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THE RELATIONS OF UNEMPLOYMENT RATE AND INFLATION IN THE EUROPEAN UNION

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Abstract
The aim of the present study is to examine the relation between unemployment and inflation through the example of the Member States of the European Union. According to the traditional economic perception there was a highly significant relationship between these two indicators. Initially, this statistical connection – known as the Phillips-curve – showed an inverse direction regarding the movements of these measures but after the phenomenon called "stagflation" economists experienced positive correlation within them. Since the 1990's this observed connection continuously started to fade away and nowadays the curve has become flat. It means that even in a low inflationary period there is a possibility for the unemployment rate to remain low as well. Even though in the present experts use a reformed Phillips-curve which examines the relations of the economic performance and the inflation, this research focuses on the linkage between unemployment and inflation. Thus, it analyses the economic development of the EU member states in the past 25 years to find out the reasons for the disappearance of the Phillips' logic.
KEY WORDS: unemployment, inflation, Phillips-curve, European Union, macroeconomic indicators.

Introduction

„The moment it's pressured by a control target system, any statistically sound indicator collapses."
- Charles Goodhart

Nowadays, we can see that the most notable theories of the XXth century's economic world are questionable within the changing economic environment (Görgényi Hegyes et al., 2017). One of the reasons for this is that the political world gathers its influence above it, as mentioned in the opening quote. This made the lives of researchers hard for a while, as we're already used to the fact that the moment economists find a connection between main microeconomic indicators, the political party in lead tries to influence it using artificial tools, in order to achieve their personal interests (Goodhart 1984). Furthermore, we cannot forget the fact that while the older, 'simpler' economic environment made it possible for two indicator's connection to be researched, nowadays, phenomena have different influencing factors - as stated by those who formed earlier theories.

In the European Union, one such example is the shared market, which waits to be realised even now, which has a strong influence on both our target indicators. The reason is that labour transit between Member States happens within the shared labour market (Levy 2005; Vinogradov et al., 2017). On the other hand, the common monetary policy and the low inflation target also pose a significant problem. Whereas the prior can garner strong influence on the labour conditions of member states, the latter makes it impossible to realise an efficient, national level monetary policy. These factors have an influence on the two important macroeconomic factors of the Member States - namely unemployment and inflation. Economics described the connection between the two for a long time using the so-called Phillips-curve, which showed reverse correlation between them. After a while, the curve became vertical, and today's newest research results show that the statistical connection between the two indicators completely disappeared. The goal of this research is to unearth the theoretic and logical reasons which cause this phenomenon.

Literature background

Interpreting unemployment

Unemployment basically signifies a state, during which the number of the active populace within an economy grows above those in employment. In this case, we differentiate between voluntary and involuntary unemployment, based on the reasons why people in this status are as they are - did they voluntarily choose to not be within the labour market, or does the labour demand not reach the level of labour supply for the current real wages (Blanchard and Katz 1996). Naturally, economic schools offer a much more in-depth description on unemployment and its reasons.

In the neo-classic model, its existence is only admitted temporarily, and they think the reason it exists comes from the labour market. According to their fundamental thought, unemployment is caused by real wages' deviation from the balance value, which is rebounded by the immediate adaptation of price levels. In time, they expanded their logic - assuming perfect market conditions - with the classic description of unemployment. In this case, the decrease of employment

causes a lower output level, which causes lack on the product market. However, there's no need for state intervention, as the current state will lead to lower real wages on the labour market, and increasing prices on the product market later. Therefore, balance still happens on its own (Malinvaud 1977). However, this modification still cannot explain the long-term unemployment we can also see today. Though to answer this, multiple explanations were made, for example the theory of insufficient information during job hunting, or the background work of labour unions. These can only explain voluntary unemployment. However, the neo-classic school could not find endogen factors within the economy, which would lead to involuntary unemployment.

The discussion of this topic by the Keynes model proved to be much more fruitful, where they inserted the definition of long-term unemployment. This was caused by the effects markets have on each other. In this case, producers did not react to the over-supply of the product market by lowering their prices, but by reinvesting their production. In other words, the Keynes logic realised the adaptation of supply to demand circumstances, which is followed by the level of labour demand through changing production volume. As in this case, the operation of markets is far from ideal, state intervention gains ground, similarly to fiscal and monetary policy. Based on the relationship between supply and employment, we can clearly state that these want to influence the demand side, which will start the previously mentioned process. The budget policy reaches this state directly through state product purchases, whereas the currency policy does it indirectly, by increasing the amount of money, and influencing the demand of the private sector (Layard et al. 2005). This is where the question comes up: if it's like this, why does not the state intervene in the economic operations of the country more, and generate a demand where employment can be maximised?

The answer is related to the other difference between the Keynes and neo-classic schools - sticky wages. Due to how the system having a part of a pre-determined minimal nominal wage, which is usually higher than the balanced real wage at the equilibrium operation of the labour market. The neo-classical flexible wages differ from these nominal wages, as these are top-down rigid, due to how labour unions cannot allow them to decrease beyond a certain level. Also, enterprises will only produce an amount that's optimal for them, regardless of the increased demand. Apart from sticky wages, the Keynes school also stresses the importance of uncertain expectations as well, which cause the already mentioned state interventions to end in different results compared to the expected ones (Mortensen and Pissarides 1994; Pissarides 2000). Such a case could be when expansive monetary policy causes the populace to keep the increased money supply to themselves, instead of spending it, or investing it. Economics calls this situation the liquidity trap, during which we cannot observe either the expected increase demand, or the labour demand.

Interpreting inflation

Though we also describe inflation using a static indicator - price level - similarly to how we describe unemployment, its interpretation can only be done if we take a look at the changes in this value. In other words, inflation can be calculated using the long-term dynamics of price levels (Fama 1981). Meanwhile, the weight of the inflation is usually classified according to its size, which makes the different groups the low inflation (one-digit increase), high inflation (two, or three-digit increase), and hyperinflation (four, or more digit increase). In the European Union, our current inflation environment can serve as a basis for the statement that Member States have been experiencing low inflation - or even none - in recent years (Bulmer and Lequesne 2013; Földi et al., 2017). However, in certain areas in the 1990's, we could observe high inflation reaching a robust three-digit, mainly in Central- and Eastern European economies, which were not part of the EU at the time.

