QUARTERLY JOURNAL
OECONOMIA
COPERNICANA

2015 VOLUME 6 ISSUE 3, SEPTEMBER

p-ISSN 2083-1277, e-ISSN 2353-1827
www.oeconomia.pl

Jędruchniewicz, A. (2015). Monetary Policy and Investments in the Polish Economy. *Oeconomia Copernicana*, 6(3), pp. 7-22, DOI: http://dx.doi.org/10. 12775/OeC.2015.018

Andrzej Jędruchniewicz[*]
Warsaw University of Life Sciences – SGGW, Poland

Monetary Policy and Investments in the Polish Economy

JEL Classification: *E31; E32; E52*

Keywords: *monetary policy; interest rates; investment growth; investment structure*

Abstract: *Investments are an important source of development of enterprises and the economy. They depend on many factors. According to most of the major economic schools, an important factor influencing the level and dynamics of investment inputs is monetary policy.*

The main objective of the study is to investigate the influence of monetary policy of Polish National Bank on the dynamics and structure of investments in Poland. Due to the realistic theory of capital, investment changes were assessed primarily from the point of view of the Austrian school. Research methods that were used in this study include deduction and statistical analysis.

In the years 2006-2013, the Polish economy has performed moderately linear relationship between the reference interest rate and the dynamics of investments. Changes in monetary policy led to a disproportionate growth of production of various goods both in periods of better and bad economic situation. Volatility of capital inputs was substantially higher than the production of consumer goods. Also,

Date of submission: March 11, 2015; date of acceptance: July 13, 2015

[*] Contact: andrzej_jedruchniewicz@sggw.pl, Katedra Ekonomii i Polityki Gospodarczej WNE SGGW, ul. Nowoursynowska 166, 02-787 Warszawa, Poland

investments in industries at the early stages of the production structure changed more dynamically than those in sectors that are closest to the consumer. The obtained results confirm the theory of the Austrian School.

Introduction

Investments in fixed assets constitute an essential factor contributing to a growth in competitiveness and innovativeness of enterprises and to economic development of the entire state. They are crucial for establishing new enterprises, accelerating modernisation of the existing ones, producing increasingly technologically advanced consumer goods and, which is of particular interest for most people, for creating new jobs. Overinvestment theories prove that the excessive growth of investments may also cause adverse consequences, *id est* they may create waves of crisis and depression, together with all of their consequences in the economy.

The level and dynamics of investment outlays are subject to many factors. According to most of the contemporary main schools of economics, the crucial factor affecting entrepreneurs' decisions on increasing fixed assets is the monetary policy pursued by the central bank.

The main aim of this study is to analyse the influence of the monetary policy of the National Bank of Poland on the dynamics and structure of investments in Poland. Because of the realistic capital theory, changes in investments will be primarily evaluated from the viewpoint of the Austrian school.

The research period covers the years 2006–2013. This period is sufficiently long to analyse the relationship between the monetary policy and changes in investments and to draw conclusions. This period considers growth and recession trends in the Polish economy.

Research Method

In the methodology of economic sciences there is an on-going discussion on whether the applied methods of scientific research should be directly transferred from mathematical-natural sciences, or whether economics should employ its typical methods. Mainstream economists advocate methodological universalism. The representatives of the Austrian school of economics assert that a methodological dualism is correct. It results from the specificity of economics as a science about human activity and from its different subject of study.

Currently, the economists of mainstream schools verify hypotheses, employing methods based on mathematical formalism (see Jurek, 2013; Czerwiński, 2002). Most economists of the Austrian school repudiate the use of such methods, formulating the following reservations: they disregard plenty of decision-making processes which are subjective, create an illusion of discovering constant quantitative relationships between categories, ignore the problem of sequential processes in time, do not consider all essential variables, consider wrongly measured variables, are wrongly tested, use aggregated data that result in the loss of crucial information (Wiśniewski, 2012; White, 2011; Mayer, 1996; Leszek, 2013).

The research methods applied in this study comply with the methodological stance of the Austrian school represented by most of its representatives. Deductive reasoning and statistical methods were used to quantitatively analyse casual dependences and changes in the structure of the analysed categories.

