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In 1999 the Nobel Prize for economics was awarded to Robert A Mundell for his analysis of monetary and fiscal policies in different foreign currency exchange rate regimes and for his analysis of optimal currency areas. Despite the fact that his scientific work started more than 30 years ago, it remains relevant and forms an integral component of international economics. His remarkable ability, indeed almost prophetic has been to foresee the future development of international currency relations.

Robert A Mundell was born in the Canadian province of Ontario in 1932, but his scientific and teaching work is connected with his life in the USA. After completing university at British Columbia University and Washington University, he gained a PhD in the field of industrial economics at MIT. In 1956 – 57 he was a postgraduate at Chicago University. He has lectured at many famous universities: Stanford University, Chicago University, the Centre of Advanced International Studies at Bologna and the Graduate Institute of International Studies in Geneva, to name but a few. During his work at Chicago in 1966 – 71 he was editor of the renowned Journal of Political Economy. His considerable professional acclaim has opened doors for him into advisory positions for many important international organisations (the UN, IMF, World Bank, European Commission) and governments (of Canada, the USA, many European and Latin American countries). Among his numerous awards are the Guggenheim prize (1971), the Jacques Rueff medal and prize (1983), an honorary doctorate of Paris University (1988). The beginnings of his scientific work span back to the end of the 50's, when Mundell focused on improving the classic and Scandinavian model of international trade and was re-evaluating the mutual relation between barriers existing in international trade and the mobility of factors.

At the start of the 60's he was the first person to introduce the term optimal currency area, where he was seeking a basis for the appropriate currency arrangement of the world economy. At the same time he developed the Mundell-Fleming model, which examines the effect of monetary and fiscal policy in conditions of fixed and flexible exchange rates.

At the end of the 60's Mundell's interest turned to models of international currency systems and in later periods Mundell devoted himself to an analysis of the supply-side economics, where he attempted to define the ways of damping down inflationary processes through radical tax reform. At the beginning of the 80's he again returned to the issue of monetary and fiscal policy mix directed at reducing inflation and economic growth and continues in his work on the history of the international currency system from antiquity to the introduction of the euro.

The Mundell-Fleming Model

In the second half of the 60's Mundell was ranked among the intellectual leaders of economic research at Chicago University. Through his precise analysis of the effects of monetary and fiscal policy on various currency systems, under the condition of an integrated capital market, Mundell recreated macroeconomic theory for the conditions of an open economy. Mundell in his study developed the IS-LM model for a closed economy and expanded it with the element of international trade and capital mobility.[1] On the basis of an analysis by means of the IS-LM model Mundell derives the following conclusions: *in conditions of fixed exchange rates* and with perfect mobility of capital, fiscal policy is highly effective, because fiscal expansion increases the interest rate, which forces the central bank to increase money supply with the aim of maintaining the fixed exchange rate and thereby the effect of the fiscal expansion is strengthened. In comparison with this, monetary policy under the stated conditions is ineffective. At a fixed exchange rate the central bank cannot implement an independent monetary policy. *In a system of floating exchange rates* monetary policy is, according to Mundell, highly effective, since monetary expansion leads to a depreciation of the currency, to an increasing of exports and income. Fiscal policy, on the contrary, appears ineffective in relation to influencing income. Fiscal expansion brings about an appreciation of the currency and leads towards a squeezing out of the net export.

Optimal Currency Area Theory

Robert A. Mundell in his ground-breaking essay of 1961[2] opened up the issue of optimal currency areas to-

[1] In textbooks this model is marked as the Mundell-Fleming model, since in the same period an analysis of stabilisation policy was also presented by Marcus Fleming, director of the research department at the IMF.

[2] R. A. Mundell's article "A Theory of Optimum Currency Areas" in 1961 represents a classic in the theory of optimal currency areas. In: the American Economic Review, 60, no. 4 (September 1961), pgs. 657 – 665.

gether and put the question of under what conditions is it advantageous for a group of countries to introduce a common currency. The work was published in a period when discussions on the advantages and disadvantages of a fixed and floating exchange rate were conducted mostly at the academic level with the national currency being considered as essential for a country and few people considered giving up a national currency and thereby the loss of sovereignty in the currency area.