Among the definitions of the schools, let's start with the neo-classic school once again. They believe that inflation can only come from the currency market and has no effect on real indicators. Therefore, we can say that their model treats inflation as a monetary phenomenon. However, we have to stress that just as before, the breaking of the equilibrium is only explained by them using outside factors. Such factors can be the irresponsible increasing of currency production, or if the result of state purchases is that the increased interest rate decreases the value of currency demand. According to their idea, the long-term increase of price levels is caused by this, and similar happenings, which also supports our claim that state intervention needs to be neglected (Green 1982).

However, the Keynes logic is much more complex than this, as in their model, price levels are created on the labour market. According to the basic mechanism, the economy always tends towards the balance state, since the demand coming from the balance on the product and currency markets determines the volume of production, and indirectly, price values. The circularity is obvious from this point, as a higher price level holds demand back, which makes a lower volume of production lead to lower price level, and later, higher demand. At this point, we have to refer back to the neo-classic model, where long-term inflation was explained by incorrect outside interference - therefore, they refused state intervention. The reason is that this state activity is part of the Keynes model, which may cause the stability of currency value significant problems via its artificial demand-inducement. This hazard can increase further in case the state budget has deficits, and the government wishes to cover this using subsidies (Greenwald and Stiglitz 1987). When analysing unemployment, we already saw examples of how state intervention sometimes causes results different from the intended ones, in other words, they don't always increase demand as intended. In this case, this means that the increase of demand does not follow that of the deficit, which leads to a hole in the budget, and the increase of national debt.

Therefore, in both models, the appearance of inflation is possible, and a common point of the two schools is that a long-term increase in price levels is most notably caused by incorrect state intervention. Taking note of how in opposition of the neo-classic school, the Keynes school does not exclude state intervention, we can say this has a much higher possibility of happening. Apart from the state, an important factor is the expectations of economic actors towards inflation, which is not a factor included in the neo-classic school. However, in the Keynes model, both enterprises, and households calculate with the possibility of inflation. This may cause a so-called "self-fulfilling prophecy" effect, where the market processes are concluded while taking the possible inflation into consideration, finally causing the actual inflation phenomenon. Furthermore, in the Keynes system, we already mentioned how much price levels influence demand, which also has an effect on production, and the level of employment as well. All this makes it obvious that we can observe a connection between the changes of the two values according to the Keynes logic.

Relationship between unemployment and inflation

The first approaches to researching the connection system between inflation and real processes can be attributed to Phillips (1985), who analysed the negative correlation between wage inflation and unemployment in the economic processes of the United Kingdom between 1861 and 1857. This correlation was later developed further by Samuelson and Solow (1960), and wage inflation was exchanged for price inflation. This is also one of the most notable moments of economic history, as changing between the price level and unemployment - which was analysed in the previous chapter - also meant the missing puzzle piece in the Keynes model, and was identified at this point in time. Therefore, nowadays, when we talk about the traditional Phillips-curve, we think of this instead of the original wage inflation equation, as its historical relevance is much more important (Szentmihályi and Világi 2015).

We have to stress the word 'traditional', as due to the economic effects we observed ever since then, there were multiple changes added to the curve by both the neo-classic and the Keynes sides. The reason of this is that after realising the connection, using the logic meant an exceptional tool for decision-makers to determine one side of it, by the necessary state of the other value. For example, some research managed to unearth a significant connection between right-wing governments choosing a lower inflation rate during their ruling, compared to how the left-wing government fighting against unemployment more (Bessenyei 2007). Naturally, at this point, we should refer back to the initial quote in the study, which is called by the 'Goodhart law' by those well-versed in economics. In that instance, he basically meant that the moment we assign a target to an indicator, it stops functioning as a trustworthy indicator (Goodhart 1984). The relevance of this will also be shown by practical examples later, but for now, let's concentrate on the Phillips-curve.

The instability of the curve's logic could already be seen by the people creating it (Samuelson and Solow), and was noted. As Phillips conducted his research in a relatively low inflation environment at the time, therefore, there was no evidence that the exchange could be maintained perfectly even among higher inflation conditions. The first notable critique against the mechanism personalised by the curve came from Friedman (1968), who introduced a new term to economic language: adaptive inflation expectations. According to his thoughts, while the enterprise sector can assume the expected level of inflation with more confidence, the household sector can only react later. Therefore, for a while, it can also do excess labour. However, later, when the different economic environment can be felt, the household sector exercises its influence through the labour unions, in order to achieve a higher level of nominal wages. In this way, according to him, the effect of demand-increasing, expansive monetary policy can only be observed in the short-term, however, in long-term, a natural rate of unemployment comes into existence which it cannot deviate from anymore. This train of thought leads us towards the long-term Phillips-curve, according to which any level of inflation can go with a current unemployment rate - and production level.

In the 1970's, it seemed that Friedman's words would become true, since the stagflation period came to the United States, during which we could not see the development of the economy even with the high inflation environment it was within. People first thought that two factors were the cause of the state of affairs at that time. One was the oil recession of 1973, the other was the strong appeal of labour unions. It must be known that when analysing inflation, this was not mentioned, but according to the Keynes school, the faster employees react to the increase in price levels - reaching an increase of nominal wages - the higher the weight of inflation could become. However, we can say that Friedman found both reasons innocent in court. In the case of the labour unions, he reasoned that employees constantly trying to regain their income state can be seen as a perfectly natural process, even in the midst of inflation. And in the case of the oil recession, he clearly stated that the irresponsible monetary policy of the American government was to blame. According to his reasoning, there were other countries, like Germany or Japan - which have a higher dependence on import as far as energy consumption goes, compared to the USA or the UK - who used a more strict monetary policy, and had to go through a lower inflation (Blundell 2007). After this, Friedman's school of focusing on currency policy became known as Monetarism.