Monetary Policy and Investments in Theory

"An investment is a change of financial means to tangible goods, services, right to use and patents, thus this is a fixed asset arranged to generate additional income or to save costs in subsequent periods" (Encyklopedia, 1995, p. 387). Another definition defines investments as *"(...) financial or tangible outlays aimed at creating new fixed assets or improving (alteration, outward extension, reconstruction, adaptation or modernisation) of the existing components of the fixed assets, and outlays on the so-called first equipment of the investment"* (Rocznik, 2013, p. 362). In macroeconomics investments also include changes in inventories. This means that their overall level in a specific period may be negative (Begg *et al.*, 2003, pp. 158-161).

Economic investments are subject to a vast number of factors, including but not limited to:

- profitability of business activity;
- level of savings;
- expectations concerning the level of future demand;
- monetary policy and credit action;
- tax policy;
- level of freedom of economic activity and making of contracts;
- development of technological infrastructure;
- efficiency and expertise of public institutions.

One of the key factors affecting the level and dynamics of investment outlays is monetary policy. This general statement is approved by almost all of the mainstream schools of economics. There are, however, fundamental discrepancies in whether this policy affects investments transitionally or permanently, so whether its effects persist for a short or long period.

The most radical is a neo-classical school. It differentiates monetary policy predicted and unpredicted by business entities. It also asserts that those entities formulate rational expectations, that is they correctly predict the future course of events in the economy (see Lucas, 1972, pp. 103-124). For such expectations there is no place for uncertainty in the economy. This is manifestly contrary to the reality in which the future is always uncertain. The hypothesis of rational expectations poorly describes real expectations of entities (*cf.* O'Driscoll & Rizzo, 1996). This results from a logical analysis of human activity and from an empirical analysis (Blaug, 2002, pp. 35-56). Neoclassical economists hold that considering such expectations, the central bank's anticipated policy is completely natural when it does not surprise people and companies. It does not make any effects in the real sphere, hence it does not affect any investments. Only prices adjust to changes in the policy. When the bank's activities are unpredicted, the change in instruments of monetary policy results in changing investments, but only for a short period. In this case, entrepreneurs make a perception error. They do not see that the general level of prices changes, and they only focus on the prices of their products. However, they quickly notice this error. The change in investments was only transitional.

The neutrality of monetary policy in the long period is also proved by monetarism (see Friedman & Schwartz, 1963). This school claims that entities have adaptive expectations. Therefore, although the effective influence of monetary policy on investments lasts much longer than the classical school asserts, those positive effects disappear after a while. The economy returns to balance through the interaction of changes in real global demand caused by changes in real money supply and changes in real remuneration.

The economists from the neo-Keynesian school attempt to prove that monetary policy affects investments in a short and long period of time (Clarina *et al.*, 1999, pp. 1661-1707). This happens even if rational expectations are taken into consideration. A condition for effective actions taken by the central bank is the stickiness of wages and prices in the economy (see Wojtyna, 2000). The stickiness of nominal wages mainly results from making long-term wage contracts, whereas the stickiness of nominal prices is primarily associated with costs of changing the price. The Keynesians also seek the sources of the stickiness of real wages and prices (Snowdon *et al.*, 1998, pp. 317-335).

The Austrian school's point of view on the relationship between the central bank's actions and the investments undertaken is alternative to the mainstream schools' ones. The most important difference in theories of those two approaches is a theory of capital. The mainstream schools hold that capital is homogeneous and they do not give high priority to the role of time in forming capital goods. Whereas, the economists from the Austrian school have an opposite viewpoint. Firstly, they believe that capital is heterogeneous, and hence plenty of investment goods are specific. Secondly, in the economy there exists a temporary production structure. Such a structure means production stages arranged in compliance with a technical process of producing and selling final goods, commencing from initial production factors (labour and land). Capital goods are, therefore, differently separated from consumer goods. According to the Austrians, monetary policy is never natural (see Mises, 2007; Hayek, 1967). An increase in the central bank's interest rate extends (deepens) and widens the production structure through investments. The extension consists in adding by enterprises new and previously non-existent stages to the hitherto production structure of consumer goods. Whereas, the widening refers to the increase of production values at the existing production stages. The existing production growth is not identical at all stages of producing consumer goods. This growth is proportional to the remoteness of medium goods from consumption and to its stability (Skousen, 2011, pp. 321-322). During the recession opposite processes occur. The production structure is shortened (made shallow).

