

## A Search for an Optimum Currency Area

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### **Abstract**

*Economic and monetary integration is the result of unifying efforts that have become a major driving force in post-war Europe. Although some of the initial initiatives, the Monetary Union project has many times been on the brink of interest. It can be as the surprise that Europe has managed to implement the common currency so soon and relatively smoothly. Nevertheless, even after its launch, this project has never completely abandoned criticism and discussion of the legitimacy and meaningfulness of its existence. Critical attitudes to the introduction of the common currency in the European Union are based above all on the Optimum Currency Area theories. The theoretical concept of optimal currency areas is currently considered a standard tool for assessing monetary integration efforts in Europe. OCA criteria are used to estimate the readiness of the candidate countries to adopt the euro, while the convergence processes are linked to the decision on the euro adoption timeline. The aim of our research article is, therefore, to closely analyze the issue of monetary policies and optimal currency areas in the context of convergence efforts towards more closely integrated economic and monetary unions.*

### **Key words**

*Political Integration, Monetary Policy, Transmission Mechanism*

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### **Introduction**

Monetary policy belongs to the core functions (from the point of view of the functioning) of the central bank and is at the same time one of its defining features. Furthermore, it means the central bank's activity associated with the regulation of the amount of money in the economy, which is linked to the use of certain instruments and pursues certain objectives. By regulating the amount of money in the economy, monetary stability is to be achieved, for which it is considered a state where the money supply  $M_s$ , corresponding to the amount of money in circulation, equals the demand for money  $M_D$ , i.e. the economically necessary amount of money in circulation. Therefore, we can say that the central bank is trying to maintain the economically needed amount of money in circulation. Since there is no way to determine the economically necessary amount of money in circulation and the same problem arises with determining the real amount of money in the economy, the disruption of monetary stability can only be recognized only side-effects. In controlling the amount of money, the central bank is centered on a monetary basis, which is made up of the total volume of bank reserves and currency

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outside the banking sector, and through which it mediates its influence on money supply in the economy.

Monetary policy objectives are usually set by law to the central bank, but almost always is the main one the price level stability. Other objectives that the central bank can monitor in its policy include balance of payments, support for economic growth, exchange rate stability, employment support, interest rate stabilization, and the stability of financial markets. The central bank basically carries out three types of monetary policy - expansive, restrictive and neutral (Meade, 2007). Firstly, if it applies an expansive monetary policy, it seeks to accelerate the growth rate of the amount of money in circulation, assuming the inflation rate is relatively low. It uses reduced interest rates on operations that money circulation-wise, thereby reducing interest rates in the economy, and thus supports the willingness of commercial banks to provide loans and clients to accept them. The willingness of households and companies to spend money increases, the speed of circulation of money is increasing, which ultimately leads to growth in the economy.

This expansive policy is chosen in the event of economic downturn, high unemployment, high interest rates, while the inflationary threat is small. Under the restrictive monetary policy, on the other hand, by increasing the interest rate on operations used by the central bank to regulate the amount of money in circulation, other interest rates in the economy will increase, which will lead to greater reluctance to provide and receive credit. As the price of money increases, households and businesses spend less willingly. Secondly, for a restrictive monetary policy, the central bank will decide in the case of too strong economic growth, which puts pressure on wage growth and consumer prices, low unemployment, and impending inflation. Thirdly, a neutral monetary policy is based on the pursuit of a stable rate of growth in the amount of money in circulation. Central banks can implement their monetary policy under the four-basic regimes<sup>2</sup> to facilitate their decision-making and make these decisions understandable to the public (Burda, 2015).