Before the Keynes school could react to the critique against their model, and the consequences foreseen by it, another traditional economist, Lucas (1973) made changes to Friedman's adaptive expectations theory. While according to Friedman, expectations only have an effect in the long-term, Lucas thought that the household sector is capable of much faster reaction. He supported his reasoning with how the most notable problem of that age's economics is underestimating the development speed of the World. We can highlight three main points argued from this: first, the reason we cannot estimate the reaction speed of the household sector because the flow of information during the 70's became much faster, meaning being informed was much easier for the general populace. Secondly, the changing World needs a different economic policy perspective, since traditional approaches lost their rights to exist in the ever-changing economic environment. Though this latter critique could be said to be quite general, as we can see it in the aforementioned historical overview that economics always adapted to new economic challenges. Finally, his third point can be considered to be a methodological stance, rather than the effect of globalisation, as Lucas thought the equation of the Phillips-curve fixed by Friedman is incorrect, as it also integrates a past period into expectations, and it's weighted the same as the future expectations. And it's an incorrect assumption that conditions 20 years before us have the same role in our lives as our immediate past. These are formalities - naturally - within the neo-classic and monetarist Phillips-curve, the point is that due to Lucas's train of thought, he believes that monetary policy is ineffective not only in long-term, but short-term as well. Therefore, his theory states that no sudden monetary intervention (or shock) can effect economy (Balatoni 2009).

After this, the ball went to the economists siding with the Keynes logic - they had to react to the changes made by the neo-classic economists, and monetarists. Their answer was one of the most notable differences between the two models, which was sticky wages and prices, as the short-term, vertical Phillips-curve made by Lucas can only hold true, in case we calculate with flexible prices and wages. However, Fischer (1977) validated that if the prices and wages are fixed for at least two periods - quarters - the monetary policy can effect real economy in the short-term. The still-used "New-Keynes based Phillips-curve" was made according to this logic, which had its generally acclaimed equation created by Calvo in 1983.

At the end of the history lesson, we have to state that the earlier research of Okun (1962) made economists to use the Phillips-curve for not unemployment, but production gap, in order to research the effects of inflation. The reason for this is the connection called the Okun-law, which states that the production gap and the unemployment rate has a connection. Therefore, we were able to interpret what level of inflation comes with which level of economic performance much easier. Nowadays, we still have many a research dealing with perfecting the model of the curve, mainly by interpreting inflation expectations in different ways. We can observe that in developed countries, the Phillips-curve became flat within a low inflation environment. This means that the growth of the economy, and the changes of inflation that had a strong positive correlation before, has been liberated from their connection (Szentmihályi and Világi 2015).

To summarise the literature background overview, we can state that the traditional logic of the Phillips-curve lost its effectiveness in developed countries. However, there's still merit in researching what time differences the various EU Member States managed to reach this state. The current structure of the European Union includes a multitude of countries with different historical backgrounds and economic pasts. Our research focuses on how the logic of the original Phillips-curve, based on inflation and unemployment changes in these countries.

Source and method

Before beginning with our quantitative research, we have to state that we analysed the processes of 28 European Union Member States. This is important because our research spans across an interval of more than 20 years, from 1991 to 2014, and for half this time period, the EU only had its original EU15 (older Member States). However, the goal of this research is exactly to know how our researched logic was implemented in different countries. Therefore, all of today's Member States take part in our research.

As for the indicators, we needed two main ones for the research: the inflation[1] and unemployment data of the countries, which we gathered from the World Bank. As for methodology, we already discussed that the Phillips-curve was calculated using pre-determined equations. However, in this case, we only wish to know the relations between unemployment and inflation, therefore, we made the visual representation as a dot diagram, in order to see the corresponding values clearly. Now, let's see what results we gained from comparing the data for the European Union's Member States.

During the research, we analyse certain points of time within a 24-year interval, to see the changes in the EU Member States' inflation/unemployment data, and using these values, we grouped them. These points of time (years) are 1991, 1995, 2000, 2005, 2010, and 2014. Naturally, this grouping does not always mean that countries in the same group will have similar economic statuses. The point of the analysis is rather to determine the movements of the nations during the 5-year cycles.

Results

Analysis of the European Union Member States

In the first phase of the analysis (1991), there are relatively few countries, as the Czech Republic, Estonia, Germany, Latvia, Lithuania, Romania, Slovakia, and Slovenia had no data corresponding to the year. Bulgaria, Poland and Croatia had so high inflation that if they were included, they would've derailed the research results as extreme cases (Fig. 1). However, these countries will also be members of the grouping.

[1] This means the inflation calculated for consumer prices, not the World Bank's GDP Deflator data.