Mundell put himself the key question in connection with this: should all existing national currencies work in a floating exchange rate regime? Should countries joined in a process of deepening integration tend towards the correlative fluctuation of their currencies, or should they give preference to a common currency? He searched for the answer to this question with the help of an analysis of a currency area, which he defines as a territory in the framework of which a fixed exchange rate regime applies.

As regards a currency area Mundell defines optimality as the ability to stabilise employment and the price level in the country. In other words, if it is possible in the economy to maintain an external balance without increasing unemployment or on the other hand without increasing inflation induced by demand, the existing exchange rate regime (whether floating or fixed) is taken as optimal. On the basis of the preceding analysis Mundell comes to the conclusion: if there is sufficient mobility of the factors of production within the country, yet low in relation to abroad, then national currencies can work efficiently in a floating exchange rate regime. In the case where the factors of production – labour and capital are sufficiently mobile within the framework of the country, then it is not possible to expect a stabilisation function from the flexibility of the national currency against other currencies – meaning in individual regions a varying rate of unemployment and inflation. In the case where the factors of production are mobile also outside the national border a floating system of currency exchange rates is not essential and Mundell inclines towards a system of fixed exchange rates.

Mundell realises that in the real world a currency is a symbol of national sovereignty, and therefore also the creation of a new currency arrangement should be accompanied also by political changes. An optimal currency area is effective only in areas where also political integration is underway (for example former colonial countries). Mundell in his analysis points also to the costs connected with maintaining a large number of national currencies. Money as a unit of account fulfils its function inefficiently in the case where prices of foreign goods are expressed in a foreign currency and must subsequently be recalculated to a domestic currency. Similarly, he considers money in the role of a medium of exchange less useful in the case where a number of currencies exist (expenses for the conversion of one currency to another are especially high in the case of non-convertible currencies or in a floating exchange rate regime).

Mundell described an *optimal currency area* as a set of regions between which there is a high mobility of factors (in particular of the workforce) with the aim of ensuring full employment in the case where one of the regions faces an asymmetric shock. The originality of Mundell's approach in formulating the problem influenced the work of further generations of economists, who consider the two case studies contained in his work (monetary union and a floating exchange rate regime) as the most important alternatives.

In the following years economists gradually expanded the optimal currency area theory (R. I McKinnon, P. B. Kennen, J. C. Ingram), where they defined other important criteria (e.g. capital mobility, the openness of the economy, the fiscal system, etc.).

Monetary union – for and against

Mundell's theory of the optimal currency area was to become the starting point of controversies over the establishment of European monetary union, in particular in respect of researching the benefits and costs of monetary union. The economist Graham Bishop at the Nobel Prize award mentioned that the European Union in discussions over the introduction of the euro had relied on Mundell's theory in assessing which member states of the EU would make up an optimal currency area. Mundell considers a common currency as crucial for monetary union, where he identifies three phases in its achievement: the introduction of a fixed exchange rate with a credible mechanism for balancing out deficits in the balance of payments; setting binding rules for monetary policy; and in the end the replacement of the domestic currency by the common currency of the monetary union (or partner countries).

In his latest works Mundell has again returned to a cost-benefit analysis of monetary union, which he outlined in his theory of optimal currency areas, attempting a systematic definition of the arguments for and against joining a currency area.