## 1 Methodology

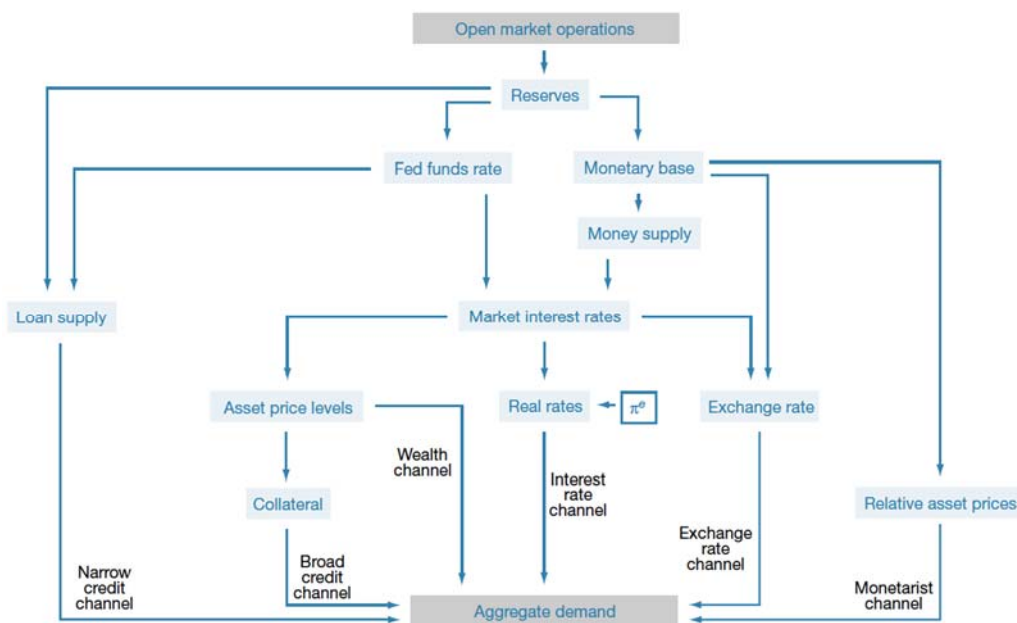
The central bank has several instruments available to implement monetary policy, which can be divided into direct and indirect monetary policy instruments according to the impact on the behavior and operation of the banking system. The main difference between these two groups of instruments lies in the extent of their impact on the banking system. Indirect instruments operate on a broader basis for banking institutions, creating unified conditions for their operation. Direct instruments are mostly the nature of administrative regulations, and their effect on the banking system is selective and addressable, the central bank seeks to influence the credit facilities and liquidity of commercial banks. Basic indirect instruments include open market operations, regulation of minimum reserve requirements and discount instruments and exchange rate interventions as an independent part of the central bank's monetary policy.

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<sup>2</sup> Implicit nominal anchor regime, monetary targeting, currency targeting, inflation targeting.

The essence of monetary policy lies in using its instruments to achieve the ultimate target of monetary policy - usually price stability. However, with the monetary policy instruments, this ultimate target cannot be achieved directly, but only through the operational criteria, i.e. the market short-term interest rate that central banks can influence by their instruments (Spanjers, 2009). According to well-known or at least forward-looking estimates, the operational criteria apply to intermediate criteria, which once again, according to known or supposed links effect the final objective of monetary policy. This chain of bonds is then referred to as a transmission mechanism, while we distinguish three basic transmission mechanisms - monetary, credit and exchange. The operational and mediating criteria for individual mechanisms are closely illustrated in Scheme 1. Monetary transmission is a complex and interesting topic because there is not one, but many, channels through which monetary policy operates. The process begins with the transmission of open market operations to market interest rates, either through the reserves market or through the supply and demand for money more broadly. From there, a transmission may proceed through any of several channels. The interest rate channel is the primary mechanism at work in conventional macroeconomic models. The basic idea is straightforward: given some degree of price stickiness, an increase in nominal interest rates, for example, translates into an increase in the real rate of interest and the user cost of capital. These changes, in turn, lead to a postponement in consumption or a reduction in investment spending. This is precisely the mechanism embodied in conventional specifications of the investment–saving curve – whether of the Old Keynesian variety, or the forward-looking equations at the heart of the New Keynesian macro models” (Kuttner, 2002).

**Scheme 1** The Transmission Mechanism and Instruments of Monetary Policy



Source: Kuttner – Mosser, 2002

The aim of our research article is, therefore, to closely analyze the issue of monetary policies and optimal currency areas in the context of convergence efforts towards more closely integrated economic and monetary unions. Therefore, the real added value of our research article is a synthesis of the theoretical approaches and functional principles of the partial aspects of the monetary union. In relation to our aim, we have constructed the following research questions:

- How do asymmetric shifts affect monetary and non-monetary union countries?
- What kind of economic shocks do we distinguish and how do they relate to the issue of fixed vs. floating exchange rate?
- Which factors affect the convergence processes?
- Which aspects are important when measuring convergence?
- What is the difference between nominal, real and price convergence?
- What are the most important optimal currency area criteria?
- Can high market liberalization also have negative effects?

