=&p=201712&i=16.7) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.NOK.8A?t=d2&c=&p=201801&i=16.8) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.NOK.8A?t=d2&c=&p=201802&i=16.9) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.NOK.8A?t=d2&c=&p=201803&i=16.10) |
| New Zealand Dollar | [104](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.NZD.8A?t=d2&c=&p=20164&i=17.1) | [86](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.NZD.8A?t=d2&c=&p=20174&i=17.2) | [97](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.NZD.8A?t=d2&c=&p=20181&i=17.3) | [5](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.NZD.8A?t=d2&c=&p=2016&i=17.4) | [4](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.NZD.8A?t=d2&c=&p=2017&i=17.5) | [5](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.NZD.8A?t=d2&c=&p=201711&i=17.6) | [4](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.NZD.8A?t=d2&c=&p=201712&i=17.7) | [3](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.NZD.8A?t=d2&c=&p=201801&i=17.8) | [5](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.NZD.8A?t=d2&c=&p=201802&i=17.9) | [9](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.NZD.8A?t=d2&c=&p=201803&i=17.10) |
| Swedish Krona | [92](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.SEK.8A?t=d2&c=&p=20164&i=20.1) | [170](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.SEK.8A?t=d2&c=&p=20174&i=20.2) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.SEK.8A?t=d2&c=&p=20181&i=20.3) | [3](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.SEK.8A?t=d2&c=&p=2016&i=20.4) | [4](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.SEK.8A?t=d2&c=&p=2017&i=20.5) | [5](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.SEK.8A?t=d2&c=&p=201711&i=20.6) | [3](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.SEK.8A?t=d2&c=&p=201712&i=20.7) | [7](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.SEK.8A?t=d2&c=&p=201801&i=20.8) | [6](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.SEK.8A?t=d2&c=&p=201802&i=20.9) | [0](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.SEK.8A?t=d2&c=&p=201803&i=20.10) |
| US Dollar | [51,572](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.USD.8A?t=d2&c=&p=20164&i=24.1) | [57,593](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.USD.8A?t=d2&c=&p=20174&i=24.2) | [77,663](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/Q.A.C.A.USD.8A?t=d2&c=&p=20181&i=24.3) | [4,736](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.USD.8A?t=d2&c=&p=2016&i=24.4) | [5,195](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/A.U.C.A.USD.8A?t=d2&c=&p=2017&i=24.5) | [4,785](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.USD.8A?t=d2&c=&p=201711&i=24.6) | [3,988](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.USD.8A?t=d2&c=&p=201712&i=24.7) | [6,013](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.USD.8A?t=d2&c=&p=201801&i=24.8) | [9,570](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.USD.8A?t=d2&c=&p=201802&i=24.9) | [7,852](https://stats.bis.org/statx/srs/tseries/XTD_DERIV/M.U.C.A.USD.8A?t=d2&c=&p=201803&i=24.10) |

Source: The table has been modified by data retrieved from BIS (27.07.2018). Countries with exchange-traded values equal to zero are thrown out.

The largest number of derivatives transactions was made in US dollars, followed by transactions in Euros and pound sterling. An interesting fact is that among the first five exchange-traded values are transactions in Brazilian reals. Brazil is the only developing country which has a significant share in the global market for financial derivatives (the same level as Australia), although it is significant behind the US and EU financial markets (more than 90% of all derivatives transactions). Figure 3 shows the difference between the first countries in participation in trade on derivative markets.

Figure 4. Derivatives markets by currencies. Source: Retrieved from BIS (27.07.2018)

In the last ten years, the dominance of the US dollar has tripled in comparison to all other currencies (Figure 4). According to BIS bank data (2018), trade in derivative markets in US dollars exceeds seventy-five trillion of US dollars. After US dollars transactions, transactions denominated in euro (26 trillion) and Japanese yen (12 trillion) follow as the biggest. The huge difference in the level of transactions in US dollars and other currencies is in the fact that US financial markets (derivatives markets) are the most developed in the world. Almost the most of innovations in financial instruments come from US financial markets. Other financial markets take over these innovations and apply them in their markets (more or less, depending on the development of their national financial markets). The markets that are most developed outside the US are: European, British, Japanese, Australian and Hong Kong. Second, there is still a major dominance of the US dollar in the world in all international transactions.

