



Analyses the Effect of Monetary Policy Transmission on the Inequality in OECD Countries

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Abstract

The aim of this article is to analyze the inequality impacts of monetary policy transmission in OECD countries' economy from 2001 to 2017. Panel regression model has been applied for the hypotheses test. Information gathering has been based on the country's basic information, i.e the data required for research are generally derived from the library method, using the World Bank website. The econometric method used in this research, is Generalized Torque Method. Dependent variable Gini coefficient index is considered as an indicator of income inequality and independent variables of monetary transfer mechanisms include interest rates, liquidity, exchange rates, the gold price, the legal reserves of the central bank and the banks' debt to the central bank. The results show that the interest impact of monetary transfer mechanism at the Gini coefficient as an indifference index in OECD countries is positive and insignificant (probability is 0.18) with a coefficient of 0.004 and it shows that raising interest rates will increase the inequality in these countries. Additionally, the effect of the capital market on the inequality is also positive with a coefficient of 0.001 and a significant probability of 0.002. It shows the positive effect of bank deposits on income inequality.

Keywords: Monetary Policy Transmission, Inequality, OECD countries

1 Introduction

Suitable macroeconomic policies have different outlets on income distribution. Monetary policies and its transition mechanisms are among the most important parts of the impact on poverty and the distribution of income (1). The goals of the mechanism of monetary policy transmission are to grasp its aims, for instance, manageable economic growth and producing a stable price (2). The understanding of how monetary policy works and the way it impacts the economy is a key factor to stabilize multiple economic aspects (3). Monetary authorities have various instruments to implement the monetary policy. Generally speaking, these instruments are divided into two groups: direct and indirect or qualitative and quantitative (4). The effects of using each instrument in controlling the money stock and subsequently achieving the monetary policy goals are different. Indirect instruments of monetary policy are:

1- Bank reserves ratio: it has lower flexibility than other monetary policy instruments and the use of it can lead to a disturbance in the banking system. For this reason, it is usually recommended to use this instrument for long-term fluctuations in the supply of money, not the short-term ones. Frequent changes in the above-mentioned ratio may encourage the banks to keep additional surplus to be able to neutralize monetary controls. Also, the banks lose one part of the interest of loan that is granted to the private sector by increasing of bank reserves ratio. Under such circumstances, the banks may take action to achieve the

intended profit for transferring the tax burden to depositors and borrowers. This will lead to a separate monetary mechanism which cannot be controlled easily by monetary authorities and decreases the performance range of the intended instrument to some extent (5).

2- Rediscount rate: it controls the money supply indirectly. Its advantage is that its changes by the central bank can quickly be effective on the interest rate. Another advantage of this instrument is that it influences the power of banks in granting credit. Hence, its effects are more comprehensive than other instruments. At the same time, the use of this instrument can have side effects on the profit of commercial banks too.

3- Open market operations: it is an effective method to control money supply in countries that have developed securities and money markets. Flexibility in the degree of the central bank intervention in the money market, its period and developing the money market through demand increase, are some advantages of this instrument. Moreover, the exchanges in this field based on the predetermined market rate are voluntary and do not have tax effects, unlike the bank reserves ratio. But in the central bank state, it is the decision-maker just at the time of buying the securities. The use of this instrument helps control the credits which are granted by banks to people and institutions to some extent. Change in the commission of various bank operations is one of the effective methods to control the volume of granted credits by banks from the demand side.

Determining the maximum profit has a considerable effect on

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financial sources of the banking system and as a result the volume of their granted credits via its effects on savings and deposits of the private sector (6). Although direct control of credits can be effective in preventing extension of credit in the short-term it may have some expenses in terms of resource allocation. This is because determining the credit line decreases the competition among the banks in granting loans and facilities. Besides, credit rationing prevents free cash flow in the economy and decreases its efficiency. Determining the credit line due to not fulfilment of business opportunities can be led to the formation of markets that are not under control by the central bank.

