Boris Siljkovic[1], Borislav Radevic[2], Nikola Pavlovic[3]
A NEW APPROACH TO MONETARY POLICY

The main objective of this paper is to explain a new approach to monetary policy. In monetary policy the choice is shifting from money supply to interest rate and nominal GDP targets. The perspective is that by maintaining the aggregate demand, deep recessions could be avoided. An alternative version of the Taylor rule, the Keynes's model of GDP revived through Krugman's stance, Mankiw formula and Mishkin equation have been examined in a certain period of time. The result shows the possibility for their application in the actual economic conditions in the US.
Keywords: *monetary policy; interest rate; GDP; public spending; the USA.*

Борис Сількович, Борислав Радевич, Нікола Павлович
НОВИЙ ПІДХІД ДО МОНЕТАРНОЇ ПОЛІТИКИ

У статті надано пояснення новому підходу до монетарної політики, в якій сьогодні спостерігається переміщення акценту з грошової маси на відсоткову ставку та номінальний рівень ВВП. У перспективі підтримка сукупного попиту допоможе уникнути глибоких рецесій. У даному дослідженні правилу Тейлора протиставлено модель Кейнса для ВВП, що переглянута Кругманом, а також підкріплена формулою Манківа та рівнянням Мішкіна. Результати аналізу вказують на реальну можливість застосування даної методології в умовах економіки США.
Ключові слова: *монетарна політика; відсоткова ставка; ВВП; державні витрати; США.*
Табл. 6. Рис. 5. Форм. 4. Літ. 17.

Борис Силькович, Борислав Радевич, Никола Павлович
НОВЫЙ ПОДХОД К МОНЕТАРНОЙ ПОЛИТИКЕ

В статье даётся объяснение новому подходу к монетарной политике, в которой сегодня наблюдается перемещение акцента с денежной массы на процентную ставку и номинальный уровень ВВП. В перспективе поддержка совокупного спроса поможет избежать глубоких рецессий. В данном исследовании правилу Тейлора противопоставлена модель Кейнса для ВВП, пересмотренная Кругманом, а также подкреплённая формулой Манкива и уравнением Мишкина. Результаты анализа указывают на реальную возможность применения данной методологии в условиях экономики США.
Ключевые слова: *монетарная политика; процентная ставка; ВВП; государственные расходы; США.*

1. Introduction

Monetary policy as a result of the development of academic thought, in its long evolution, has been constantly changing. Throughout the monetary history to date, constant changes in monetary policy of central banking have led to improvements in monetary strategies in the world, especially in the world's largest economy. The financial crisis of 2007 around the world indicated a change in the approach to monetary strategy and the policy that would accommodate newly arisen circumstances. Influential economists of our time have suggested that money, more or less, should be no longer a relevant category as prior to the outbreak of the global financial crisis. In contrast to them, influential academic circles in the US are even more precise, as they point out that monetary policy strategy should include the so-called loose monetary policy that would be applied in the future.

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The current monetary strategy of the US is the application of monetary policy which involves targeting projected inflation rates. Such strategy implies the modern version of monetary policy through the creation of the so-called "policy on the fly" according to circumstances. The monetary policy of the US FED over that last 5 years has been the policy of "lender of last resort" in the national financial system. However, popular ideas have started with a change in the objective of the so-called projected targeted inflation and therefore projected nominal GDP (most commonly used measure of national production, expressed in current prices) have been proposed. Hence, the monetary policy of the FED may be at a turning point as the global financial crisis is coming to its end.

John Maynard Keynes, the founder of Keynesianism (Keynes, 1936) explains that when aggregate real income is increased, aggregate consumption is increased as well, but not to the same extent. Thus, there must be an amount of current investment sufficient to absorb the excess of total output over what the community chooses to consume when employment is at a given level.

John B. Taylor (Taylor, 1993) has developed new approaches to monetary policy, he proposed the Taylor Rule which central banks have used since then to determine interest rates. The Taylor principle is widely credited with keeping economic performance stable for the past two decades: raise short-term interest rates to cool economies when inflation or output becomes too high, lower rates when either falls too low. Afterwards, alternative versions have been derived from the original Taylor Rule but with the same aim to provide central banks with a tool for conducting monetary policy.