The US dollar is the currency that globally dominates in transactions, trade, balance sheets, reserves and securities. With all this in mind, it is clear to see why the crisis emerged on US financial markets was immediately transferred to many other world markets (the first on financial and after on all other flows), but also, we can say that the largest number of financial innovations as a result of knowledge management comes from the US market. The following table shows the dominance of the dollar in derivative instruments and foreign exchange contracts (Table 2).

Table 2. Global OTC derivatives market (In billions of US dollars)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Notional amounts outstanding | | | | Gross market value | | | |
|  | H1 2016 | H2 2016 | H1 2017 | H2 2017 | H1 2016 | H2 2016 | H1 2017 | H2 2017 |
| All contracts | [552,925](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.A.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20161&i=1.1) | [482,422](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.A.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20162&i=1.2) | [542,439](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.A.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20171&i=1.3) | [531,912](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.A.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20172&i=1.4) | [21,119](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.A.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20161&i=1.5) | [14,948](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.A.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20162&i=1.6) | [12,683](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.A.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20171&i=1.7) | [10,956](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.A.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20172&i=1.8) |
| Foreign exchange contracts | [85,867](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20161&i=2.1) | [78,781](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20162&i=2.2) | [88,429](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20171&i=2.3) | [87,117](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20172&i=2.4) | [3,578](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20161&i=2.5) | [3,324](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20162&i=2.6) | [2,626](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20171&i=2.7) | [2,293](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.TO1.A.A.3.C?t=d5.1&c=&p=20172&i=2.8) |
| USD - US Dollar | [75,422](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.USD.A.A.3.C?t=d5.1&c=&p=20161&i=18.1) | [70,550](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.USD.A.A.3.C?t=d5.1&c=&p=20162&i=18.2) | [77,044](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.USD.A.A.3.C?t=d5.1&c=&p=20171&i=18.3) | [74,756](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.USD.A.A.3.C?t=d5.1&c=&p=20172&i=18.4) | [3,104](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.USD.A.A.3.C?t=d5.1&c=&p=20161&i=18.5) | [2,947](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.USD.A.A.3.C?t=d5.1&c=&p=20162&i=18.6) | [2,299](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.USD.A.A.3.C?t=d5.1&c=&p=20171&i=18.7) | [1,974](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.USD.A.A.3.C?t=d5.1&c=&p=20172&i=18.8) |
| EUR - Euro | [26,473](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.EUR.A.A.3.C?t=d5.1&c=&p=20161&i=19.1) | [24,334](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.EUR.A.A.3.C?t=d5.1&c=&p=20162&i=19.2) | [27,826](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.EUR.A.A.3.C?t=d5.1&c=&p=20171&i=19.3) | [28,280](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.EUR.A.A.3.C?t=d5.1&c=&p=20172&i=19.4) | [917](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.EUR.A.A.3.C?t=d5.1&c=&p=20161&i=19.5) | [871](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.EUR.A.A.3.C?t=d5.1&c=&p=20162&i=19.6) | [929](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.EUR.A.A.3.C?t=d5.1&c=&p=20171&i=19.7) | [782](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.EUR.A.A.3.C?t=d5.1&c=&p=20172&i=19.8) |
| JPY - Japanese Yen | [15,400](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.JPY.A.A.3.C?t=d5.1&c=&p=20161&i=20.1) | [14,146](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.JPY.A.A.3.C?t=d5.1&c=&p=20162&i=20.2) | [14,904](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.JPY.A.A.3.C?t=d5.1&c=&p=20171&i=20.3) | [14,838](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.JPY.A.A.3.C?t=d5.1&c=&p=20172&i=20.4) | [916](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.JPY.A.A.3.C?t=d5.1&c=&p=20161&i=20.5) | [714](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.JPY.A.A.3.C?t=d5.1&c=&p=20162&i=20.6) | [405](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.JPY.A.A.3.C?t=d5.1&c=&p=20171&i=20.7) | [300](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.JPY.A.A.3.C?t=d5.1&c=&p=20172&i=20.8) |