Despite the disadvantages of direct tools of monetary policy, these instruments are still be applied after the indirect instruments are introduced. One of the reasons for more efficiency of indirect instruments is that they prevent the growth in unofficial sectors that diminish the share of financial assets controlled by the central bank, unlike direct controls. As indirect instruments act via the market, they create more effectiveness in the use of the monetary policy. To achieve the monetary policy goals, a mix of its instruments is usually used. This mix depends much on the degree of development and extension of the monetary and money markets. Empirical evidence reveals that open market operations in advanced countries which have developed money and capital markets have more efficiency than other instruments. But in developing countries, several instruments are usually used to control the money supply because of the lack of efficient money and monetary markets. In these countries, the government's lending from the central bank for supplying the budget deficit and absence of independence of the central bank on the one side and high influence of the global conditions on economy of such countries on the other side have been led to some difficulties for monetary authorities in controlling and directing the monetary base. Due to this issue, successful implementation of the monetary policy in achieving the intended objectives is faced with many problems such as high inflation rates, production volatilities, increased unemployment, and unequal income distribution even if a favourable mix of various monetary instruments is selected. According to the above information, the goal of this study is the analyses the monetary policy impact transmission on the inequality in OECD countries.

2 Literature review

Economists have long paid attention to inequality, as researchers have considered the association among inequality and economic growth. Inequality exceeds its social aspect and affects the performance of the economy. Kuznets (7), notably paid attention to a reversed U-shape among economic growth and inequality. Piketty and Saez (8), noticed when the output growth is less than return on capital, inequality rises. There is extensive practical help for the concept that higher imbalance of income supply might decrease growth of economic and damage its sustainability (9-15), documented the benefits of lower inequality for human capital. Other studies distinguished between emerging and developed countries regarding the association between economic growth and inequality (16, 17).

Nonetheless, this theory is about to change, for the value of central banks themselves and under new limitations. The primary contravention in the conventional way of defines has been established through the inadvertent redistributive outcomes of the unconventional monetary policy, like income shift from depositors to debtors because of lower interest rates (18), and

expanding wealth inequality with rising benefit of portfolio investments(19) and (20). However, several economists argue that this is for the larger public good, as the positive impacts of quantitative easing exceed the possible negative effects (19). According to Draghi (2015), advocated the quantitative easing systems maintaining that inequality would have been even greater in their lack. Besides, Bernanke (6) described that the Feds monetary policy supported economic growth and job creation, which favor mostly the middle class, but accepted that easy monetary policy increased asset prices, that are owned mainly by highest income households. Also, the study by Stiglitz (21) maintains that the method monetary policy has already been carried out has asymmetric impacts: it seems that workers do not make up in the recovery what they lose in the downturn.

Via perceiving that the individual's income relies on efficiency which peaks at maturity, Bullard (22) began his study of the association between monetary policy and income inequality. Productivity is low at the starting of working life and retirement and as a result, income is decreased. The scholar observes that income must be calculated for the individual whole life, and it cannot be based on a moment in time. He inferred that quantitative easing enhanced equity prices, but had no harmful influences on inequality as wealth is transferred to future generations. Brounen, Koedijk (23), specified the lower households' tendency to keep for older people and this could change across generations remarkably.

This somewhat revised tenet is being challenged for several reasons in the aftermath of the crisis. There exists growing evidence that inequality before the crisis gave rise to (aggravated) the financial crisis (24-26). The pattern of capitalism is switching again in support of re-adjust for stance the banking sector, and economic knowledge itself is examining its restrictions and writing its handbooks again. The latest equilibrium is low for long, and, as IMF (2016) is placing it today. There is a mixture of deleveraging, low inflation, high-indebted, recession, high inequalities, fewer opportunities, high structural pressure. Also, long-run money neutrality may be argued faster. Other central banks guidelines might affect income and wealth distribution except for the unconventional monetary policies. Capital account liberalization (if conducted very quick and in the absence of backstops) increases inequality and raises the risk of inequalities (27). Inequality is increased as a result of too high or too low inflation rates. Monnin (28) noted that lower inequality is the result of higher inflation rate, but only up to a certain point. By means of data for the US economy, the study by (29) has been showed that wealth is distributed again from banks to borrowers via when there is a inflation fluctuations, the liabilities and assets are declining real value. When the inequality is rising, the interest rate in high. According to Rognie and Auclert (30), the finding has been shown that there is three channel of monetary policy impacts on the consumption of household including: interest rate exposure, earning heterogeneity, and unexpected inflation. It is well documented that interest rate exposures facilitate the monetary policy transmission. (31, 32) inferred that monetary policy has a direct effect on households' disposable income when loans have changeable interest rates.

Highly indebted households modify their consumption to the shifts in interest rates. The researchers assume that when households are indebted and have mortgages with modifiable interest rates, monetary policy has a robust effect on the real economy. Also, inequality is raised due to high volatility in

exchange rates, particularly when households are indebted in a foreign currency that is a recurrent case in developing Europe outside the euro area.