## **2 Results and Discussion**

### **2.1 Ever closer to Heaven? The Relevance of Optimum Currency Area**

Since concepts of monetary area and monetary union can be found in many optimum currency area theories, it is appropriate to define them. Firstly, the currency area is a fixed exchange rate regime where two or more currencies are fixed in the territory of each other. Secondly, the currency union consider fixed exchange rate regime, which includes the commitment of the member states to share a single common currency (Brunnermeier, 2016). However, most authors use the terms monetary area and monetary union as synonyms. Moreover, the development of optimum currency area theories can be defined as early – traditional and contemporary – alternative. Traditional<sup>3</sup> ones, which arise in the 1960s, analyze the absorption of economic shocks and we can mark them as purely macroeconomic, characterized by the fact that they are based on the Keynesian assumptions of short-term wage and price, the interchangeability of inflation and unemployment by the principle of Phillips curve, and the possibility of stimulating economic policy performance. Since the 1970s, a second<sup>4</sup> approach has emerged, which assumes that no country meets all aspects of the optimum currency area, focusing on analyzing the benefits and costs that arise when setting up a monetary union. In attitude to the microeconomic aspects and the inefficiency of nominal exchange rates in shock absorption, while the criterion of symmetry of shocks comes first. At the end of the 20th

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<sup>3</sup> Mundell (1961), McKinnon (1963) and Kenen (1969).

<sup>4</sup> Grubel (1970), Corden (1972), Ishiyama (1975), Tower and Willet (1976).

century, the question is raised about the impact<sup>5</sup> of monetary integration on the economies of the monetary union countries, having its rebirth<sup>6</sup> in the birth of the European Monetary Union.

The optimum currency area views can be evaluated from a microeconomic and macroeconomic point of view. Models based on microeconomics views attempt to incorporate market imperfections and rigors into optimum models such as nominal rigidity (wage or price); poorly functioning financial markets; the existence of expectations and their subsequent fulfillment or non-fulfillment; public finances and inflation taxes. The macroeconomic approach evolves in two directions. The first one analyzes the development of real or nominal exchange rates on historical databases. Analysis of real exchange rates<sup>7</sup> is based by the assumption that changes in the real exchange rate lead to changes in relative prices in the economy and therefore countries with volatile exchange rates are not suitable candidates for entry into the monetary union. However, the shortcoming of this approach is that, based on past data (from the time the country had its own currency), it forms conclusions about the future, which does not fully reflect the reality. The second macroeconomic approach attempts to prove the existence of economic shocks and to estimate their correlation, analyzing their symmetry/asymmetry in the European Community and the United States. In terms of optimum currency area theories, the benefits and risks arising from the country's entry into monetary union can be identified by examining the conditions under which the core economic policy objectives (price stability, full employment, balance of payments balance, and economic growth).

## 2.2 A Macroeconomic Assessment of Monetary Integration

The concept of optimal currency areas is nowadays considered to be a standard tool for assessing monetary integration efforts, namely in Europe however, late cases represent the Southeast Asian monetary forms, Asian Pacific Currencies, French Franc Zone in Africa, Caribbean Currency Union. On a similar note, there are numerous optimal criteria, which are used to estimate the readiness of the candidate countries to adopt the common currency and the assessment of the current readiness and convergence process is linked to the decision on the time horizon adoption (Kawai, 2015). When a country is deciding to join the Common Monetary Union (also known as Common Monetary Area; Currency Union), it should accept the choice of the right timing of entry to eliminate the risk of disrupting its own macroeconomic stability. The country's economy should at the entry meet the parameters in which the loss of the exchange rate and the

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<sup>5</sup> Krugman's specialization hypothesis and Frankel-Rose hypothesis of the endogeneity of OCA criteria.

<sup>6</sup> Méltiz (1991), Tavlas (1993), Blanchard and Wolfers (2000), Calvo and Reinhart (2002), Alesina and Barro and Tenreiro (2002), Barro and Lee (2011), (Pasimeni, 2014), De Grauwe (2017).

<sup>7</sup> The so-called OCA index, where the value of the index reflects the country's eligibility to become a member of the monetary union. The lower the value of the index, the lower the volatility of the nominal exchange rate in the economy, and thus, it is more appropriate for the country to adopt the common currency (Capie, 2014).

separate monetary policy does not cause serious economic problems, since at that moment, together with monetary and exchange rate policy, it also loses the opportunity to adjust its competitiveness by changing the exchange rate. Decisions on the setting of interest rates will be made by the common central bank (i.e. the European Central Bank) and there is a natural risk that the setting of monetary policy will not fully meet the needs of the country (Baldwin, 2015). In view of the "irreversibility" of the process of engaging in the common monetary union and the abandonment of sovereignty over monetary and exchange rate policy, it is desirable for the countries to understand the potential risks of economic asymmetric shocks whose impact on the single country will be different from the impact on the currency. We talk about so-called asymmetric shocks<sup>8</sup>.