| GBP - Pound Sterling | [10,528](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.GBP.A.A.3.C?t=d5.1&c=&p=20161&i=21.1) | [9,080](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.GBP.A.A.3.C?t=d5.1&c=&p=20162&i=21.2) | [11,070](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.GBP.A.A.3.C?t=d5.1&c=&p=20171&i=21.3) | [12,257](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.GBP.A.A.3.C?t=d5.1&c=&p=20172&i=21.4) | [667](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.GBP.A.A.3.C?t=d5.1&c=&p=20161&i=21.5) | [367](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.GBP.A.A.3.C?t=d5.1&c=&p=20162&i=21.6) | [346](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.GBP.A.A.3.C?t=d5.1&c=&p=20171&i=21.7) | [305](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.GBP.A.A.3.C?t=d5.1&c=&p=20172&i=21.8) |
| CHF - Swiss Franc | [3,909](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.CHF.A.A.3.C?t=d5.1&c=&p=20161&i=22.1) | [3,541](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.CHF.A.A.3.C?t=d5.1&c=&p=20162&i=22.2) | [4,120](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.CHF.A.A.3.C?t=d5.1&c=&p=20171&i=22.3) | [4,257](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.CHF.A.A.3.C?t=d5.1&c=&p=20172&i=22.4) | [134](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.CHF.A.A.3.C?t=d5.1&c=&p=20161&i=22.5) | [112](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.CHF.A.A.3.C?t=d5.1&c=&p=20162&i=22.6) | [113](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.CHF.A.A.3.C?t=d5.1&c=&p=20171&i=22.7) | [91](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.CHF.A.A.3.C?t=d5.1&c=&p=20172&i=22.8) |
| CAD - Canadian Dollar | [3,511](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.CAD.A.A.3.C?t=d5.1&c=&p=20161&i=23.1) | [3,350](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.CAD.A.A.3.C?t=d5.1&c=&p=20162&i=23.2) | [4,068](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.CAD.A.A.3.C?t=d5.1&c=&p=20171&i=23.3) | [4,088](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.CAD.A.A.3.C?t=d5.1&c=&p=20172&i=23.4) | [125](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.CAD.A.A.3.C?t=d5.1&c=&p=20161&i=23.5) | [111](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.CAD.A.A.3.C?t=d5.1&c=&p=20162&i=23.6) | [140](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.CAD.A.A.3.C?t=d5.1&c=&p=20171&i=23.7) | [107](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.CAD.A.A.3.C?t=d5.1&c=&p=20172&i=23.8) |
| SEK - Swedish Krona | [1,775](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.SEK.A.A.3.C?t=d5.1&c=&p=20161&i=24.1) | [1,812](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.SEK.A.A.3.C?t=d5.1&c=&p=20162&i=24.2) | [2,038](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.SEK.A.A.3.C?t=d5.1&c=&p=20171&i=24.3) | [2,268](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.SEK.A.A.3.C?t=d5.1&c=&p=20172&i=24.4) | [47](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.SEK.A.A.3.C?t=d5.1&c=&p=20161&i=24.5) | [46](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.SEK.A.A.3.C?t=d5.1&c=&p=20162&i=24.6) | [55](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.SEK.A.A.3.C?t=d5.1&c=&p=20171&i=24.7) | [47](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.SEK.A.A.3.C?t=d5.1&c=&p=20172&i=24.8) |
| Other currencies | [34,716](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.$TO1+TO1-USD-EUR-JPY-GBP-CHF-CAD-SEK.A.A.3.C?t=d5.1&c=&p=20161&i=25.1) | [30,748](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.$TO1+TO1-USD-EUR-JPY-GBP-CHF-CAD-SEK.A.A.3.C?t=d5.1&c=&p=20162&i=25.2) | [35,789](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.$TO1+TO1-USD-EUR-JPY-GBP-CHF-CAD-SEK.A.A.3.C?t=d5.1&c=&p=20171&i=25.3) | [33,490](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.A.A.B.5J.A.5J.A.TO1.$TO1+TO1-USD-EUR-JPY-GBP-CHF-CAD-SEK.A.A.3.C?t=d5.1&c=&p=20172&i=25.4) | [1,245](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.$TO1+TO1-USD-EUR-JPY-GBP-CHF-CAD-SEK.A.A.3.C?t=d5.1&c=&p=20161&i=25.5) | [1,479](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.$TO1+TO1-USD-EUR-JPY-GBP-CHF-CAD-SEK.A.A.3.C?t=d5.1&c=&p=20162&i=25.6) | [964](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.$TO1+TO1-USD-EUR-JPY-GBP-CHF-CAD-SEK.A.A.3.C?t=d5.1&c=&p=20171&i=25.7) | [979](https://stats.bis.org/statx/srs/tseries/OTC_DERIV/H.D.A.B.5J.A.5J.A.TO1.$TO1+TO1-USD-EUR-JPY-GBP-CHF-CAD-SEK.A.A.3.C?t=d5.1&c=&p=20172&i=25.8) |