Financial instability increases inequality too. By extending the study with the financial stability aim of the central banks, Masciandaro and Passarelli (4), noticed the trade-off among price and financial stability. The researchers concluded that both have redistributive implications. However, policies of central banks are segment of a policy combination, altogether with structural, fiscal, and budgetary guidelines. In another study, Ball, Furceri (5) concluded that fiscal merging increases inequality via higher unemployment and lower salaries. Also, indebted households have a low size to attract wage cuts when the economy joins into recession (33). The researchers considered that lower disposable income balances the drop of debt service even if decreasing interest rates reduce the debt burden for households. Therefore, the attempts of high-indebted households to deleverage throughout slump are endangered by decreasing disposable income. Alternatively, times of robust growth of credit were related to higher asset prices, contributing to a rise in debtors' wealth. d'Alessio and Iezzi (34), point out that over indebtedness gives rise to social deprivation and poverty and might even result in instability in the financial system. Based on the study of (35), the periods of robust income growth for the highest wealthy households, occurred with sizable growth of indebtedness for the rest of the people could stimulate financial crisis. According to (22), the income inequality is lower than wealth inequality, and subsequently the consumption inequality is lower than the wealth inequality. Also, through having access to credit markets to use extra on debt when people are still young and they make low income, resulted in smooth consumption among this group throughout their lifetime.

3 Effectiveness mechanisms of monetary policies

The main phenomenon of expansionary monetary policy is inflation. (36) stated that using the expansionary monetary policy particularly in the short run will upsurge the price level and impacts on household's income. Negative effects of expansionary monetary policy on income distribution have relatively been confirmed in all other studies as well. One of the dominant theories on the association between money growth and the general price level is quantity theory of money that was proposed as a referable rule by classical economists including David Ricardo in the 19th century. According to this theory, the general price level is changed proportionally to changing of the money stock. This viewpoint presumes that the velocity of money and the volume of the production are fixed. However, the developing of money theories questioned the assumption of the fixed velocity of money. New theoreticians of this school consider the concept of sustainability of velocity of money instead of its stability because the factors which change it act slowly so that its changes are predictable and identifiable. Inflation is created when the monetary reserve is increased considerably faster than production.

Exploring the behavior of inflation and money stock growth in many countries indicates that experience of high inflation rates in these countries has been accompanied by the high growth of money stock (37). However, the viewpoint of Keynesians and monetary theoreticians about the inflation method is not so different. Both consider that high inflation rates are the outcome of the high growth of monetary reserve. Thus, if inflation is

conceived as a rapid and continuous increase in prices, majority economists approve that with Friedman's idea that inflation can be considered a monetary occurrence everywhere. Hence, three types of inflation are separable: cost-push inflation, demand-pull inflation, and budget deficit inflation via borrowing from the central bank (money issuance). About production cost inflation, it has been argued that cost-push inflation is considered a monetary occurrence as well since, in this state, the government increases demand to prevent production decline and employment level.

3.1 Monetary policy and interest rate

According to classical economists, monetary policy is not effective on the real interest rate. Although cash injection in the economy may decrease the interest rate for a short period, this probably raises the price level.

In contrast, Keynesians believe that fluctuations in the supply of money are led to changes in the interest rate. Following the appearance of unemployment, prices and money wages are decreased. If money stock is not decreased in reaction to such conditions, the monetary reserve surplus will decrease interest rate which will encourage investment and the economy returns to full employment as domestic investment is one of the key determinants of economic growth and flourishing (38). From this viewpoint, adjustments in the supply of money will have permanent impacts on the real interest rate. Effects of monetary growth on interest rate depend on whether the monetary policy is permanent or temporary (Meltzer, 1995). If changes of the monetary reserve are permanent, four types of effect can be explained: the effect of granting loan, liquidity, income impact and price expectations.

Real and nominal interest rates are reduced because of the development of granting a loan. Based on the liquidity impact, reduction of interest rate is essential for money market settlement by assuming that price level and income are fixed following the increase of monetary reserve. As a result, the income effect of reducing nominal and real interest rates is led to income increase. If it is assumed that no change is created in real variables by executing the monetary policy, the nominal interest rate is expected to be increased equal to the effect of price expectations. But if money growth is changed temporarily, no change is expected at the general price level. In this state, money effects on the interest rate are similar to its permanent effects. The difference is that the expected effects of price are neutralized. Thus, if temporary effects of the expansionary monetary policy are accepted, inflation effects of these policies are modified via wage change and will not finally have any effect on the employment level and poverty adjustment in the long term.