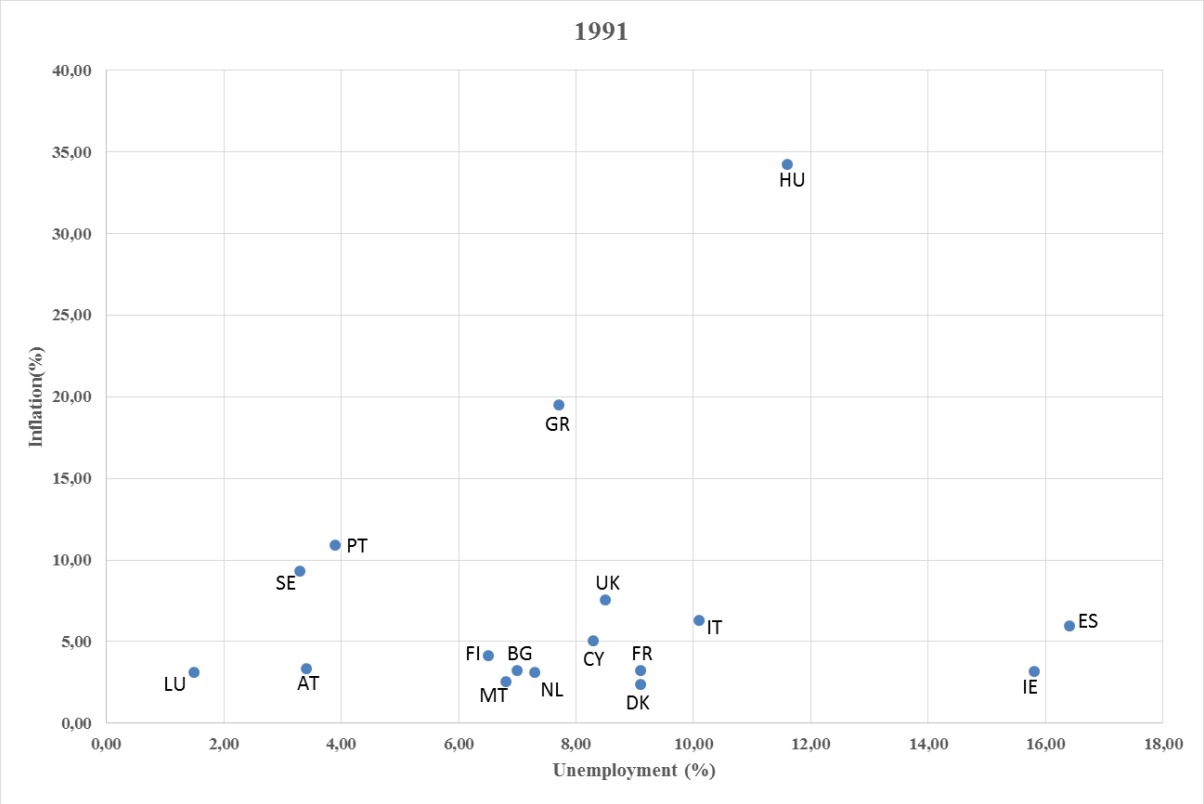

Fig. 1. Inflation/unemployment relation of Member States in 1991
Source: Self-made, based on World Bank data, 2016

We can see on the figure that the Member States are amassed between the 6 and 10% unemployment rate, under the 10% inflation level. Of the countries that remained in the analysis, Hungary proved to be the example breaking the norm of the Phillips-curve, as it produced both high inflation and high unemployment. Contrary to Hungary, Luxembourg and Austria had low values for both indicators. Let's see how we could assign the countries into clusters.

The goal of forming groups is to assign the countries into a 2×2 matrix, according to the low or high inflation/unemployment. However, in order to achieve this, we have to determine what we define as low or high values for the indicators in question. In the case of unemployment, this would be a constant, 8% is the limit, above which we chose to consider unemployment rate high. As for inflation, the demands of the European Union state that there's an allowed difference of 1.5% from the average of the three best-performing countries, which would've proven to be hard to determine, naturally. As the target system of Hungary's inflation determined a maximum of 3% as the ideal level for a long time, we also relied on this value after 2000. However, in the 1990's, there was a relatively high inflation environment, which caused us to increase this rate to 5% for 1991 and 1995. Let's see the clusters for 1991 (Table 1).

Table 1. Member State groups for 1991

1991	(-) Inflation (+)	
(-) Unemployment (+)	GR, PT, SE	BG, CY, HU, IT, PL, ES, UK, CR
	AT, BE, FI, LU, NL, MT	FR, DK, IE

Source: Self-made, based on World Bank data, 2016

Basically, only 6 out of the 20 Member States were correspondent to the theory of the traditional Phillips-curve. Apart from this, if we take a look at the two opposing extremes, while countries in a better state - excluding Malta - are all EU15 countries, those in a bad state show a very colourful image. The reason is that not only the Mediterranean and Regime Changing countries, but the United Kingdom was in this group as well. To compare, let's see the year 1995 (Fig. 2).

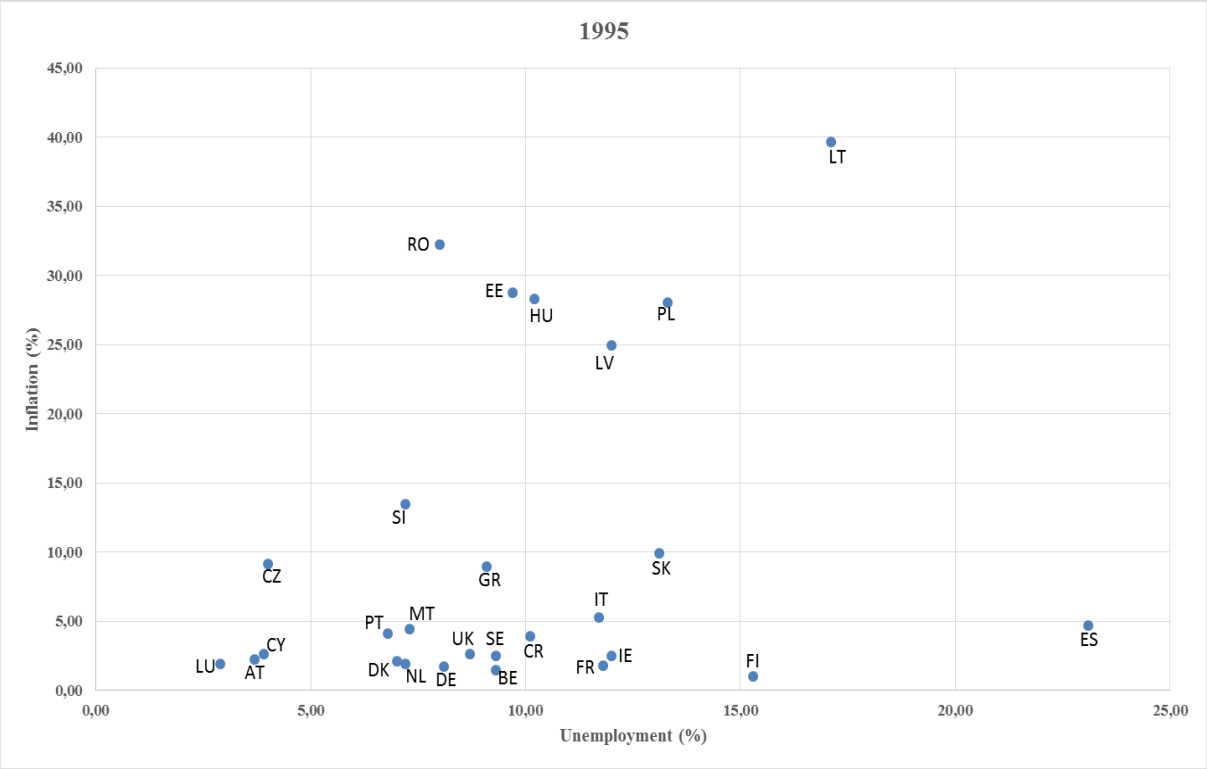

Fig. 2. Inflation/unemployment relation of Member States in 1995
Source: Self-made, based on World Bank data, 2016

For this year, we were able to assign data for each Member State, only Bulgaria had to be excluded due to their extremely high rate of inflation. (However, as for the cluster analysis, they will take part as well, similarly to the previous Table.) We can say that the distance growing between the Member States is only an optical illusion, as the outer curve we can observe on the figure only exists because the countries which had a Regime Change finally appeared in the analysis. Naturally, there were a few cases of countries changing clusters, but we can highlight two examples where both inflation and unemployment changed. These were Portugal and Sweden, where the lower unemployment and higher inflation values for 1991 changed to the opposite.