Source: The table has been modified by data retrieved from BIS (27.07.2018).

So how many countries have been exposed to international risks after two major crises (financial and sovereign crisis)? In Table 3, real effective exchange rates increment indicates an appreciation of the economy's currency against a broad basket of currencies. If we observe the period of the last five years, the highest fall of real effective exchange rates had Australia, European Union, Canada and Mexico. In the European Union, Greece, Ireland, Norway and Sweden had highest fall of real effective exchange rates denominated in their currencies.

Table 3. Real effective exchange rates, (27 economies indices, CPI-based; period averages; 2010 = 100)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Year | | | | |
| 2013 | 2014 | 2015 | 2016 | 2017 |
| Australia | [106.4](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.AU?t=i2&c=&m=N&p=2013&i=3.1) | [101.3](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.AU?t=i2&c=&m=N&p=2014&i=3.2) | [94.9](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.AU?t=i2&c=&m=N&p=2015&i=3.3) | [94.3](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.AU?t=i2&c=&m=N&p=2016&i=3.4) | [97.3](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.AU?t=i2&c=&m=N&p=2017&i=3.5) |
| Austria | [101.4](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.AT?t=i2&c=&m=N&p=2013&i=4.1) | [102.3](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.AT?t=i2&c=&m=N&p=2014&i=4.2) | [100.5](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.AT?t=i2&c=&m=N&p=2015&i=4.3) | [101.3](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.AT?t=i2&c=&m=N&p=2016&i=4.4) | [102.4](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.AT?t=i2&c=&m=N&p=2017&i=4.5) |
| Belgium | [101.0](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.BE?t=i2&c=&m=N&p=2013&i=5.1) | [100.5](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.BE?t=i2&c=&m=N&p=2014&i=5.2) | [97.6](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.BE?t=i2&c=&m=N&p=2015&i=5.3) | [99.8](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.BE?t=i2&c=&m=N&p=2016&i=5.4) | [101.4](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.BE?t=i2&c=&m=N&p=2017&i=5.5) |
| Canada | [98.8](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.CA?t=i2&c=&m=N&p=2013&i=8.1) | [92.8](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.CA?t=i2&c=&m=N&p=2014&i=8.2) | [84.5](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.CA?t=i2&c=&m=N&p=2015&i=8.3) | [82.4](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.CA?t=i2&c=&m=N&p=2016&i=8.4) | [83.6](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.CA?t=i2&c=&m=N&p=2017&i=8.5) |
| Chinese Taipei | [106.4](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.TW?t=i2&c=&m=N&p=2013&i=11.1) | [106.0](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.TW?t=i2&c=&m=N&p=2014&i=11.2) | [111.2](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.TW?t=i2&c=&m=N&p=2015&i=11.3) | [108.5](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.TW?t=i2&c=&m=N&p=2016&i=11.4) | [114.3](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.TW?t=i2&c=&m=N&p=2017&i=11.5) |
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| Finland | [100.3](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.FI?t=i2&c=&m=N&p=2013&i=19.1) | [101.5](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.FI?t=i2&c=&m=N&p=2014&i=19.2) | [98.6](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.FI?t=i2&c=&m=N&p=2015&i=19.3) | [99.1](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.FI?t=i2&c=&m=N&p=2016&i=19.4) | [99.2](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.FI?t=i2&c=&m=N&p=2017&i=19.5) |
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| Germany | [98.8](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.DE?t=i2&c=&m=N&p=2013&i=21.1) | [99.0](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.DE?t=i2&c=&m=N&p=2014&i=21.2) | [94.7](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.DE?t=i2&c=&m=N&p=2015&i=21.3) | [95.4](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.DE?t=i2&c=&m=N&p=2016&i=21.4) | [96.6](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.DE?t=i2&c=&m=N&p=2017&i=21.5) |
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| United States | [100.5](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.US?t=i2&c=&m=N&p=2013&i=60.1) | [103.2](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.US?t=i2&c=&m=N&p=2014&i=60.2) | [118.5](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.US?t=i2&c=&m=N&p=2015&i=60.3) | [123.0](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.US?t=i2&c=&m=N&p=2016&i=60.4) | [122.3](https://stats.bis.org/statx/srs/tseries/EER/A.R.N.US?t=i2&c=&m=N&p=2017&i=60.5) |