If such shocks occur, the country will be exposed to their effects differently from the common monetary union, and the union's central bank monetary policy on the manifestations of these shocks will not respond adequately to country's as it will be driven by developments in the currency and not in the country. Based on the assessment of the risk of asymmetric shocks and the ability to cope with shocks by their own mechanisms, it is possible to determine the degree of alignment<sup>9</sup> of the country with the monetary union. Under the term asymmetric shock, we understand a global shock, affecting simultaneously or negatively/positively more countries, but with an asymmetric, therefore unequal (opposite) impact on each of them. An asymmetric shock can also be considered a shock where the impact on both countries is symmetrical but of varying intensity. In addition to asymmetric shocks, countries may be exposed to the idiosyncratic shock – a country-specific unsystematic shock affecting individuals or macro households with little or no correlation with market risk. Likewise, symmetrical shocks with asymmetric impact can also occur, while there may be many reasons for the different reaction of two countries to the same shock. This may be due to a different socio-economic structure, regulation of labor markets, the role of the financial and banking sector, the external debt of the country (Marco, 2014).

Naturally, if countries form a monetary union, they lose the option of using their own monetary and exchange rate policy to restore balance - asymmetric shocks-wise and then, it will be necessary to use other mechanisms to restore the balance (labor mobility and wage flexibility). Moreover, the basic point of the optimum currency area is to determine whether the countries or regions of the monetary union are exposed to symmetrical shocks or whether they have other mechanisms to absorb asymmetric shocks. Countries with their own currency can counterbalance the effects of asymmetric shocks using the exchange rate, autonomous monetary and fiscal policies. The autonomous fiscal policy of monetary union countries is limited by the existence of the stability and growth pact. Therefore, it is necessary to understand the criteria (De Grauwe, 2016) for the optimal currency area, which include:

- A risk sharing system i.e. automatic fiscal transfer (to redistribute money to areas/sectors);

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<sup>8</sup> The existence of which is essential for the functioning of currency areas. The asymmetric shock is represented by a change in aggregate supply or demand that does not affect all countries in the monetary union in the same way (i.e. consumer preferences between monetary union countries, resulting in an asymmetric demand shock).

<sup>9</sup> At a time when it is decided that the degree of alignment is sufficient, it is clearly advantageous for the country to adopt the common central bank 's monetary policy and to join the union.

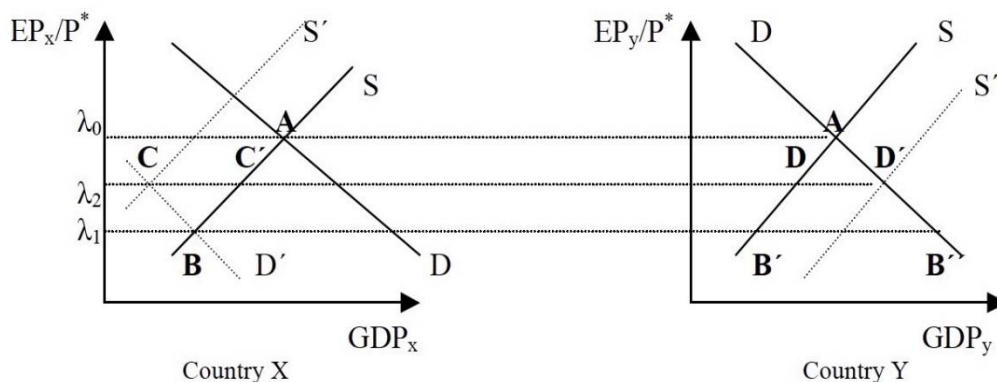
- Diversification of production;
- Openness of the economy with capital mobility across the region;
- Political conditions, ability to act uniformly (commonality of destiny) and similar business cycles (i.e. homogeneous preferences);
- Price and wage flexibility across the region;
- Productivity and labor mobility across the region.