In the case of the Member State groups in Table 2, we'd like to highlight one thing this time, which is the reasoning weight of the inflation rate, or more importantly, it's capability to divide. If we take a look at the Table, we cannot differentiate between the EU15 and EU13 Member States based on unemployment. A different situation is prevalent for inflation, where we can see that apart from Croatia and Malta, only the EU15 countries had low inflation. Furthermore, we can only see high inflation in this year for the EU13 Member States - excluding Greece. Not to mention, most of the latter countries managed to get into the worst category, where both indicators have a really high value. This is no surprise, since we can generally say that in most of the Regime Changing countries, we could not observe an aware, deliberate economic policy in their first few years. Such a case was Hungary as well, where the country was, so to say, going with the flow from 1991 and 1994. 1995 was the first year when we deliberately used economic policy intervention, in the form of the notorious, and widely argued Bokros package (Aassve et al. 2006).

Table 2. Member State groups for 1995

1995	(-) Inflation (+)	
(-) Unemployment (+)	BE, FI, FR, DE, ES, SE, UK, CR, IE	BG, EE, GR, HU, IT, LV, LT, PL, SK
	AT, CY, LU, NL, PT, DK, MT	CZ, RO, SI

Source: Self-made, based on World Bank data, 2016

Now, let's take a look at the year 2000 (and let's not forget, we were stricter with the inflation maximum requirement, and lowered it to 3%), where all countries that had a Regime Change had the chance to make more significant interventions within their economies (Fig. 3). Now, only Romania was excluded, due to their high inflation value. Apart from them, all other Regime Changing nations seemingly adapted the decrease of inflation. This could also be seen on the figure of the analysis, as a two-digit, high inflation has become scarce. Therefore, we must make sure to not evaluate on first look, since the movement constraints of this figure are much tighter. However, we can see that whereas the

inflation's decreasing value made our Figure flatter, unemployment stretched it horizontally. And as for changing between inflation and unemployment, we have an example once again: Ireland. While during the 1990's, they always fought with a high unemployment rate even during low inflation, by 2000, they managed to push back its value. However, they had to deal with a higher inflation rate.

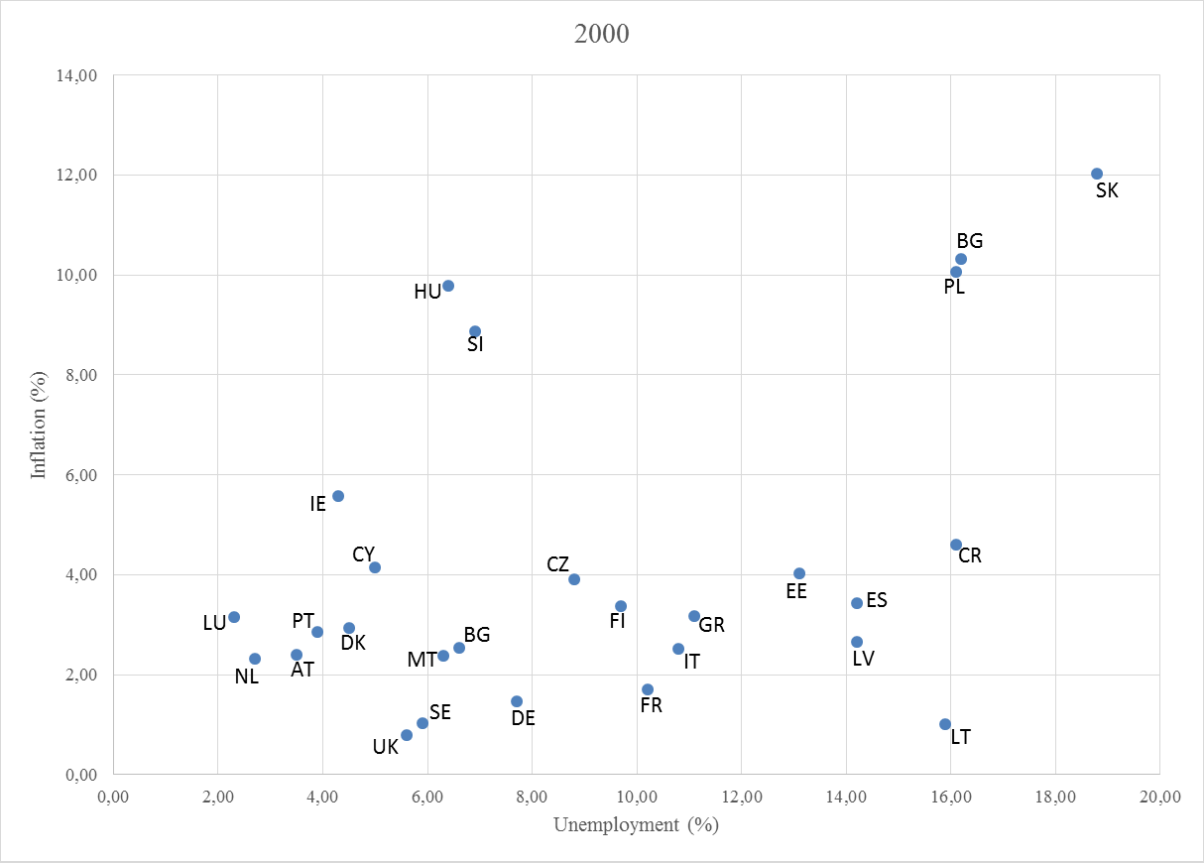

Fig. 3. Inflation/unemployment relation of Member States in 2000
Source: Self-made, based on World Bank data, 2016

As for the grouping, we can take a look at Table 3 for the values of 2000.