Monetary policy affects investments through a mechanism of transmission of monetary impulses (see Kapuściński *et al.*, 2014). The main channels of the mechanism are an interest rate channel directly associated with the pursued monetary policy, and a credit channel. The reduction in interest rates encourages enterprises to invest through increasing their inclination to invest, and reduces credit costs, which as a consequence increases the value of credits taken by companies. The lower interest rate also leads to a wealth effect and an increase of Tobin's q ratio. At present, the wealth effect emphasizes the role of a financial accelerator that refers to the security of the obtained credits (Bernanke *et al.*, 1999, Vermeulen, 2002).

Monetary Policy in Poland

The decisions made by the National Bank of Poland in the years 2006–2013 primarily aimed at achieving the statutory target of the monetary policy, that is taking care about the stable price level and supporting the gov-

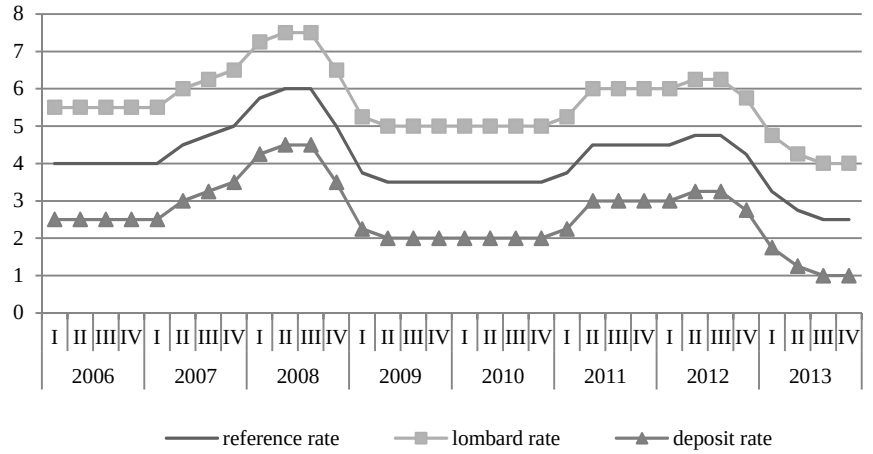
ernment's economic policy (Ustawa, 1997). In 2004 the Monetary Policy Council quantified the generally formulated final target. It considered that the continuous 2.5% inflation target with an admissible fluctuation range of +/- 1 percentage point was in compliance with a fast economic growth and close to the expected reference value for the inflation criterion (Strategia, 2003). The National Bank of Poland, in its activities, also considered an additional target that becomes dominant in the recession period, that is the maintenance of the banking system stability.

In the analysed period the central bank in Poland conducted the adopted final target, using the direct inflation target strategy. This strategy is characterized by: public announcement of a mid-term and quantified inflation target, legal approval of the price stability as the most important long-term target of the monetary policy, implementation of many economic factors in the decision-making process, increased transparency of the monetary policy strategy based on intensive communication with the public and financial markets (objectives and plans of activities of the monetary policy), higher responsibility of the central bank for achieving inflation targets (Koszczyński, 2004, p. 85). This strategy focuses on maintaining the stability of prices in the medium term (Svensson, 1999, pp. 607–654). Consequently, in the short period the central bank may implement the monetary policy to support the government's economic growth policy and to minimize production and employment fluctuations.

The pursuit of monetary policy requires the use of specific instruments. The National Bank of Poland held in the strategy adopted in 2003 and effective in the audited period that: "*The interest rate will be the key instrument necessary to achieve the inflation target. Rates that guide the monetary policy will be a reference rate, lombard rate and deposit rate.*" (Strategia, 2003, p. 20).

In the years 2006–2013 the interest rates of the National Bank of Poland were adjusted to achieve the final target of the monetary policy in the medium period, the level of crediting entities by the banking sector and changes in the real economic sector. In that time the central bank tightened and mitigated its policy twice (Figure 1). The most important rate is a reference rate. The highest rate was in 2008 (6%), and the lowest in 2013 (2.5%). It has also been the lowest rate since the beginning of the systemic transformations in Poland.