Most important, the openness of the economy<sup>10</sup> helps the competitive environment in international trade, which is then able to offset the prices of most commodities. Thus, when the economy is small and very open to foreign trade, it has little ability to influence the prices of its goods on world markets. In such a case, the assignment of the exchange rate does not represent such a loss. The better the country's meet the criteria, the higher the benefits of joining the monetary union can be expected. In addition to the benefits and risks stemming from the immediate fulfillment of the optimum currency area criteria, the country can face other risks and benefits associated with entering the monetary union. When searching for an optimum currency area, we mostly need to look at the cost of a monetary union in which an asymmetric shock occurs. In other words, if one country of the monetary union is hit by a negative demand shock there will be shifting of the demand curve for the production of country X to the left down from  $D$  to  $D'$ . The vertical axis  $EP_x/P^*$ ,  $EP_y/P^*$  captures the real exchange rate of the countries of the monetary union against the non-monetary union countries, where  $P_x$  and  $P_y$  are prices of domestic goods in the countries of the monetary union,  $P^*$  is the price level of the non-monetary union countries,  $E_0$  is the common exchange rate. Point A represents the initial equilibrium of both countries X and Y at the real exchange rate  $\lambda_0 = E_0P_x/P^* = E_0P_y/P^*$ .

If the country X was not part of the monetary union and could change its exchange rate freely, regardless of the common central bank, the real exchange rate would depreciate to  $\lambda_1 = E_1P_x/P^*$ . Since the country Y has no reason to change its nominal and real exchange rate, the value of its real exchange rate  $\lambda_0$  is optimal. Given that both countries are part of a monetary union, there is a contradiction between their needs. Assuming inflexible wages and prices, both countries share the same real exchange rate  $\lambda_2 = E_2P_x/P^* = E_2P_y/P^*$ . Country X is in recession, while country Y is experiencing a boom. In the long run, this is untenable. The new level of the exchange rate does not suit a single country. For one country, the currency is too strong, for another weak. Total output is a combination of surplus supply  $CC'$  and surplus demand  $DD'$ . Country X cannot sell its production, so its prices should decline until the real exchange rate drops to  $\lambda_1 = E_2P'_x/P^*$ . Country Y is in the opposite situation. The prices of its production should increase until the real exchange rate rises to the original level of the real exchange rate  $\lambda_0 = E_2P'_y/P^*$  (Lacina, 2007).

<sup>10</sup> A simple share of foreign trade volume on GDP or also covers foreign trade intensity with the integrated countries.

**Scheme 2** Effect of an Asymmetric Shock in Monetary Union



Source: Author

**2.3 Deciding on the Exchange Rate Regime**

Exchange rates are an appropriate tool if countries need to adjust their external exchange rates and domestic wages since prices also adjust slowly. It is also considered as an effective macroeconomic tool that protects the economy from the external shocks. In the system of free-floating exchange rates, change in the nominal exchange rate can help to eliminate the negative effects caused by real shocks without losing out on the output and employment side. Deciding on the exchange rate regime is a complex issue. In selecting the exchange rate regime. The country must take into account its structural characteristics such as the mobility of factors of production, the size and openness of the country, the wage and price flexibility, the arrangement of the financial system, the nature and symmetry of any shocks, the historical credibility of monetary policy. As we have mentioned, by joining the monetary union, the country loses the opportunity to use the exchange rate as a macroeconomic tool, has no possibility to determine the amount of money in circulation and thus to influence the economic developments in the country. Negative effects are thus mitigated by a change in the price level or real GDP.

Additionally, the variability of domestic nominal<sup>11</sup> GDP under the flexible exchange rate regime is the result of domestic monetary shocks, fully affecting the domestic market. On the other hand, in the monetary union, national nominal GDP is partly influenced by domestic or foreign currency shocks, depending on the degree of openness of the economy and real shocks (caused by monetary distortions, they create the costs of adjusting the country in the monetary union). The impact of shocks is shared by all countries of the monetary union and the net income is positively influenced by the volatility of domestic monetary shock as the emergence of monetary union reduces the impact of the monetary shock. The volatility of foreign currency shock affects net income negatively, as only the countries of the monetary union influence this shock. By creating a monetary union with a positive correlation between domestic and foreign currency

<sup>11</sup> The monetary value of all the finished goods and services produced within a country's borders in a specific time period evaluated at current market prices, whereas the real GDP is inflation-adjusted.



shocks, countries with higher monetary instability will gain stability. Monetary shocks (unexpected changes in the M2 monetary base) are transmitted across countries, which is an advantage for countries with less monetary stability. For other countries, the monetary shock is likely to be a loss (the more open, the higher the loss). The openness of the economy strengthens the cost of adapting to the monetary shock. With a negative correlation between domestic and foreign currency shocks, monetary stability will gain all countries, as foreign currency shocks mitigate domestic monetary shocks.