Many analysts claim that the best parameter for targeting could be the nominal GDP. Namely, a downfall of previously stable relations between money quantity and nominal GDP, made some economists during the 1980s propose the nominal GDP for target variable. McCallum and Nelson (1999) argue that nominal GDP targeting at a rate equal to the long-run average rate of growth of real output plus a desired inflation rate, would result in the average inflation rate close to the desired value and perhaps in reduced fluctuations of real output and unemployment.

Bernarke and Mishkin (1997) explained why they favor targeting nominal GDP instead of targeting inflation. According to them, the stance that monetary policy is neutral in the long run restricts the set of feasible long-run goal variables for monetary policy, but inflation is not the only possibility.

Mishkin (2006) considers that fears of focusing primarily at inflation which might lead to greater fluctuation in production, have urged some economists to propose a variant of the targeting inflation strategy in which central banks would actually target the growth rate of nominal GDP (real GDP multiplied by price level) rather than inflation. As a typical proponent of the monetarist approach Mishkin (2012) prefers savings. He rewrote the Keynes's equation: $Y = C + I + G + NX$ (Y — output, C — consumption, I — investment, G — government spending and NX — net export) and adjusted this equation to the conditions of goods market equilibrium in an open economy and developed that saving (S) equals: $S = Y - C - G = I + NX$. Alternatively, it could be written as follows: $NX = S - I$.

Krugman (2013) states that it was a good thing that deficit was allowed to rise as the economy slumped. The willingness of government to keep spending was one of

the main reasons we didn't experience a full replay of the Great Depression. In 2010, when the new government of the Prime Minister David Cameron turned to austerity policies, it resulted in throwing the nation back into recession. Krugman considers that lower prices induce lower demand for money which produces lower interest rates causing higher spending. According to (Krugman, 2011) that process doesn't operate when, as currently, short-term interest rates are zero. Sumner (2011) argued that the Federal Reserve should engage in the strategy called "NGDP targeting" to lift the economy out of its morass. Sumner explains that the concept of targeting interest rates is almost prehistoric. He was very specific pointing out that the demand targeting and price level targeting are much better options. Thus, as an advocate of nominal GDP targeting, he believes that such a policy should be adopted immediately, especially due to the lack of aggregate demand.

Paul Krugman and Greg Mankiw (2012) debated whether the US is exiting the liquidity trap, an impossible state of affairs in which the Fed would have to drop rates below zero to set the right balance in the fight against inflation and unemployment. Some years ago, Mankiw had analyzed the Fed's interest rate actions and determined they approximated the simple formula: *FF = 8.5% + 1.4(I - U)*, where *FF* is the Fed funds target rate, *I* is inflation (core CPI) and *U* is the unemployment rate. In other words, if the rates of inflation and unemployment are equal, then the Fed would set the rates at 8.5%. For every percentage point by which unemployment exceeded inflation, the Fed funds rate would decline by 1.4%. If unemployment is high and inflation is low, as currently, the Fed funds rate would logically be negative, but this is not possible; hence, the liquidity trap. Mankiw formula: *Federal funds rate = 8.5 + 1.4x* (Core inflation-Unemployment) is basically saying there is a trade off between inflation and unemployment and, the only transmission mechanism is via the Fed targeting interest rates.

Carney (2013) argues that if exceptional stimulus needed to be given, the best method could be to adopt a (temporary) target for the level of nominal GDP. In many respects this could be more powerful than employing thresholds under flexible inflation targeting. However, when policy rates are stuck at zero, there could be a more favorable case for NGDP targeting. The exceptional nature of the situation, and the magnitude of the gaps involved, could make such a policy more credible and easier to understand. The benefits of such a regime change would have to be weighed carefully against the effectiveness of other unconventional monetary policy measures under the proven, flexible inflation-targeting framework. Further, Carney believes that when opting for targeting nominal GDP, the focus is not supposed to be on the symptoms (i.e. inflation) but on the cause (e.g. change in aggregate demand).

2. Research hypotheses

1) An alternative version of the Taylor Rule serves as an efficient tool for determining federal funds rate in conducting monetary policy under present macroeconomic conditions in the US economy.