Figure 1. Interest rates of the National Bank of Poland

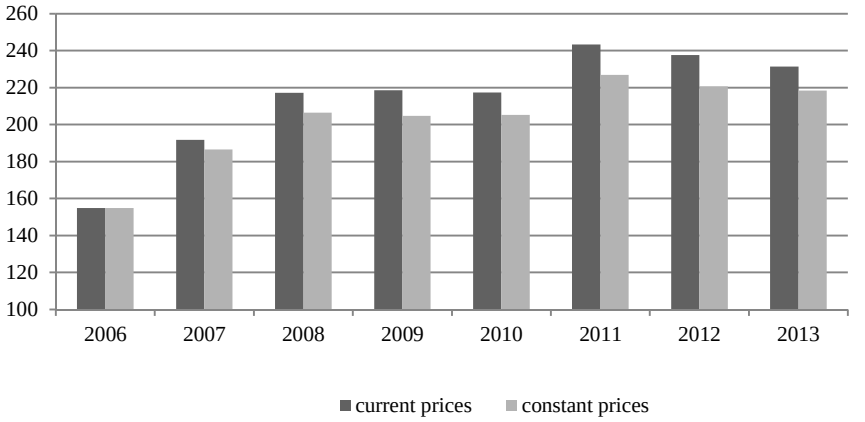


Source: own study on the basis Podstawowe (2014).

Level and Dynamics of Investments

In the analysed period of 2006–2013 the Polish economy investment outlays displayed an increasing trend with its fluctuations (Figure 2). Investments in current prices were close to the values denominated in constant prices from 2006. This provides evidence that inflation is small – in absolute terms – at the early stages of producing consumer goods. Investment outlays – in nominal and real terms – were the smallest in 2006 and the largest in 2011. The average annual nominal value of investments amounted to PLN 214 billion and the real value equalled to 203 billion. The standard deviation was PLN 28.7 billion and PLN 23.1 billion, respectively. In Poland amounts earmarked for accumulation averagely amounted to 15.6% of the gross domestic product on a yearly basis and were four times less than the value of individual consumption.

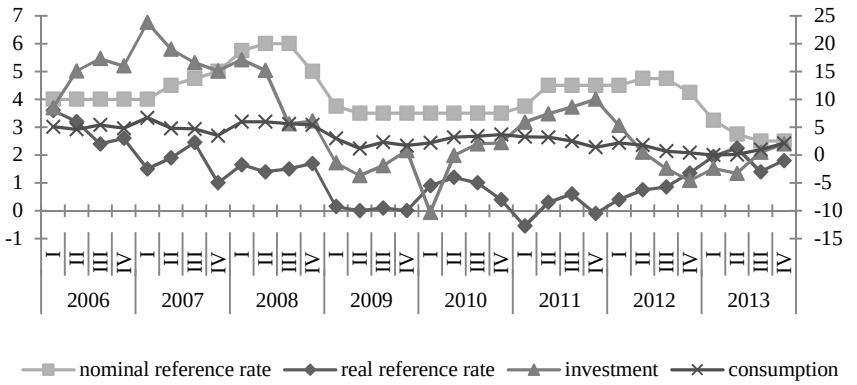
Figure 2. Investment outlays in Poland in billion PLN



Source: Wskaźniki (2014) and own calculations.

Most schools of economics agree with the opinion that the monetary policy affects investments in the short period. In order to explain real changes, there is no need to consider the neo-classical school's theory, as it accepts rational expectations that are contrary to entrepreneurs' conduct, and assumes the full flexibility of wages and prices. The analysis of data shown in Figure 3 leads to conclusions concerning the relationship of the analysed categories in Poland. It is evident that the dynamics of investments change on a cyclical basis. It complies with the monetarism theory, neo-Keynesian school and Austrian school. In the analysis of changes in investments the theory focuses on the effect of the real interest rate. The provided data, however, show that changes in the nominal rate more considerably affected the accumulation rate than changes in the real rate. In the years 2006–2013 for the analysed categories the Pearson correlation coefficient was the greatest when investments were delayed by 6 quarters and equalled -0.55. This means that the depending force was moderate (*cf.* Mojon *et al.*, 2002, pp. 2111–2129). In the real economy it is hard to expect a close relationship between the analysed categories. What is crucial here is that the National Bank of Poland always decreased interest rates before the upward trend of the cycle (*cf.* Warżała, 2014, pp. 119-136). A minor significance of the real rate is explained by the fact that entrepreneurs have an illusion of money and difficulties in considering inflation expectations for consumer goods. The economists of the Austrian school emphasize that it is pointless to consider a general level of prices as entities have subjective expectations concerning prices for specific goods and services.