3.2 Credit policies

Extension of credit is one of the determinants of final demand. Developing domestic productions in response to changes in total demand via bank credits and capital markets depends on the economic structure. Potential domestic supply, employment status, degree of use of capital, technology level and degree of replacement of import goods instead of domestic productions in total demand are all effective on the effectiveness of credit policies on production and employment.

When there is unemployment, increasing of domestic credits through demand stimulation and at the same time its effect on the interest rate can develop employment provided that increasing of

prices is not responded via supplying of import goods and other manufacturing restrictions are not disclosed. About the countries that do not have active and organized markets, the role of credit allocation in the process of manufacturing and employment is more important. The manufacturing sectors in such economies mainly act in small scales and these units use unofficial credit markets to supply cash working capital due to inefficiency of the market mechanism in credit allocation. Naturally, they will be faced with higher interest rates than the official markets. Hence, increasing of cost of supplying short-term financial resources encounters these sectors with reduced competitiveness and is often led to their bankruptcy which often creates jobs and has a major role in earning money of low-income groups.

Effectiveness paths of monetary policy on real variables can be divided into channels of interest rate changes, fluctuations in asset prices, and credits volume. Monetary policy from the path of change in asset prices is usually effective on total demand through the impact of foreign exchange rate on net export (wealth effects and Tobin's Q theory). Domestic deposits (in terms of domestic currency) will have less attraction than other deposits (in terms of foreign currencies) due to the reduction of real interest rate following the expansionary monetary policy and their value is decreased relatively. This weakens the domestic money. Under such circumstances, net export and production are expected to be increased. Depending on how employment elasticity in the export sector and totally in production is, the effect of this mechanism on poverty will be different. Small enterprises which are exposed to more financial constraints (at the same time, they include the main part of the poor labor force) are more influenced by the monetary policy from the channel of increased credits (39, 40).

Increasing expected prices at the time of frequent use of expansionary monetary policy is led to an unpredicted increase in prices. The power and motivation for lending are raised under such conditions. Finally, the impact of monetary policy on the liquidity of households is one of the effective paths of monetary policy on real variables. Although most of the discussion on the effect of credits has been focused on business expenses, they are as important as the monetary policy effectiveness. Expansionary monetary policy can increase the stock price and thus, the worth of financial assets. In this state, consumers' durable goods expenditure like the building is raised. Of course, this effect is converse for households who keep their assets in cash (mainly poor groups) because of their decreased purchasing power of assets. If the resultant of these effects is positive, the investment will be increased by increasing the expenditure on durable goods and as a result, expansionary monetary policy will raise total demand. Many economists believe that channel of credits is more important in influencing the economic variables.

4 Empirical Specification and Data

In this study, the type of study is of an applied type; accordingly, a multivariate linear regression model has been applied for the hypotheses testing. The econometric model of this study based on the Inui, Sudou (41), show the impact of monetary policy transmission on the inequality as following:

$$Gini_{it} = \alpha_0 + \alpha_1 er_{it} + \alpha_2 financialMarket_{it} + \alpha_3 Gold_{it} + \alpha_4 Liquidity_{it} + \alpha_5 Reserves_{it} + \alpha_6 Monetary_{it} + \varepsilon_{it} \quad (1)$$

Which Gini, the dependence variable, is the Inequality index and other variables are transmission monetary policy indices like interest rate (*er*), stock return of financial market (financial Market), gold price (Gold), Liquidity or money volume (Liquidity), International Reserve of central bank (Reserves) and Monetary policy. The statistical method utilized in this research is the panel data method of OECD countries. Information gathering has been based on the country's basic information, i.e information and the data required for research are generally derived from the library method, using the World Bank website (WDI). The econometric method used in this research, Generalized Torque Method (GMM) which in this way equations that estimate their unobservable effects in each country and the existence of a dependent variable in the explanatory variables is a fundamental problem the generalized estimator (GMM), which is based on dynamic panel models, is used. This technique is necessary to evaluation the model using of this method first, the variables that are used in the model are specified. The GMM estimator compatibility is validated by the hypothesis that the error statements are not auto-correlated and the tools depend on that can be tested by dual tests specified by (42). The first test of the Sargan test is from predetermined limits which test the validity of the tools. The second is M which tests the existence of second-order serial correlations in first-order difference-difference errors. Dependent variable Gini coefficient index which is an indicator of income inequality and independent variables of monetary transfer mechanisms consist of: interest rates, liquidity, exchange rates, the gold price, the legal reserves of the central bank and the banks' debt to the central bank. The study period is from 2001 to 2017.