2) GDP is determined by its components (*C + I + G + NX*) and an increase in government spending will cause growth in GDP.

3) The Mankiw formula could be efficiently applied by the monetary authority for setting interest rate under current economic conditions in the US.

4) The Mishkin equation for calculating savings is applicable nowadays for the economic conditions of the US and a stance that the saving induces GDP growth is dependable.

5) The consumption as a share of GDP necessarily determine the wealth of a country based on the empirical research of the leading economies.

3. Methodology

In terms of the monetary policy conduct, Miomir Jaksic (2003), a prominent Serbian economist, deliberates that John Taylor has proposed a specific formula to describe the FED policy which adjusts federal funds rate according to what happening with both inflation and GDP. An alternative variation of the Taylor rule is:

$$r_{ff} = 2 + 0.5(\pi - 2) - 0.5(GDP\ Gap), \qquad (1)$$

where r_{ff} (real federal funds) rate is equal to nominal federal funds rate less inflation:

$$r_{ff} = i_{ff} - \pi,$$

where GDP gap amounts:

$$GDP\ Gap = 100X((\gamma - y) / y)$$

If $\pi = 2$ and output is at natural level, then monetary policy should target real federal funds rate of 2% (nominal is 4%).

For each 1% of π growth, monetary policy automatically becomes restrictive and real federal funds rate increases by 0.5%.

For each 1% of fall in GDP, under its natural level, monetary policy automatically becomes expansionary and decreases the federal funds rate by 0.5%.

$$i_{ff} = \pi + 2 + 0.5(\pi - 2) - 0.5(GDP\ Gap) \qquad (2)$$

With regard to the close connection between nominal GDP targeting and the Taylor's rule, (Koening 2012) explains the perspective on the example, if the FOMC might announce a (log) target of $n^*_T = p^*_T + Ey^*_T$ for T years from now, where Ey^*_T is today's best estimate of future potential real GDP and where $p^*_T = p + T * \pi^*$ extrapolates the current price level forward at the inflation rate π^*. If policymakers succeed in hitting this target (so that $p_T + y_T = n^*_T$) and, if potential output evolves as expected ($y^*_T = Ey^*_T$) and if output converges to potential ($y_T = y^*_T$), the price level must converge to p^*_T and, given the definition of p^*_T, the average annual inflation over the next T years $[(pT - p) / T]$ will be equal to π^*. None of these conditions is likely to be met. However, each of them is likely to hold in expectation: Under nominal-income targeting, policy is systematically adjusted, so that $E(p_T + y_T) = n^*_T$; trivially, $Ey^*_T = Ey^*_T$; and with $T > 5$ years, output can usually be expected to converge to potential so that $Ey_T = Ey^*_T$. Therefore, while inflation won't typically average out to π^* over the next T years, this version of nominal-GDP targeting ensures that:

$$(E(p_T - p) = \pi^*) / T \qquad (3)$$

This equation implies tighter control of inflation expectations than is achieved using the Taylor rule. Under the Taylor rule, policy is expected to drive inflation to target over the next several years, whereas under nominal GDP targeting, policy is expected to keep inflation equal to its target level, on average, over the next several years.

More generally, $Ep_T = p^*_T$: Nominal-GDP targeting pins down the expected future price level. This result holds for any p^*_T choice that depends only on currently available information. The specific implementation of nominal GDP targeting is mathematically equivalent to setting $n^*_T = (p + Ey^*) + v * T$, where $v = E(y^*_T - y^*) / T + \pi^*$. In words: To obtain future target nominal GDP, extrapolate current nominal potential GDP forward at a rate that equals the economy's estimated potential growth rate plus the long-run desired inflation rate.