Figure 3. Reference rate of the National Bank of Poland (left axis) and annual dynamics of investment and consumption in % (right axis)



Source: Wskaźniki (2014) and own calculations.

The representatives of this Austrian school believe that the theory of this school better explains the behaviour of investments than theories of other schools. This particularly refers to the reason for a downturn phase and changes in this category in the recession period. The Austrians stress out that the aggregated values on which the mainstream schools are based are a source of a little and frequently erroneous knowledge of changes in the economy as they conceal essential processes and valuable information. They also emphasize that relative changes in economic categories, not absolute ones, are crucial in the economy. By using the temporary production structure, the economists of the Austrian school hold that the central bank's active policy in the system of fiduciary money the dynamics of investments are greater than the production of consumer goods as they are at the earlier stages of the production process.

This school's theory is proved by the data shown in Figure 3. In Poland, in the analysed years 2006–2013 the dynamics of investment outlays were considerably greater than the dynamics of consumer goods. The average annual investments increased by 6% and consumption by 3.2%. The Austrians' assertions are also proved by the variability of the analysed categories. The standard deviation from investment outlays amounted to 8.3 percentage points, whereas from consumer goods – 1.9 percentage points. During upward trends of the cycle the growth rate of investments was greater, whereas during recession it was smaller than consumer goods' one. Only changes in 2010 did not comply with this theory.

The monetary policy does not completely explain changes in the level of investments, as they are subject to numerous factors. A particularly important factor is systemic conditions established for entrepreneurs by the state. They reduce costs of pursuing business activity. In the analysed period, the upward trend of investments in Poland was affected by a better quality of administrative regulations and increase in economic freedom (Table 1). The World Bank's Doing Business 2015 (2014) report shows that in the years 2013/2014 the worst situation pertained to investment and construction processes and tax law. Good conditions for business encourage not only domestic companies, but also foreign ones to invest.

Table 1. Conditions for pursuing business activity in Poland (% compared to the best result in the world)

	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14
Starting a business	64.4	66.4	81.7	81.8	81.9	82.3	85.8	85.8
Obtaining building permits	44.9	45.2	45.3	45.4	56.5	60.6	63.0	63.0
Registration of ownership	54.0	54.1	54.1	61.5	61.5	77.2	80.2	80.3
Enforcing contracts	56.9	56.9	56.9	56.9	56.9	65.0	64.8	64.8
Bankruptcy and Reorganization Law	36.3	36.7	36.7	38.6	33.9	58.7	68.6	69.7
Index of Economic Freedom (pts.)	59.3	58.1	60.2	60.3	63.2	64.1	64.2	66.0

Source: Doing (2007–2014), Masior (2014), Index (2014).

Investment Structure in Polish Economy

The Polish statistics divides outlays on fixed assets into three types of investments: buildings and structures, machinery, equipment and tools, and transport equipment (Rocznik, 2013). In the years 2006–2013 they averagely include 97.7% of all investments in a given year. The largest part of investment outlays generally pertained to buildings and structures (Table 2). Each year this share was over 50%. In absolute terms, those outlays constantly increased until 2011, when they reached the largest value in constant prices – PLN 126.3 billion. In terms of its significance, the second kind of investments was outlays earmarked for machinery, equipment and tools. They equalled to 32.9% (PLN 66.6 billion) of all investments in the

Polish economy on an annual average. In relative and absolute terms the least significant was outlays on transport equipment. They were averagely five times less than investments in buildings and structures. They averagely amounted to 10.9% of investment outlays.