One significant surprise is that the cluster of low inflation rates and high unemployment was halved, and not only that, excluding the French, it was completely reshuffled.

Its two new members are Latvia and Lithuania, who were certainly gifted with this state, compared to the one they were in before, since we could describe them in the previous grouping as having extremely high inflation and high unemployment. At least they managed to salvage one of these problems. The extremities denying the Phillips-curve are still filled to the brim, and they also dominate the total outline. Though we have to state that the less advantageous side also lists in its members countries like the Czech Republic or Finland. They only got here due to the stricter inflation criteria, as if we look at them relatively, neither of their values is that high (unemployment under 10%, inflation under 4%).

In the case of Hungary, we can finally say that while their too-high inflation is still on the decrease, at least Hungary managed to gain grounds in a better situated category due to reducing unemployment.

Table 3. Member State groups for 2000

2000	(-) Inflation (+)	
(-) Unemployment (+)	FR, IT, LV, LT	BG, CZ, EE, FI, GR, PL, SK, ES, CR
	AT, BE, DE, NL, PT, SE, UK, DK, MT	CY, HU, LU, RO, SI, IE

Source: Self-made, based on World Bank data, 2016

And now, let's take a look at the year when all the countries became Member States of the European Union, excluding Croatia. This can be seen on Fig. 4.

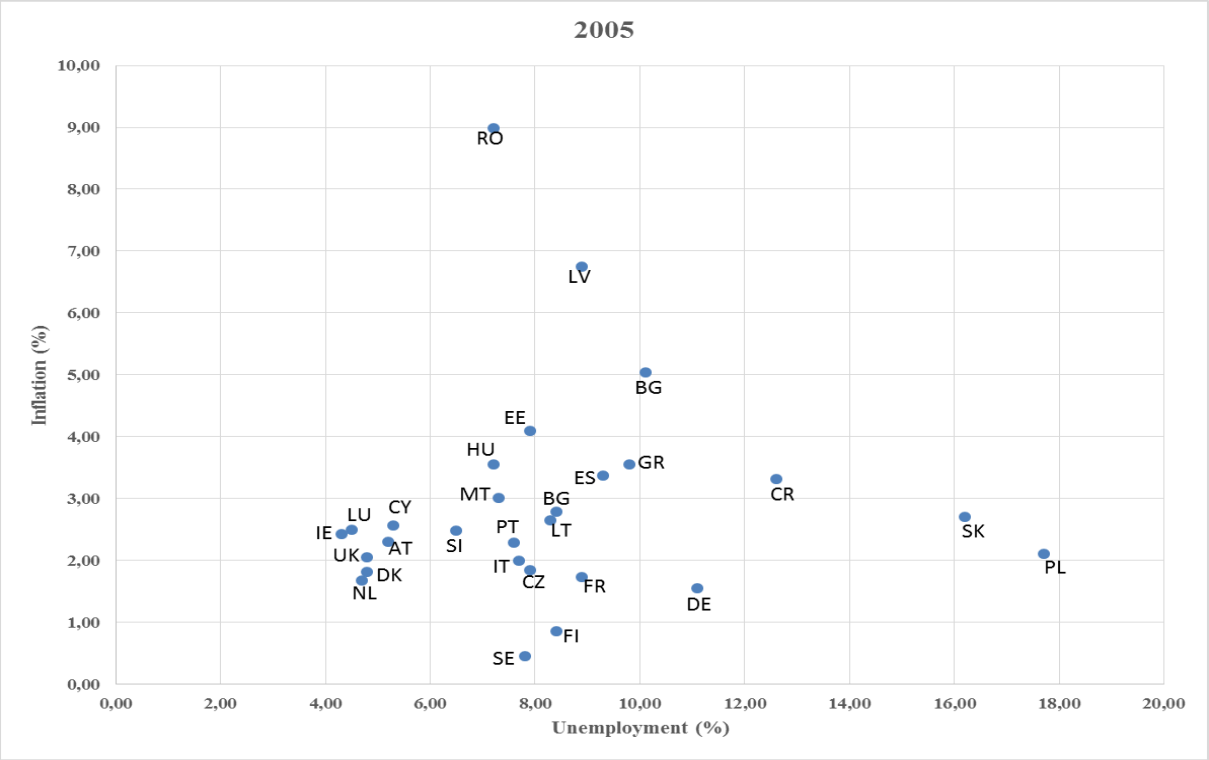

Fig. 4. Inflation/unemployment relation of Member States in 2005
Source: Self-made, based on World Bank data, 2016

Before we start a more in-depth analysis of the Figure, let's take our time, and think about the previous comment. Most of the countries are now Member States of the EU, which also means they have to meet different criteria. At this point, once again, we can go back to Goodhart's Law, who questions all indicators which are used for reaching political goals. In our case, this simply means that in some cases, we will be able to observe significant results for some Member States - often newly admitted ones. However, as for determining how realistic these are, we would need a level of insight into economic history for each nation which is simply impossible for us. Therefore, after this, we'll try to focus on researching the connection between inflation and unemployment, assuming the data can be considered trustworthy.

We can start with the case of Ireland, who were already highlighted in an earlier period as the successful victor against unemployment, for the price of high inflation. However, by the time of 2005, the Irish economy reached its modern-time peak, which made us realise that below an inflation rate of 3%, they managed the lowest unemployment. From the mid-1990's until this time, they had exemplary economic results, and due to this, they received the name "Celtic Tigers" (Baccaro and Simoni 2007). As for the European Conditions, the countries huddled together greatly, so much so that even the cluster analysis only managed to break them apart due to the strict 3% and 8% limit values. However, we can clearly see that both unemployment and inflation are on a relatively low level for each of the countries. On first sight, only Germany shows a relatively higher unemployment for low inflation. Furthermore, we could place Romania, Latvia, Bulgaria, Croatia, Slovakia and Poland on an imaginary Phillips-curve distanced from the mid-point.