We can see that the more the countries are open, the more will they gain from becoming members of the monetary union. In the same manner, real demand shocks are relevant only within the context of the monetary union. If they are positively correlated and have the same standard deviation, no adaptation costs are incurred by the country. Otherwise, the exchange rate implies high adjustment costs. In conclusion, if the country is exposed to strong asymmetric shocks, it is better for it to have a floating exchange rate, as it allows a relatively rapid settlement of the external imbalance while the fixed exchange rate hinders it.

## 2.4 The Cost of Successfully Integrating into the Monetary Union

The successful integration of a country into a monetary union depends on the magnitude of the difference in the real and nominal level of economic variables compared to the average of the countries of the monetary union. The smooth and continuous concurrence of nominal and real convergence with the values of the monetary union, where the price level, along with the country's economic level, will move closer to that of the monetary union. In other words, for a trouble-free integration process the balance between economic and price levels is crucial, since too rapid rise in consumer price levels, inadequately backed by labor productivity growth and wage growth, would threaten<sup>12</sup>. The development of living standards as a result of falling real wages and real incomes for the population. The underlying assumption of catching up with the monetary union countries' (when joining the union), in the context of socio-economic levels, is that less developed countries are at a lower technological level and can, therefore, be more economical than those already on the technological frontier. One of the possible ways to achieve faster economic growth is expansionary national economic policies. However, with longer-term expansion, demand-driven inflationary pressures are occurring, and attempting to achieve nominal convergence thus hinders real and structural convergence<sup>13</sup> (Alexiadis, 2013).

It is important to note that, when it comes to the price convergence, it is often confused with nominal convergence. Testing of price convergence is performed using variables reflecting the price levels of economies, namely individual product prices, or more aggregated data in the form of price indexes. Furthermore, nominal convergence

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<sup>12</sup> Wage growth, which would be faster than labor productivity growth, would lead to a reduction in competitiveness and a slowdown in economic growth.

<sup>13</sup> Convergence in theoretical concepts is related to economic growth theories, which seek to analyze and explain the factors influencing the pace and levels of economic growth in individual countries. Moreover, convergence means that the difference between two values decrease over time and these differences become negligible and converge to zero.

represents the convergence of nominal variables, such as GDP in nominal terms or in nominal wages. Mostly, however, under the nominal convergence means the fulfillment of the Maastricht criteria<sup>14</sup> to ensure the stability of the common currency and are a prerequisite for admission to the Eurozone member countries. Real convergence means approaching the socio-economic level of another country or group of countries. The real convergence occurs when the gap in the socio-economic level of comparable countries is reduced, measuring the productivity of the economy, by the most commonly used gross national income per capita and real gross domestic product per capita. Therefore, it logically means that the gap between rich and poor economies diminishes over time. In the most cases, the indicator GDP per capita in purchasing power parity is commonly used for measuring real convergence, since the advantage of this indicator is that

it reflects the purchasing power of the domestic currency, and thus eliminates price differences between the economies, while also reflecting the standard of living of its residents.

However, when trying to achieve faster economic growth by expansionary national economy policies, fiscal expansion is untenable in the medium-term due to budgetary constraints. Another potential source of long-term acceleration of economic growth and rising economic levels may be the strength of the economy. This is supported by the continuous accumulation of human capital and the continuous development of new technologies that guarantee the economy a faster GDP growth per capita than in other countries. Real convergence based on this mechanism is of a long-term nature. This model of internal growth is based on the idea of generating economic growth by itself, corresponding rather to the environment of large developed economies located on the technological frontier. Another source of growth acceleration means increasing international interaction. Leveling up the country's standard of living is a question of the medium-term horizon. The external source of financing is the accompanying phenomenon of this growth resource, unlike the endogenous growth of the economy associated with internal financing. International interaction can help boost the country's economic level by liberalizing trade or closing a technological gap (Baldwin, 2016). Trade liberalization will expand export and import opportunities, including expanding the possibility of importing previously unavailable technologies. Thanks to technological innovations, foreign demand for domestic goods will increase. This will result in a transition of the economy to a faster growth path in the medium term. In some models, high liberalization can lead to the displacement of domestic goods by imported.