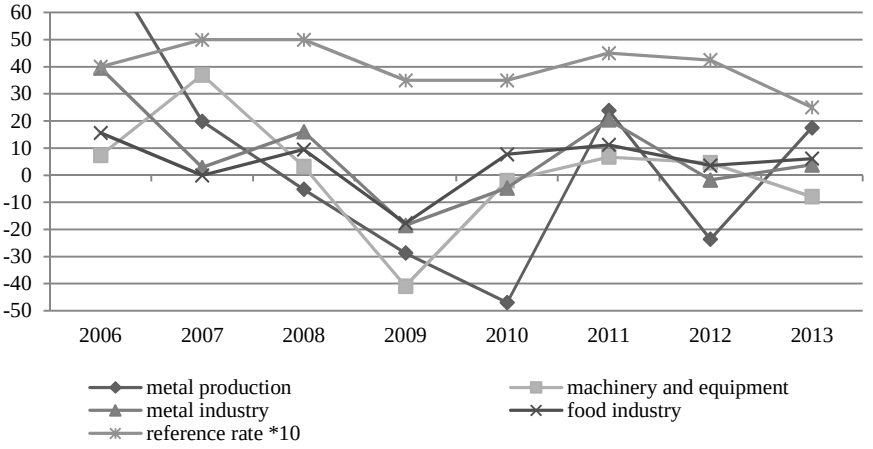
Table 2. Investment structure in Poland

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Structure in bn zlotys (constant prices)								
Buildings and structures	81.1	95.1	104.0	112.1	115.5	126.3	123.5	118.1
Machinery, equipment and tools	52.9	64.8	74.3	67.0	61.5	70.7	69.5	71.8
Transport equipment	17.6	23.2	24.7	20.4	22.5	24.1	21.4	23.1
Structure in %								
Buildings and structures	52.4	51.0	50.4	54.7	56.3	55.7	56.0	54.1
Machinery, equipment and tools	34.2	34.8	36.0	32.7	30.0	31.1	31.5	32.9
Transport equipment	11.4	12.4	12.0	10.0	11.0	10.6	9.7	10.6

Source: Środki (2013), Wskaźniki (2014) and own calculations.

The mainstream schools do not sufficiently appreciate the stability of capital goods. The Austrian school does not have one view on this issue, as well. For Rothbard (2007, p.103) the only solution of this problem is to discount the value of future services. Whereas, for other Austrians the stability of goods has a more complex influence on the production structure, hence on entrepreneurs' decisions. Besides the interest rate a depreciation rate of the fixed asset is also essential for the decision on investment. *"A lower rate of value loss means that the economy needs fewer fixed goods ..."* (Skousen, 2011, p. 203). Therefore, entrepreneurs, making decisions on investments characterized by a specific stability level, must consider a useful life of the fixed asset and a subjectively estimated interest rate to be in such period.

Figure 4. Reference rate and annual dynamics of investment structure in %



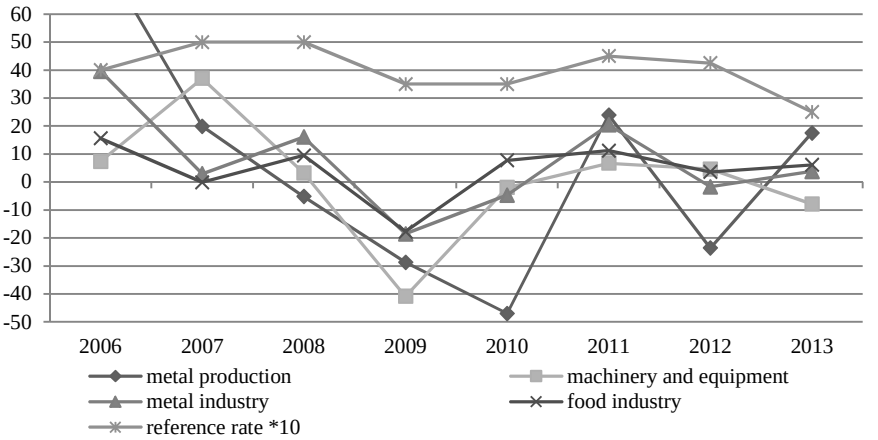
Source: Wskaźniki (2014), Podstawowe (2014) and own calculations.

According to Rothbard's approach at changes in interest rates investment outlays on buildings and structures should be the most dynamic and for transport equipment – the least. The data in Figure 4 show that in the years 2006–2013 the dynamics of investment structure were completely different in the Polish economy. The standard deviation (average is not relevant at positive and negative changes) from outlays on buildings and structures amounted to 7.7 percentage points, for machinery, equipment and tools was 12.2 percentage points, and for transport equipment equalled to 16.9 percentage points. The variability of investments, therefore, cannot be explained by the change in the reference rate of the National Bank of Poland. In addition, two issues need to be considered. The first issue is a depreciation period. According to the data shown in Figure 4, the dynamics of investments are opposite to the useful life of the fixed asset. Secondly, changes in the central bank's rate might differently affect the anticipated interest rate to be in various periods corresponding to the useful life of fixed assets.