5 Empirical results and discussion

Before estimating the model, in this part the trend of some variables like Gini index as inequality in some countries of OECD and some variables of transmission monetary policy as liquidity and central bank liability of OECD will be following. As Figure1. Shown the index as inequality in some countries of OECD, most of the countries are in range of 0.25 to 0.4. In the next figure, it showed the liquidity index as a transmission monetary policy. As shown in Figure 2, liquidity index as a transmission monetary policy in some countries of OECD, this index is increasing in this period. The next figure, it shown the Central bank liability index as a transmission monetary policy. As shown in Figure 3. Central bank liability index as a monetary policy transmission in some countries of OECD; Source, this index in some countries like Netherland is increasing.

5.1 Stationary test

The usual methods of econometric studies in empirical work are based on the assumption of the Stationary factors; because there is a possibility that the estimate is false with non-invariant variables and citing the results of such estimates will lead to misleading results (43). In this study, Levin Lin Chu's statistics were used. Brief of the finds of this test, assuming the factors of the trend and width of the source, it is presented in Table (1). Based on the finds of this table and the calculated probability levels, it is concluded that all variables are monitored at the level.

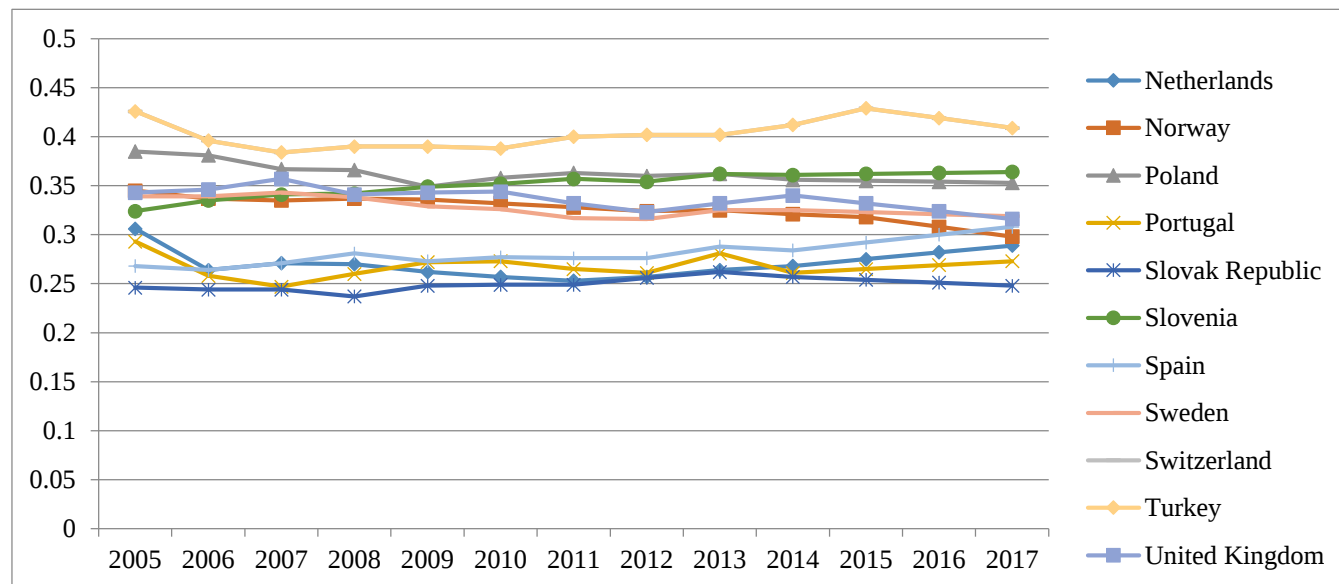


Figure 1: Gini index in some countries of OECD; Source; WDI 2019

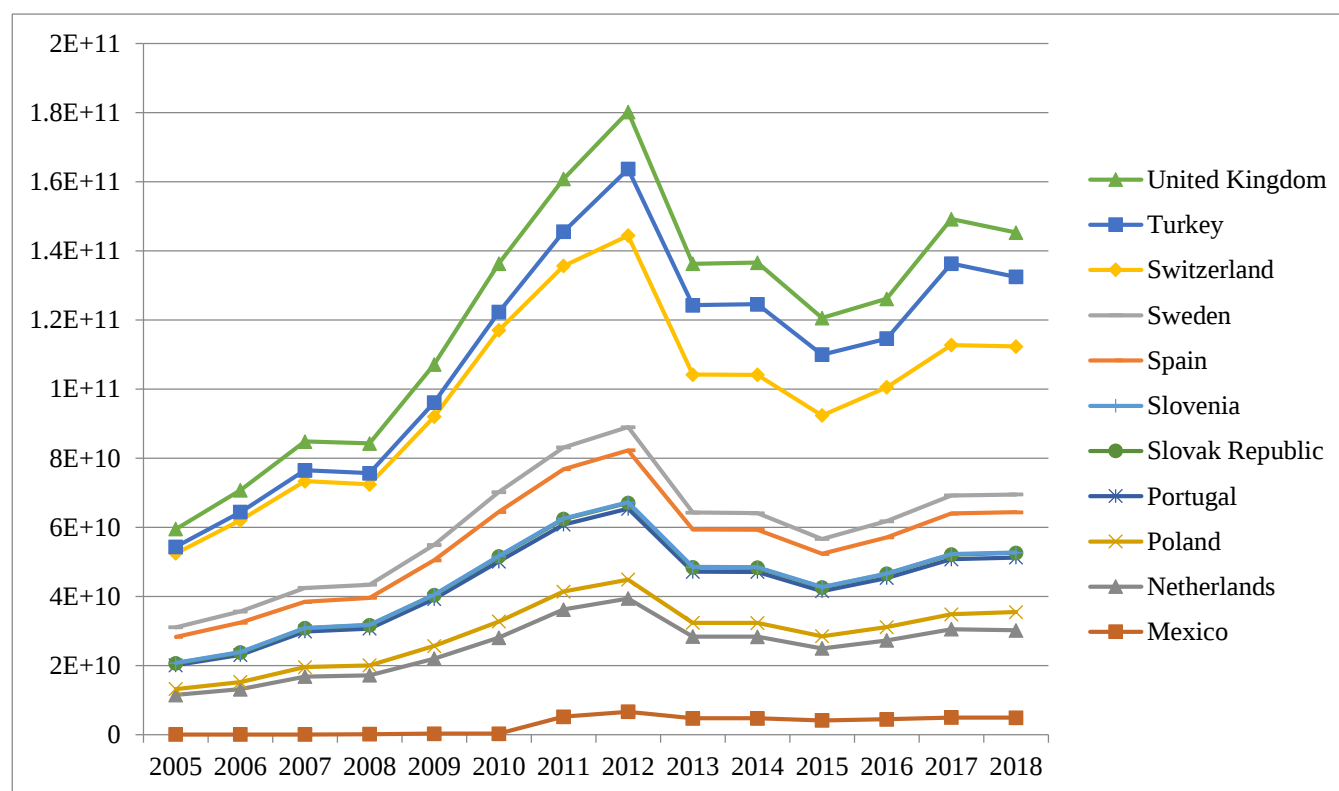


Figure 2: Liquidity index as a monetary policy transmission in some countries of OECD; Source; WDI 2019