Source: The table has been modified by data retrieved from BIS (27.07.2018).

If we say that Greece and Ireland were affected by sovereign crisis and that affected the fall of their real effective exchange rates, we cannot say the same for Norway and Sweden. Both countries did not have a public debt problem and were not directly exposed to sovereign crisis. Similarly, we can say for Canada and Australia. However, these countries were highly connected with international financial markets. This means that international financial factors have had a major impact on real effective exchange rates of the mentioned countries. Strong connections and exposure to international financial (derivative) markets have two consequences: a) positive - because it promotes innovations and experience in managing financial flows (financial knowledge management) and b) negative - conveys the consequences of the crisis among different markets.

# Conclusion

Financial innovations result as a process of financial knowledge management creating new ideas, instruments and solutions for complex financial flows. According to the methodology of OECD (2005), innovations can be classified into four groups: (1) product, (2) process, (3) marketing and (4) business organization. Innovation in finance can be recognized as ordinary in the first two groups, as a product and process. Sustainable and growing returns to financial flows are impossible without knowledge management. Numerous examples have shown that the absence of knowledge management usually lead to an increasing in risk, lower profits and ultimately to the takeover or bankruptcy. On the other hand, many financial derivatives resulted as innovations in the financial knowledge management have influenced on the growth of risks in financial flows. In fact, we can conclude the following: financial innovations based on the best practice aimed to risk protection contribute to the stability of financial flows. Such instruments represent a cost to companies but also reduce risks. Form other side, financial innovations based on the urge to acquire high extra profits poses a risk to the large losses and can generate a crisis.

Without financial innovations and financial knowledge management, the wealth of nations cannot grow and be sustainable as also economic and technological development would be very slow (Blach, 2011). Although numerous literature indirectly points to the importance of knowledge management in finance (through financial innovation) in researches of Fabozzi and Modigliani (2003), Anderloni and Bongini (2009), Frame and White (2009), Blach (2011), it is very hard to find literature on the financial knowledge management. Therefore, the main findings of this paper is is to explain the character of financial knowledge management

**Findings**

The following Table 3.1 reports Cronbach’s alpha (α) coefficients and square roots of the AVEs for each construct.

<TABLE x.x HERE>

**References**

Acharya, V. V., and Yorulmazer, T. (2008). Information Contagion and Bank Herding. *Journal of Money, Credit and Banking, 40*(1), 215-231.

Anderloni, L., Bongini, P. (2009). Is Financial Innovation Still a Relevant Issue? In: L. Anderloni, D. T. Llewellyn, R. H. Schmidt (ed.), Financial Innovation in Retail and Corporate Banking, Cheltenham: Edward Elgar.

Amore, M.D., Schneider, C., Zaldokas, A. (2013). Credit supply and corporate innovation. *Journal of Financial Economics* 109, 835-855.

Anderson, N. and West, M.A. (1996). The team climate inventory: development of the TCI and its applications in teambuilding for innovativeness. *European Journal of Work and Organisational Psychology*, 5(1), 53-66.

Błach, J. (2011). Financial innovations and their role in the modern financial system – Identification and systematization of the problem*. Financial Internet Quarterly „e-Finanse”*, 7(3), 13-26.