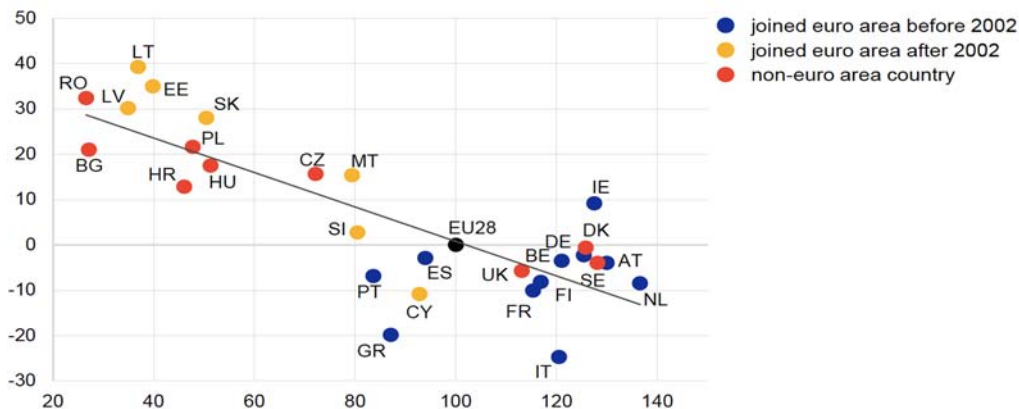
To analyze real convergence from a practical point of view, in the eurozone (as an example of OCA), there is significant evidence that the GDP per capita of lower-income economies has been catching up with that of higher-income economies since the start of monetary union. We will compare GDP per capita (expressed in PPS) across EU countries. (The different accession dates of those countries to both the EU and the euro area) – The first wave of euro area members (the EA-12), more recent members as well as all non-euro area EU Member States, between the years 1999-2016. According to European Central Bank since 1999 some degree of real convergence has taken place in the most

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<sup>14</sup> Price stability (consumer price inflation rate); sound public finances (government deficit as % of GDP); sustainable public finances (government debt as % of GDP); durability of convergence (long-term interest rate); exchange rate stability (deviation from a central rate).

recent EU Member States". As shown in the Scheme 3<sup>15</sup>, both non-euro area EU countries (green triangles) and countries that adopted the euro after 2002 (blue circles) usually performed better than the EA-12 countries (red squares) over the period 1999-2016. The **Lithuania, Estonia, Latvia, Romania and Slovakia have achieved the largest degree of convergence among EU countries** so far, followed by other countries in the CEE (Central and Eastern Europe) region" (European Central Bank, 2017).

**Scheme 3** Development of Real Convergence in the EU between the years 1999-2016



Source: European Central Bank, 2017

Scheme 4 shows the development and forecast of the real gross domestic product growth (in % over last year, average). The EU has seen a sustained return to growth following the economic and financial crisis.

**Scheme 4** Development and Forecast of Real Gross Domestic Product in the EU between the years 2000-2019



Source: European Commission, 2017

<sup>15</sup> GDP at current prices per capita in PPS; EU28 = 100; x-axis shows the initial level in 1999; y-axis shows the cumulative change in the level (1999-2016).

This is set to continue in coming years. Higher growth rates in non-euro area Member States compared to the euro area will support further upward convergence and the euro area will account for as much as 85% of the European economy after the United Kingdom's departure from the EU in 2019" (European Commission, 2017).

## 2.5 Accelerating the Economic Growth

Economic growth is accelerated mainly by closing the technological gap – by improved technical efficiency following trade liberalization between countries/areas, but this mechanism is only available to economies that have not reached certain technological boundaries. The necessary condition for its realization is the mobility of capital, namely the liberalization of the capital market and the existence of private ownership. Economies that have begun to import technology and human skills through foreign direct investment have a relatively higher GDP per capita. For foreign investors, FDI is attractive to the economies of the new monetary union member states, as their marginal revenue is higher than in more developed economies. In addition, if economies are very open this increases the effect of international interaction and for those economies that do not have enough domestic resources to close the technology gap, foreign direct investment is more advantageous than a mere increase in debt because it allows risk sharing and the transfer of both technology and human skills (capital). The role of foreign direct investment in closing a technological gap also has a direct effect on nominal convergence. The availability of resources needed for real convergence depends on the criteria which foreign investors consider relevant to their investments, especially the relative labor cost. Other key factors include the country's credibility, human qualification and infrastructure.

On the other hand, the most discussed causes of price convergence include differences in labor productivity (as well as other important causes of price convergence include improving the quality of goods and services, deregulation of prices, cutting down existing constraints and inflowing foreign investment). Labor productivity in countries with lower economic levels is behind labor productivity of developed countries, particularly due to the lower capital production and lack of know-how. Labor productivity in less developed countries is growing faster due to the higher marginal product of additional capital and an increase in human skills. The relationship that raises labor productivity growth and the rise in price levels is called the Balassa-Samuelson effect<sup>16</sup> and it has two implications in the context of monetary union/optimum currency area convergence.