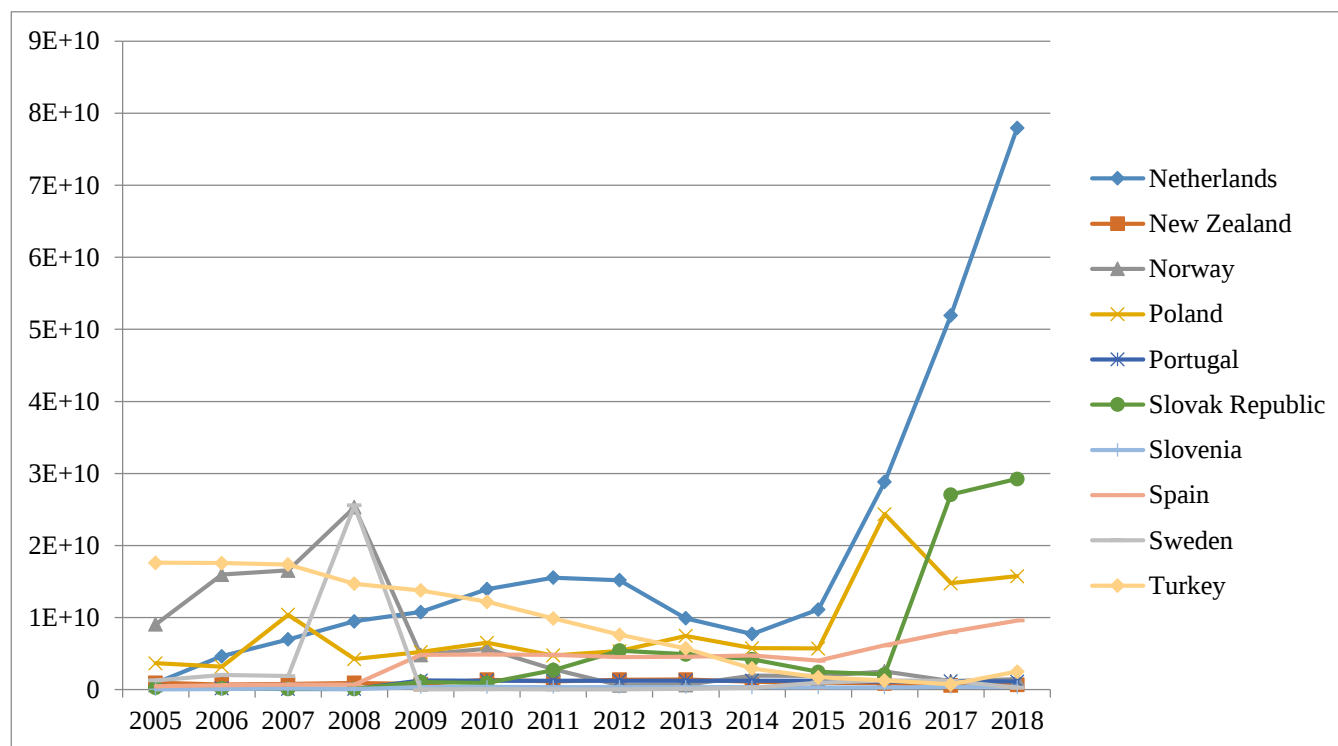


Figure 3: Central bank liability index as a monetary policy transmission in some countries of OECD; Source: WDI 2019

Table 1: Stationary result

Variables	Levin Lin Chu's statistic		Result
	Prob	Statistic	
Gini Index	0.000	-14.79	I (0)
interest rate	0.001	-2.89	I (0)
Capital market return	0.010	-2.19	I (0)
Liquidity	0.010	-2.06	I (0)
Bank reserves	0.005	-2.80	I (0)
Central bank debt	0.007	-2.41	I (0)
Gold price	0.000	-5.06	I (0)

Source: Research findings

5.2 Autocorrelation test

In order to determine the degree of self-correlation of disorder sentences, the Arlano and band test statistics are applied, and the results are shown in Table 2. According to the results of Table 2, we see that the hypothesis is zero, the lack of self-affiliation in the sentences of the discrete disorder has not been rejected and so Arlan and Bond's method an appropriate method for estimating model parameters and eliminating static effects. In other words, with a degree of differentiation from the sentences of the disorder, the serial correlation between components of the disrupted sentences and the sentences of the disordered disorder have no first and second-order autocorrelation.

5.3 Estimated Model Analyses

In this study, the GMM method was used in panel data the model is used to estimate the pattern. Estimated pattern results in this study is presented in Table 3. it is necessary to estimate the model by this method first, the variables that are used in the model are specified. Parental statistics the Sargan test is a pre-determined constraint which tests the validity of the tools.

Table 2: Arlano and Band test results

Self-correlation of disorder	Z statistic	Prob
1	-1.26	0.16
2	-1.31	0.21

Source: Research findings

It should be noted that the Sargan (44), has been overestimated and is used to determine any kind of correlation between tools and errors. For tools to be valid, there should be no correlation between tools and error sentences. Additionally, the zero hypotheses of the parent statistics of the Sargan test (tool variables that are independent of the pattern are not correlated with waste) cannot be rejected, and hence it can be said that the variables used in this model are appropriate.