The contemporary mainstream schools of economics renounce the theory of temporary production structure, whereas for the Austrian school this theory forms the basis for analysing cyclical changes in the economy resulting from changes in the monetary policy. According to this theory, the dynamics of investment outlays at individual stages refer to the distance from consumption on a directly proportional basis. The analysis of data on investments in four selected industries arranged in accordance with the technical process of production of consumer goods prove the Austrian school's

theory (Figure 5). Directions of changes in investments in industries are consistent with the cycle's phases in Poland. The variability of investments in industries completely complies with their distance from the consumer. The standard deviation from outlays on fixed assets in the metal production industry amounted to 40.4 percentage points, 21.4 percentage points in the machinery and equipment production industry, 17.8 percentage points in the metal industry, and 10.1 percentage points in the food industry. The dynamics of investments in the food industry was also characterized by the least variability co-efficient (226%). This means that the standard deviation was more than twice the average one (Sobczyk, 2006).

Figure 5. Annual changes in investments in industries producing goods in %



Source: Rocznik (2013), Biuletyn (2014), Podstawowe (2014) and own calculations.

Conclusions

Among the main schools of economics monetarism, neo-Keynesian school and Austrian school indicate that the monetary policy is a crucial factor affecting the dynamics of investment outlays in a short and long period of time. They provide various reasons for neutrality of money. The monetarists refer to the role of adaptive inflation expectations and wage negotiations. The Keynesians prove that even for rational expectations, the leading role in the economy is played by the stickiness of wages and prices. Whereas, the Austrian school emphasizes the significance of homogeneous

capital and time in the influence of the central bank on investments. Therefore, this enables the analysis of changes in investments in industries at various stages of the temporary production structure.

In the Polish economy, in the years 2006–2013 investment outlays were growing and annual dynamics were variable. The study proved a moderate linear relationship between the reference rate and the dynamics of investments. This is understandable. From the viewpoint of the Austrian school, the most essential is monetary impulses of the central bank before investment changes. Such impulses have occurred in Poland. The theory of the Austrian school was also confirmed with respect to the non-proportional dynamics of the production of various goods. The variability of investment goods was considerably higher than consumption goods' one.

The conducted analysis leads to conclusions that also refer to changes in the structure of investments in Poland. The largest variability referred to outlays on transport equipment, then on machinery, equipment and tools, whereas the smallest one applied to buildings and structures. On the other hand, the research on the dynamics of investments in industries proved that in the years 2006-2013 the outlays on fixed assets were the most variable in the metal production sector, and the least variable in the food industry. This proves the Austrians' thesis that the dynamics of investments are the greatest at the earlier stages of the production structure.

References

Begg, D., Fischer, S., Dornbusch, R. (2003). *Makroekonomia*. Warszawa: PWE.

Bernanke B. S., Gertler M., Gilchrist S. (1999), The Financial Accelerator in a Quantitative Business Cycle Framework. In J. B. Taylor, M. Woodford (Ed.), Handbook of Macroeconomics. Amsterdam: Elsevier.

Biuletyn Statystyczny (2014), Warszawa: GUS.

Blaug, M. (2002). Ugly Currents in Modern Economics. In U. Mäki (Ed.), Fact and Fiction in Economics, Cambridge: Cambridge University Press. http://dx.doi.org/10.1017/CBO9780511493317.003.

Butos, W. N. (2006). Money, Prices, and Capital: An Austrian Approach to Macroeconomics. *Quarterly Journal of Austrian Economics*, 4(9). http://dx.doi.org/10.1007%2Fs12113-006-1020-2.

Clarida, R., Gali, J., Gertler, M. (1999). The Science of Monetary Policy: A New Keynesian Perspective. *Journal of Economic Literature*, 2(37). http://dx.doi.org/10.1257/jel.37.4.1661.

Doing Business (2007-2014). Retrieved form http://www.doingbusiness.org/ (23.11.2014).

Encyklopedia biznesu (1995), t. 1. Warszawa: Fundacja Innowacja.

Friedman, M., Schwartz, A. (1963). *A monetary history of the United States 1867-1960*. Princeton: Princeton University Press.