In light of what we mentioned, the grouping seen in Table 4 may be the most unnecessary at this point, as based on the Figure, we can already imagine a perfect outline for the conditions of 2005. In spite of this, we can still use it to draw a conclusion: as for division, unemployment began to take on a much more important role. The reason of this is that there are much less countries that have a (relatively) high inflation. Therefore, the over-abundant - disadvantageous - upper right section also began to shrink.

Table 4. Member State groups for 2005

2005	(-) Inflation (+)	
(-) Unemployment (+)	BE, FI, FR, DE, LT, PL, SK	BG, GR, LV, ES, CR
	AT, CY, CZ, IT, LU, NL, PT, SI, SE, UK, DK, IE	EE, HU, RO, MT

Source: Self-made, based on World Bank data, 2016

The analysis of the year 2010 may prove to be interesting for us for many different reasons, as this period shows the state immediately after the Great Economic Depression began to show its influence (Fig. 5).

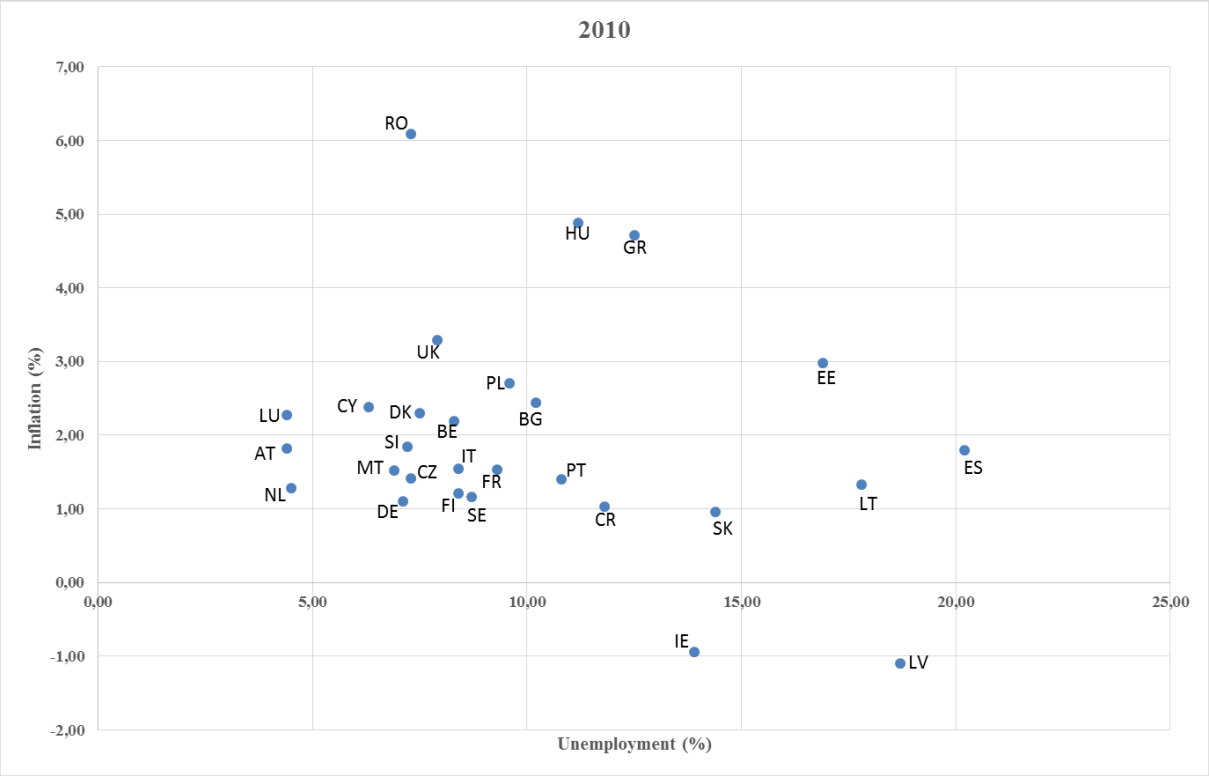

Fig. 5. Inflation/unemployment relation of Member States in 2010
Source: Self-made, based on World Bank data, 2016

We have to start the evaluation with the fact that inflation almost completely disappeared, and we can only talk about the EU's directive of 3% as the general norm, and the relatively high inflation is only slightly above it. As for unemployment, we can see how much the countries huddled together in the interval between 5 and 10%. However, of the EU13, only the Czech Republic, Poland, Cyprus and Malta, who performed well up until now were in this group.

The Great Economic Depression had much more detrimental effects on almost all of the late-joining Member States apart from them. The Phillips-curve, said to have moved by 2005 is much more of a half-circle at this time, which had the Baltic nations and Spain on its edge.

Furthermore, this group also had Hungary join them, and Ireland, who was an example twice before. As for the latter, the high unemployment rate returned.

The cluster analysis seen in Table 5 mainly supports the phenomenon that started in the previous period, which means that the unemployment is the main factor deciding the cluster membership.

Table 5. Member State groups for 2010

2010	(-) Inflation (+)	
(-) Unemployment (+)	BE, BG, EE, FI, FR, IT, LV, LT, PL, PT, SK, ES, SE, CR, IE	GR, HU
	AT, CY, CZ, DE, LU, NL, SI, DK, MT	RO, UK

Source: Self-made, based on World Bank data, 2016

Finally, let's take a look at the final year of our analysis, 2014, which can be seen in Fig. 6.