On the other hand, there is the Keynes's model implying that $Y = AD$, where $AD = C + I + G + NX$ revived through the Krugman's stance expressed through the formula:

$$GDP = C\,(consumer) + I\,(investment) + G\,(government) + (X - M)\,(net\ exports)\ (4)$$

If we transform this formula to the current conditions in the US economy using figures from the forth quarter (Q4:2012), the outcome will be:

$$-0.1\% = 1.52\% + -0.08\% + -1.33 + -0.25$$

Yet, some economists are of the opinion that G is supposed to be removed from calculations. When G is removed from GDP, a better picture of "health" of the private sector in the US is obtained. The US GDP is closely linked to the amount of G. Hence, defense spending is viewed as something what contributes to GDP. On the other hand in Scandinavia, where defense spending is essentially none, per capita GDP far exceeds that of the US. If G goes up then C and I have to go down to offset it and keep GDP the same. It seems that the Keynesian model is that G going up increases GDP, so deficit spending is a good thing. Austerity alarmists say then reducing G will reduce GDP.

4. Empirical research results

The Taylor rule is a guideline for central banks how to adjust real interest rates in response to changes in inflation and output. The primary inputs for the Taylor rule formula are CPI inflation and the output/inflationary gap. If we try to apply the alternative Taylor rule under current economic conditions of the US (the data as of December 2012) and calculate the real federal funds rate, the result will be:

$$r_{ff} = 2 + 0.5(1.7 - 2) - 0.5 * 6 = -1.15.$$

We consider that the Taylor rule can't be applied under the actual economic conditions in the US due to the existence of liquidity trap-zero bound constraint.

Table 1. **Actual FFR & FFR based on the alternative Taylor's rule**

	2009 Q1	2010 Q1	2011 Q1	2012 Q1
Actual FFR	0.16	0.16	0.10	0.09
Alternative FFR Taylor rule	-1.35	-3.9	-3.7	-1

Source: Authors' calculations based on the data from http://research.stlouisfed.org.
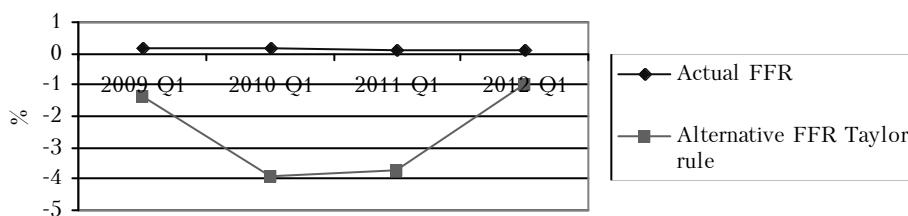
Source: Authors' calculations based on the data from http://research.stlouisfed.org.
Figure 1. **Actual FFR and FFR based on the alternative Taylor rule**

If we transform the formula ($GDP = C + I + G + NX$) to current US conditions using the figures of (Q4 2012), the outcome will be:

$$-0.1\% = 1.52\% + -0.08\% + -1.33 + -0.25$$

We have explored the components of GDP and their changes on the quarterly basis in 2011 and 2012 in the US. By the above equation we have calculated the % of change in GDP in each quarter (see Table 2).

Table 2. **Change in GDP and its components (expressed in %)**

Variables	2011 Q1	2011 Q2	2011 Q3	2011 Q4	2012 Q1	2012 Q2	2012 Q3	2012 Q4
GDP	0.1	2.5	1.3	4.1	2.0	1.3	3.1	-0.1
PCE	2.22	0.7	1.18	1.45	1.72	1.06	1.12	1.52
GPDI	-0.68	1.4	0.68	3.72	0.78	0.09	0.85	-0.08
NX	0.03	0.54	0.02	-0.64	-0.06	0.23	0.38	-0.25
G	-1.49	-0.16	-0.60	-0.43	-0.60	-0.14	0.75	-1.33

Source: Authors' calculations based on the data from http://www.bea.gov.
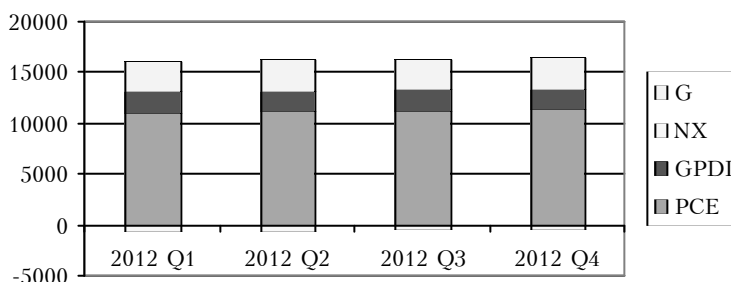
Source: Authors' presentation based on the data from http://www.bea.gov.
Figure 2. **GDP in the US by its components on the quarterly basis in 2012**