The Sargan statistical test is used to test the correlation of wastes. It uses a chi-square distribution and the test statistic has a degree of freedom which is equal to the number of predictor variables of the pattern, rejects the zero test for the correlation of waste. As a result, the validity of the results is verified for interpretation. Separately, the results are as follows:

Table 3: Results of estimating regression by GMM method (dependent variable: Gini coefficient)

Variable	Coefficient	Std. Err	t	p > t	95% Conf	Interval
Gini						
Interest rate	0.0043212	0.0032541	1.33	0.186	-0.0020952	0.007376
financial market	0.0017879	0.0005789	3.09	0.002	0.0006464	0.0029294
Gold	-1.70E-12	1.26E-12	-1.36	0.178	-4.17E-12	7.79E-13
International liquidity	-3.73E-12	2.31E-12	-1.62	0.108	-8.29E-12	8.23E-13
International reserves	1.55E-10	6.93E-11	2.23	0.027	1.82E-11	2.92E-10
Monetary policy	4.37E-14	7.27E-14	0.60	0.548	-9.95E-14	1.87E-13
Cons	3.52E+01	1.26E+00	27.83	0.00	3.27E+01	3.77E+01
sigma_u	7.5740797					
sigma_e	1.5166556					
rho	0.9614485					
F-test	270.49					
Prob	0.00					

Source: Research findings

The results show that the effect of interest rate variable as a monetary mechanism transfer on the Gini coefficient as an indifference index in OECD countries it is positive and insignificant (probability is 0.18) with a coefficient of 0.004 and it shows that raising interest rates will increase the inequality in these countries. Also, the research results show the effect of the capital market the inequality is also positive with a coefficient of 0.001 and a significant probability of 0.002. The results also display the impact of bank deposits on income inequality. Poverty and inequality are influenced by the changing of nominal and real variables.

6 Conclusion

According to classical theories, implementing the monetary policy will just have price changes. From this perspective, monetary policy will influence distribution through price changes. If the change in total demand mix is in the benefit of capital-intensive goods (because of reduced interest rate), poverty is influenced via decreased demand for labor force too. New classics consider the rational expectations theory and flexibility of wages and maintain that the supply curve is horizontal if monetary and financial policies are predictable. Therefore, these policies are not effective in real variables. But if the above-mentioned policies have occurred unpredictably and unexpectedly, the supply curve will have a positive slope and these policies can change real variables. Finally, due to the total adjustment of expectations, the supply curve becomes horizontal and the effect of such policies on real variables is neutralized.

In contrast, Keynesians believe that a nominal increase in money stock instead of a certain price level upsurge the real money supply. Therefore, the equilibrium interest rate is reduced, and investment and production will be increased. Therefore, employment (poor group) and income can be improved. The budget deficit policy, however, is more secure in achieving this objective, because the reduction of interest rate does not necessarily improve investment. Three channels can be

considered for the monetary policy effectiveness on improving income distribution and poverty conditions (45). The first and the most important channel is that implementing the expansionary monetary policy in a certain period increases average income in that period and decreases poverty directly. This is because increasing the average income will decrease the number of people below the poverty line. This result will be accurate by assuming that income distribution is fixed in the short-term. Second, monetary policy can have short-term benefits for the poor through the reduction of the unemployment rate and increasing of participation rate of the labor force as well as real wage among the workers who have low skills.

On the other hand, poor income is mainly obtained from transfer payments than other people in society. As such kind of payments is less affected by periodical changes, implementing of monetary policy may worsen the status of income distribution and will, at last, be to the detriment of the poor. Thus, the expected effects of monetary policy on improving poverty conditions from the second channel are less than the first one. Third, inflation following the expansionary monetary policy can worsen income distribution through reduction of the real value of wages and transfer payments and will, at last, be to the detriment of the poor. If expected inflation and its extensive changes are led to uncertainty about the output of manufacturing activities and prosperity of activities which have private benefits more than social benefits, they can result in lower employment level. Continuity of high inflation in the macroeconomy environment can influence the poor more than other groups because expected inflation is led to the transfer of resources to early return and nonproductive sectors. Therefore, long-term investments are influenced more than other cases.

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Ethical issue

Authors are aware of, and comply with, best practice in publication ethics specifically with regard to authorship (avoidance of guest authorship), dual submission, manipulation of figures, competing interests and compliance with policies on research ethics. Authors adhere to publication requirements that submitted work is original and has not been published elsewhere in any language.

Competing interests

The authors declare that there is no conflict of interest that would prejudice the impartiality of this scientific work.

Authors' contribution

All authors of this study have a complete contribution for data collection, data analyses and manuscript writing.

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