Firstly, it explains how much higher productivity can increase the price level in one country compared to the other so that the fixed exchange rate does not damage the

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<sup>16</sup> Based on the division of the economy into the tradable and non-tradable goods sectors. If labor productivity increases in the economy, wages in the tradable and non-tradable sectors also grow. Prices in the tradable goods sector, however, are growing more slowly, as wage growth is associated with a more pronounced increase in labor productivity. Also, in the non-tradable goods sector, comparable wage growth will be required, but due to the nature of goods in this sector, such productivity growth is not achieved. In addition, wage costs are generally higher in this sector. In view of this discrepancy, there is a rise in prices mainly in the non-tradable sector. As a result, the price level is rising throughout the economy.

country's competitiveness. This is especially important for countries sharing a single currency. Assuming the perfect mechanism of equalizing the prices of tradable goods between countries and the same proportion of tradable goods on the market, for each two countries A and B, the common currency can express a relationship for the existence of an inflation differential as  $p_{cA} - p_{cB} = (1 - \alpha)(q_A - q_B)$ , where  $p_{cA}$  and  $p_{cB}$  are changes in the consumer price index in the country,  $\alpha$  is the share of tradable goods and  $q_A$ ,  $q_B$  the rate of labor productivity growth in countries A and B.

It is therefore obvious that higher labor productivity growth in one country of the monetary union will also lead to the higher growth of price levels. This also means that the differing rates of rising in price levels in individual countries of the monetary union are not a problem if they occur in line with the increase in labor productivity. However, if the rise in price levels is too rapid in relation to the increase in labor productivity, this situation will lead to the loss of competitiveness of the country with higher inflation (if it is unable to offset the resulting inflation differentials through the depreciation of the currency). The persistence of such a situation in the economy will lead to imbalances in the current account of the balance of payments, which can then also be a source of instability of the common currency in addressing the problem of its financing. Secondly, the Balassa-Samuelson effect is relevant primarily to floating-rate economies, trying to keep the inflation rate at the desired level. This factor has influence especially during the exchange rate economic and monetary union mechanism participation. If labor productivity growth does not lead to a rise in price levels, a nominal appreciation of the exchange rate will occur within the  $\Delta E^i = \alpha \pi^{NT} \cdot (PP^T - PP^{NT})$ , where  $\pi^{NT}$  is the share of non-tradable goods on the price index and the  $(PP^T - PP^{NT})$  is the difference between the growth rate of labor productivity in the tradable and non-tradable goods sectors (Barro, 2004).

## Conclusions and policy implications

The gradual deregulation of trade barriers and the growing international division of labor coupled with stable exchange rates can be described as factors contributing to economic development. In an environment in which individual economies are increasingly interconnected and the influence of the external economic environment increases, more and more economic entities are interested in stable conditions in dealing with foreign countries. The countries in the position of the importer are dependent on the prices of the expected deliveries and countries in the exporter's position are under the influence of global demand, while the exchange rate is the crucial variable in these relations<sup>17</sup>. In this context, the currency area represents an area in which countries commit to accepting fixed exchange rates without the possibility of devaluation or revaluation, renouncing their national currencies and responsibility for implementing monetary policy -they undertake to coordinate economic policy jointly. If certain conditions are met, such as the general integration of economies and the mobility of factors of production, monetary integration is considered the best possible solution. The optimum

<sup>17</sup> If prices fall, the prices of imported goods are rising, while prices of exported goods are declining. If a country wants to avoid higher inflation than a competing country, it needs to keep the exchange rate stable, meaning that there is a tendency to create a currency area.

currency area theories are the forefront of many integration discussions of whether Western Europe is an optimal currency area.

The optimum area of the monetary union corresponds to the balance of benefits and costs. The emergence of the European Monetary Union was a new impetus when examining the question of what the optimal currency area is. On the other hand, we should not forget about the emergence of strong currencies facing currency crises. Finding answers to the question of which area is optimal has brought many different views, i.e. the optimal area can be considered the one whose goal is full employment, stable price levels, and external balance. Furthermore, it can describe links between regions or countries that seek to increase the well-being of their citizens above the welfare level achieved by using their own currency. Likewise, we can argue that the essence of the problem of answering the question of what is optimal is the impossibility of finding an empirical rule that identifies the optimal currency area, i.e. the impossibility of defining the net benefit that the country derives from membership in the currency area, however, the optimal can be viewed as the sustainability of the external and internal macroeconomic equilibrium, deepening integration of capital and financial markets.

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