Blanco, I. and Wehrheim, D. (2017). The bright side of financial derivatives: Options trading and firm innovation, *Journal of Financial Economics* 125(1), 99-119. DOI: 10.1016/j.jfineco.2017.04.004

BIS (Bank for International Settlements) (2018). https://www.bis.org

Boot, A. W. A. (2014). Financial Sector in Flux. *Journal of Money, Credit and Banking, 46*(s1), 129-135.

Boot, A. W. A., and Thakor, A. V. (2010). The Accelerating Integration of Banks and Markets and Its Implications for Regulation. In Berger, A., Molyneux, P. and Wilson, J. (Eds.), *The* *Oxford Handbook of Banking* (pp. 58-90). Oxford: Oxford University Press.

Cao, H. H. (1999). The effect of derivative assets on information acquisition and price behavior in a rational expectations equilibrium. *Review of Financial Studies* 12 (1), 131–163.

Capon, N., Farley, J.U., Lehmann, D.R. and Hulbert, J.M. (1992).Profiles of product innovators among large US manufacturers. *Management Science*, 38(2), 157-68.

Chakravarty, S., H. Gulen, and S. Mayhew (2004). Informed trading in stock and option markets*. The Journal of Finance* 59 (3), 1235–1257.

Chaudhry, M., Christie-David, R., Koch, T., and Reichert, A. (2000). The Risk of Foreign Currency Contingent Claims at US Commercial Banks. *Journal of Banking & Finance, 24*(9), 1399-1417.

Damodaran, A. (2003). *Investment Philosophies*.Wiley Finance.

Darroch, J. (2005). Knowledge management, innovation and firm performance. *Journal of Knowledge Management* 9 (3), 101-115. DOI: 10.1108/13673270510602809

Fabozzi, F. J., and Modigliani, F. (2003). *Capital Markets. Institutions and Instruments*. Upper Saddle River: Pearson Education International.

Fang, V. W., X. Tian, and S. Tice (2014). Does stock liquidity enhance or impede firm innovation? *The Journal of Finance* 69 (5), 2085–2125.

Frame, W. S., and White, L. J. (2009). *Technological Change, Financial Innovation, and Diffusion in Banking* (Working Paper 2009-10). Atlanta: Federal Reserve Bank of Atlanta.

Froot, K. A., Scharfstein, D. S., Stein, J. C. (1993). Risk Managements Coordinating Corporate Investment and Financing Policies. *The Journal of Finance, 48*(5), 1629-1658.

Gao, H. (2010). Optimal compensation contracts when managers can hedge. *Journal of Financial Economics* 97, 218-238.

Gennaioli, N., Shleifer, A., Vishny, R. (2012). Neglected risks, financial innovation, and financial fragility. *Journal of Financial Economics* 104, 452-468.

Griffin, A. and Hauser, J.R. (1996). ‘Integrating R&D and marketing: a review and analysis of the literature. *Journal of Product and Innovation Management*, 13, 191-215.

Grubišić, Z., Zarić, S., & Vukovic, D. (2011). FDI Inflow in see Countries and its Consequences in the Context of the Financial Crisis. Finance and the Performance of Firms in Science, Education, and Practice. Tomas Bata University in Zlin, Faculty of management and economics, Czech Republic. (edt.) Drahomira Pavelkova, (Proceedings paper), pp. 116-129. ISBN 978-80-7454-020-2.

Hagstrom, R. (2005). *The Warren Buffett Way.Wiley & Sons*. 2nd Edition

Hall, R. (1993). A framework linking intangible resources and capabilities to sustainable competitive advantage, *Strategic Management Journal*, 14, 607-18.

He, J. J. and X. Tian (2013). The dark side of analyst coverage: The case of innovation. *Journal of Financial* Economics 109 (3), 856–878.

Hsu, P.-H., X. Tian, and Y. Xu (2014). Financial development and innovation: Cross-country evidence. *Journal of Financial Economics* 112 (1), 116–135.

Hsu, P., Li, F., Nozava, Y. (2018). The Bright and Dark Sides of Financial Derivatives: Options Trading and Product Development, *SSRN Electronic Journal*. DOI: 10.2139/ssrn.3101881

Hu, J. (2014). Does option trading convey stock price information? *Journal of Financial Economics* 111 (3), 625–645.