Hayek, F. A. (1967). *Prices and Production.* New York: Augustus M. Kelly.

Index of Economic Freedom (2014). Retrieved from http://www.heritage.org/index/visua lize (23.11.2014).

Jurek, W. (2013). O matematycznym podejściu do problemów ekonomicznych, *Studia Oeconomica Posnaniensia*, 1(250).

Kapuściński, M., Łyziak, T., Przystupa, J., Stanisławska, E., Sznajderska, A., Wróbel, E. (2014). Monetary policy transmission mechanism in Poland. What do we know in 2013?, Working Paper No 180. Warsaw: NBP.

Kokoszczyński, R. (2004). *Współczesna polityka pieniężna w Polsce.* Warszawa: PWE.

Leszek, P. (2013). Matematyka: język fizyki w dobrej służbie ekonomii? *Studia Ekonomiczne. Economic Studies*, 1(LXXVI).

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

Masior, M. (2014). Komentarz do wyników rankingu Doing Business 2015 dla Polski. Analiza FOR nr 13. Retrieved from http://www.for.org.pl/pl/a/3276,Analiza-FOR-132014-Komentarz-do-wynikow-Doing-Business-2015-dla-Polski (23.11.2014).

Mayer, T. (1996). *Prawda kontra precyzja w ekonomii*. Warszawa: Wydawnictwo Naukowe PWN.

Mises, L. von (2007). *Ludzkie działanie. Traktat o ekonomii*. Warszawa: Instytut Ludwika von Misesa.

Mojon, B., Smets, F., Vermeulen, P. (2002). Investment and monetary policy in the euro area. *Journal of Banking & Finance*, 11(26). http://dx.doi.org/10.1016/S0378-4266(02)00202-9.

O'Driscoll, G. P., Rizzo M. J. (1996). *The Economics of Time and Ignorance*. London-New York: Routledge.

Podstawowe stopy procentowe NBP w latach 1998 – 2013 (2014). Source http://www.nbp.pl/home.aspx?f=/dzienne/stopy_archiwum.htm (22.11.2014).

Rocznik Statystyczny Przemysłu (2013). Warszawa: GUS.

Rothbard, M. N. (2008). *Ekonomia wolnego rynku*, t. 3. Warszawa: Fijorr Publishing.

Skousen, M. (2011). *Struktura produkcji. Giełda, kapitał, konsumpcja.* Warszawa: Fijorr Publishing.

Sobczyk, M. (2006). *Statystyka. Aspekty praktyczne i teoretyczne*. Lublin: Wydawnictwo Uniwersytet Marii Curie-Skłodowskiej.

Snowdon, B., Vane, H., Wynarczyk, P. (1998). *Współczesne nurty teorii makroekonomii*. Warszawa: Wydawnictwo Naukowe PWN.

Strategia polityki pieniężnej po 2003 r. (2003). Warszawa: NBP.

Svensson, L. E. O. (1999). Inflation targeting as a monetary policy rule. *Journal of Monetary Economics*, 3(43). http://dx.doi.org/10.1016/S0304-3932(99)00007-0.

Środki trwałe w gospodarce narodowej w 2012 roku (2013). Warszawa: GUS.
Vermeulen, P. (2002). Business fixed investment: evidence of a financial accelerator in Europe. *Oxford Bulletin of Economics and Statistics*, 3(64). http://dx.doi.org/10.1111/1468-0084.00020.
Warżała, R. (2014). Morfologia cykli koniunkturalnych w Polsce. *Ekonomista*, 1.
White, L. H. (2011). *The Methodology of the Austrian School Economists*. Auburn: The Ludwig von Mises Institute, Auburn University.
Wiśniewski, J. B. (2012). Metodologia austriackiej szkoły ekonomii: obecny stan wiedzy. Retrieved form http://mises.pl (12.11.2014).
Wojtyna, A. (2000). *Ewolucja keynesizmu a główny nurt ekonomii*. Warszawa: Wydawnictwo Naukowe PWN.
Wskaźniki makroekonomiczne (2014). Source http://stat.gov.pl/wskazniki-makroekonomiczne/ (23.11.2014).
Ustawa z 29 sierpnia 1997 r. o Narodowym Banku Polskim, Dz. U. 1997, nr 140.