Through our empirical research we worked out that GDP would grow if more of its components increase or if those that are increasing can offset the other components that are declining. The government spending was declining in most of the quarters but for Q3 2012. In that quarter all the components of GDP were rising. Thus, we ponder that an increase in government spending will certainly induce GDP to grow if associated with the increase in other GDP components. A rise in government spending large enough to offset decline in other components could induce GDP growth as well. If we look into the last quarter of 2012, we consider that decline in GDP was primarily caused by the declines in government spending and private investments. The government component declined for 1.33% and this was crucial bearing in mind that government spending helps providing income that consumers can spend while paying off their debts. In the end the increase in all the components will certainly contribute to GDP growth (as happened in Q3 2012). As it is the case in the Keynes's model, the response of the total production to changes in consumption, investment, government spending and net export is outlined in Table 3.

Table 3. **The response of total production (GDP) to changes in its components**

Variables	Change in variables	Change in total production (output)
Personal consumption	^	^
Investment	^	^
Government spending	^	^
Net Export	^	^

Source: Authors.

The Mankiw Rule is a monetary policy rule developed by the economist Greg Mankiw. It is designed to provide a recommendation on how central banks should set short-term interest rates. It is similar to the Taylor Rule in terms of the results, but the inputs are slightly different. The primary inputs for the Mankiw Rule are core CPI inflation and unemployment. If we apply the actual Mankiw formula under the current US conditions using the data as of December 2012, the result will be

$$FFR = 8.5 + 1.4x(1.89 - 7.8) = 8.5 - 8.274 = 0.22.$$

The obtained result is quite close to the actual federal funds rate in the USA in December, 2012, which was 0.16. We applied the Mankiw's formula using the figures on the US unemployment rate and core inflation rate through certain quarters from February, 2011 to December, 2012 and compare the acquired results with the effective federal funds rate.

Table 4. **Effective US FFR and FFR based on the Mankiw rule**

Indicators	Feb. 2011	June 2011	Jan. 2012	June 2012	Dec. 2012
Core inflation rate	1.09	1.64	2.28	2.22	1.89
Unemployment rate	9.4	9	8.5	8.2	7.8
FFR Mankiw rule	-3.13	-1.8	-0.2	0.12	0.22
Effective FFR	0.16	0.07	0.11	0.17	0.17

Source: Authors' calculations based on the data from http://ycharts.com.
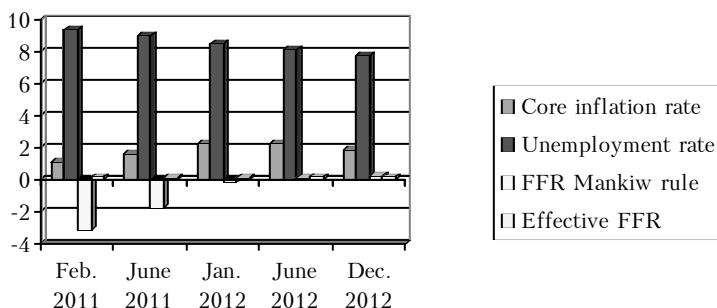
Source: Authors' presentation based on the data from http://ycharts.com.
Figure 3. **Effective US FFR & FFR based on the Mankiw rule**

Basing on the empirical research and the obtained results, we have come to a standpoint that with a decrease in the unemployment rate in the US the Mankiw formula is more practical, and contrary — if the unemployment rate increases.

We have examined the data on investment, net export, saving, GDP in the 4 quarters (from October, 2011 to July, 2012) in the US and calculated the savings basing on the Mishkin equation. Figures are shown in Table 5.