Jovanović, A., Vukovic, D., and Zakić, N. (2012). Allocation problems of institutional support for regional development financing in Serbia. *Actual problems of economics*, 138 (12), 370-380.

Kochetkov D. M., Larionova V. A., and Vukovic D. B. (2017). Entrepreneurial Capacity of Universities and Its Impact on Regional Economic Growth. *Ekonomika regiona [Economy of Region]*, 13(2), 477-488.

Laeven, L., Levine, R., Michalopoulos, S. (2015). Financial innovation and endogenous growth. *Journal of Financial Intermediation* 24, 1-24.

Li, S. (2015). *Financial Institutions in the Global Financial Crisis: The Role of Financial Derivatives, Bank Capital, and Clearing and Custody Services*. Doctoral dissertation, University of Ljubljana, Faculty of Economics.

Marinč, M. (2013). Banks and Information Technology: Marketability vs. Relationships. *Electronic Commerce Research*, 13(1), 71-101.

Mayordomo, S., Rodriguez-Moreno, M., and Peña, J. I. (2014). Derivatives Holdings and Systemic Risk in the US Banking Sector. *Journal of Banking & Finance, 45*, 84-104.

Michalopoulos, S., Leaven, L., and Levine, R. (2009). *Financial Innovation and Endogenous Growth*. National Bureau of Economic Research, Working Paper 15356, Cambridge, September, p. 1-33.

Nelson, R.R. and Winter, S.G. (1982). *An Evolutionary Theory of Economic Change*. Harvard University Press, Cambridge, MA.

Norden, L., Buston, C. S., and Wagner, W. (2011). *Banks’ Use of Credit Derivatives and the Pricing of Loans: What Is the Channel and Does It Persist under Adverse Economic Conditions*. Erasmus University Rotterdam and Tilburg University. Working Paper.

OECD. (2005). *Oslo Manual. Guidelines for Collecting and Interpreting Innovation Data.* 3rd ed., Eurostat

Pan, J. and A. M. Poteshman. (2006). The information in option volume for future stock prices. *Review of Financial Studies* 19 (3), 871–908.

Petrovic, M., Lukic, D., Radovanovic, M., Vujko, A., Gajic, T., and Vukovic, D. (2017). The “urban geosites” as an alternative geotourism destination – the evidence from Belgrade. *Open Geosciences*, 9(1), 442-456. https://doi.org/10.1515/geo-2017-0034

Preiss, K. (1999). Modeling of knowledge flows and their impact. *Journal of Knowledge Management*, 3 (1), 36-46.

Tang, H. (1999). An inventory of organisational innovativeness. *Technovation*, 19, 41-51.

Thakor, A. V. (2012). Incentives to Innovate and Financial Crises. *Journal of Financial Economics,* 103(1), 130-148.

Vukovic, D., Markovic, D., and Hanic, A. (2016). Snowflake model of regional competitiveness- Evidence from Serbia. *International review*, 1-2 (2016), 59-74.

Vukovic, D.B., Ranisavljevic, D., Hanic, E. (2017) (a). The Challenges of Start-Up Entrepreneurship in Post-Transition Period: Evidence of the Republic of Serbia, in *Insights and Potential Sources of New Entrepreneurial Growth*. Filodiritto Publisher, Bologna (Italy), pp. 336-346. ISBN 978-88-95922-84-3.

Vukovic, D. B., Hanic, E., and Hanic, H. (2017) (b). Financial integration in the European Union — the impact of the crisis on the bond market. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 12(2), 195–210. doi: 10.24136/eq.v12i1.10

Vukovic, D. B., Radulovic, D., Markovic, M., Kochetkov, D. M. and Vlasova, N. Y. (2017) (c). Development of a Financial Framework for the National Plan for Regional Development: The Evidence from Serbia. *Ekonomika regiona [Economy of Region]*, 13(4), 1314-1328. doi 10.17059/2017-4-27

Vyklyuk, Y., Vukovic, D., and Jovanović, A. (2013). Forex prediction with neural network: USD/EUR currency pair. *Actual problem of economics*, 10 (148) /2013, pp. 251-261.