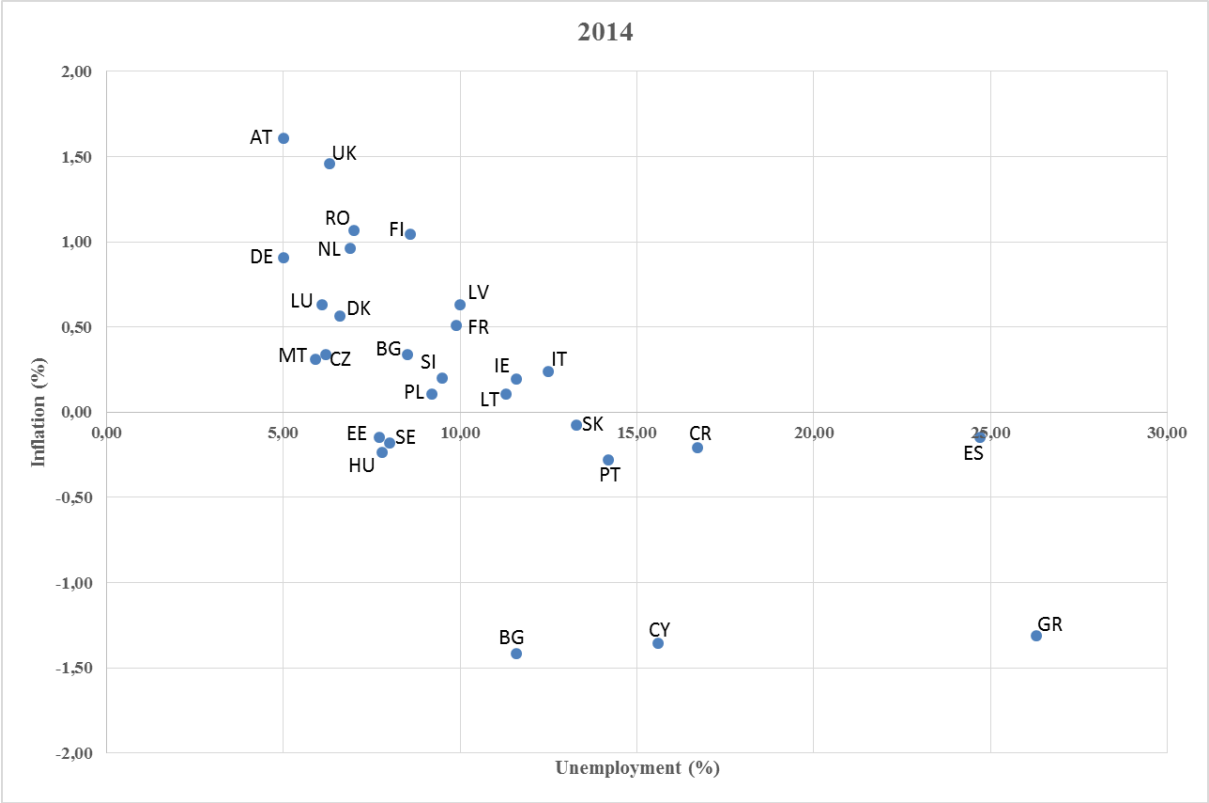

Fig. 6. Inflation/unemployment relation of Member States in 2014
Source: Self-made, based on World Bank data, 2016

We can see that the conclusion drawn in the literature chapter holds true, meaning that today, inflation almost completely disappeared, and merely exists in the economy of the EU. Also, its negative correlation with unemployment has become a sliver of existence. An interesting factor, however, is that the extended curve (resulting in a half-circle) reminding us of the earlier points of the Phillips-curve has disappeared completely, and countries having the highest unemployment rate all have a negative inflation. Also, we might want to take a look at the Baltic countries, who had the highest unemployment rate in the previous period, but managed to reach a significant decrease by 2014. And this suggests a motif that may prove analysis of the connections between inflation and unemployment completely unnecessary. The reason for this is the phenomenon already mentioned in the introduction - the labour force is leaving its country - which was significant by the time of 2010 not only in the Baltic countries, but in the Central- and Eastern-Europe regions on a whole as well (Józsa and Vinogradov, 2017). Naturally, this is also obviously advantageous for statistics, since it efficiently does away with unemployed, but it's no coincidence that nowadays, it's more effective to analyse the Phillips-curve in relation to the production gap.

Finally, it may prove to be no surprise that the results of Table 6 have no weight, as starting from 2005, due to the disappearance of inflation, it was capable of explaining less and less. We can see that the grouping system for countries we made is completely dependent on the unemployment data.

Table 6. Member State groups for 2014

2014	(-) Inflation (+)	
(-) Unemployment (+)	BE, BG, FI, FR, GR, IT, LV, LT, PL, PT, SK, SI, ES, CR, IE	
	AT, CZ, EE, DE, HU, LU, NL, RO, SE, UK, DK, MT	

Source: Self-made, based on World Bank data, 2016

Conclusions

Based on the results of the research, we can make three distinct conclusions for the relation between indicators during the time interval: first, inflation during the 90's had a much more important role in explaining the state of affairs, we could see how in some cases, high and low inflation clusters almost completely separated EU15 from EU13. During the 2000's, this trend completely turned around, due to inflation disappearing, and unemployment garnered higher and higher influence in separation within the cluster. And by the 2010's, due to how labour travels within the EU, a state where the traditional Phillips-curve's logic is impossible to interpret

came into being, for most of the newly joined Member States.

To summarise the analysis, we can state that the traditional interpretation of the Phillips-curve, which suggests a relation between unemployment and inflation, has completely diminished nowadays. One of the reasons for this is the process of globalisation, which was already foreshadowed by Robert Lucas in 1973 - as we said in the literature chapter. He mainly stressed the importance of the flow of information accelerating back then, however, one of the most notable challenges of nowadays is obviously the liberalised European labour market. This phenomenon also raises the question: is it efficient to aim at the generally prevalent common European market, if economic policy's tools clearly don't function on this level at this point in time? The other extremity is when the common policies successfully passed stand in the way of Member States in efficiently using their national-level economic policy toolset. We could see how the Europe-level monetary policy, and low inflation expectations resulted in national-level monetary policy losing its influence above domestic economies. The right of existence of the Phillips-curve was first questioned when it became vertical in the 70's. In spite of modifications, nowadays, its horizontal curve shows that the relation it suggests has diminished almost completely. One of the reasons for this is the lack of synchronised usage of the economic policy toolset.

The other, we could say 'bad luck' of the Phillips logic is that it highlighted a connection system between macroeconomic indicators, which are always the priority of the political power, no matter which power it is. And according to Goodhart's Law introduced during the analysis, manipulation of phenomena like indicators measuring economic performance was not only done in present time. Goodhart meant this statement, or thought as the critique of the British government headed by Margaret Thatcher, who simply went too far with their monetary policy, and always had it latch onto a certain target of political interest. Therefore, from the perspective of later analyses, an interesting question could be if the earlier trends of macro-economy were really defeated by the ever-changing World, or they simply deteriorate under the selfish governance of the political leadership.

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