Table 5. **GPDI, NX, S based on FRED data, S derived from the Mishkin equation and GDP**

Indicators	2011-10-01	2012-01-01	2012-04-01	2012-07-01
Gross private domestic investments	1991,1	2032,2	2041,7	2080,1
Net export	-594,8	-615,8	-576,9	-516,8
Mishkin equation	1396.3	1416.4	1464.8	1563.3
Saving based on FRED	1925,0	1945,6	1952,4	1975,1
GDP	15321,0	15478,3	15585,6	15811,0

Source: Authors calculations based on the calculations and the data from
http://research.stlouisfed.org.
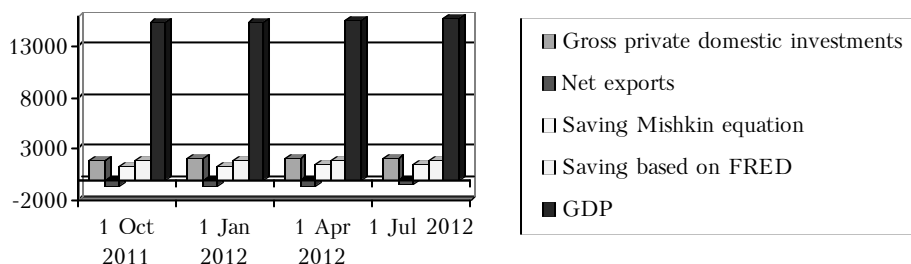
Source: Authors' calculations on the data from http://research.stlouisfed.org.

Figure 4. **Indicators' dynamics**

We can consider that GDP in the US was growing within the analyzed period while its components (investment and net export) were rising with the exception of a light decrease of net export in January, 2012. Thus, the saving calculated by the Mishkin equation differs from the data collected from FRED. We are of opinion that the Mishkin equation which favors saving don't provide exact results on saving in the situation when net export figures are negative which is the case with the US for the time being. An increase in saving can encourage GDP to grow but only if associated with a rise in investments (see details in Table 3).

If we sum up the influence that saving has over the growth of social wealth based on the empirical researches of leading economies in the world. The results are shown in Table 6. Through the empirical research we have confirmed that government spending as GDP share doesn't determine the wealth rank of a country in the world. A typical example is France where government spending is 53% of GDP but the country is ranked 23rd on the wealth list.

Table 6. **Country's wealth rank and government spending as GDP share, 2011**

Wealth Rank	Country	Government spending as a share of GDP, %
7	Switzerland	32,0
9	Japan	37,1
11	USA	38,9
12	Canada	39,7
15	Germany	43,7
17	Britain	47,3
23	France	52,8

Source: Authors' presentation based on the data from http://www.themoneyillusion.com.
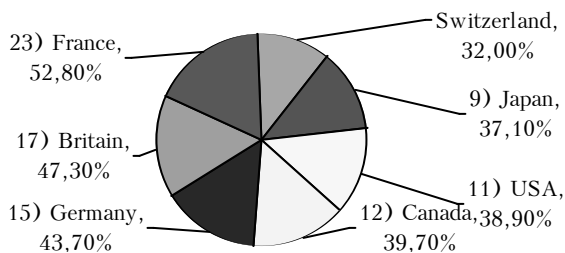
Source: Authors' presentation.

Figure 5. **Government spending as a share of GDP**

French model stems from Krugman's stance that favors government spending and disapproves austerity measures supported by Mishkin. The government in France is following the Kruman formula and in case of succees these ideas will be confirmed.

5. Conclusion

Generalizing the empirical indicators of leading economies, we arguethat regardless of monetarist or Keynesian approach to monetary policy, we proved that to a certain extent we are all Keynesians. Certain rules of the authors such as Taylor, Mankiw, Krugman, Mishkin which we have analyzed in the paper, could produce a result and serve as guidelines for monetary policy conduct. Interesting is the finding that favors only one component of macroeconomic policy could provide reliable results if there is a consistency with other macroeconomic components. Moreover, the acquired results could be effective only if they are complementary what requires correlative relationships between them. We have analyzed these indicators within a certain time period and set of economic conditions in the US economy. At other times different correlations between macroeconomic indicators could be established. Each period has its own peculiarities and therefore the above mentioned rules cannot be used as universal at all times.Nevertheless, this completed analysis gives us the right to consider it as a basis for further research and contemplation.

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