According to Mundell, a country should consider membership of a currency union, or zone with fixed exchange rates for these reasons:

- If the country has an interest to maintain a rate of inflation different from the rate of inflation in the currency area;
- If the country wants to use the exchange rate as an instrument of employment for lowering or raising wages;
- If the country wants to use the exchange rate as an instrument for influencing the balance of trade (currency devaluation);
- If the country prefers to use money expansion to finance government spending (something which would be prevented by the required discipline in the conditions of fixed exchange rates);
- If the government is not willing to surrender segniorage as a means of international payment;

• If the regime of fixed exchange rates could clash with the policy of a central bank having a mandate to maintain price stability;

• If currency integration with many countries means the elimination of national sovereignty, which is a symbol of national independence;

• If the country prefers secrecy of statistical data;

• If there is not a political and economic elite available in the country capable of maintaining a system of fixed exchange rates in balance;

• If political authorities are not able to achieve a balanced budget and/or create confidence in a permanently balanced budget or in the viability of the fixed exchange rates;

• If the country is not willing to accept the degree of integration instituted by the agreement on the optimal currency area (e.g. common standards, immigration, tax legislation, labour law).

In a similar manner Mundell introduces the reasons that should support a country's decision on becoming a member of an optimal currency area:

• Adjustment of the set rate of inflation in the optimal currency area;

• A reducing of transaction costs in international trade;

• Elimination of expenses for the emission and maintenance of the national currency;

• The setting of a clear direction for economic policy around which the expectations of economic subjects may be formulated;

• The elimination of exchange rate movements;

• Ensuring the international softening of the negative impact of shocks;

• Greater participation in financial markets and the capital market of the union;

• The creation of a competitive currency as a certain counterbalance against the dollar;

• The creation of a larger economic bloc with the possibility of influencing international economic development;

• The creation of a mechanism for strengthening monetary and fiscal discipline outside the influence of the political process.

In connection with the creation of European monetary union, it is necessary to mention that Robert Mundell is often termed the "father" of the idea of a common European currency. Mundell started to concern himself with the idea of a single European currency during his stay at Bologna, where he strengthened his conviction of its necessity and viability. Thus, in 1965, a period when there was not great enthusiasm for a common European currency, he analysed a model of 3 currency areas – the dollar area, the sterling area, and a third area with a common European currency. At the end of the 60's Mundell presented in a New York article "The Case for a Common European Currency", causing a great response, and in which was proposed a common currency, with the title "Europa".

Thanks to this work, Mundell was invited by the European Commission to Brussels, to cooperate on the preparation of various alternatives of the common currency (in 1970 as a consultant to the Currency Committee and in 1972 – 73 as a member of the Working Group for Economic and Monetary Union in Europe).

Mundell does not regard the Maastricht project as the only route to monetary union. In his view, also countries that have stayed outside can gain utility from the monetary union even without a definitive loss of sovereignty, on the basis that they will be disciplined in their budgetary management and their currencies will be fixed against the euro in a very tight band.

Reform of the international currency system

Mundell in his last works emphasises also the operation of monetary factors on political events, many of the political events of the 20th century had their roots in imbalances in the international currency system. According to Mundell, the introduction of the euro should mean a new era in the international currency system. The euro has become the second most important currency in the world, with a tripolarity being seen in the world currency system, comprising the euro, dollar and yen. The exchange rate between these currencies (he calls them the G3) represents the most important price in the world economy. The stability of the international currency system will in fact rely on the stability of the G3. Mundell considers it necessary to elaborate a methodology for the resolution of crisis situations concerning the dollar – yen – euro exchange rate. According to him, it is possible that in the 21st century exchange rates will become fixed between the G3 themselves, which would mean the creation of a completely new international system. He does not even rule out the creation of some type of monetary union between the three zones.

Towards a world currency

Mundell in the 90's in his works, linked to his studies from 1968, presented his vision of a world currency. The creation of a world currency would in his view bring immense utility. Prices throughout the world would be denominated in the same unit and their level would be equal in all parts of the world, international trade would be increased, along with countries' real incomes and would subsequently lead to economic growth and an increase in welfare. He describes the improvement in the effectiveness of monetary policies as one of the greatest assets in an area two thirds of the world's territory.

Mundell considers dollarisation as the fastest and most efficient way to create a world currency. In this case however, also the political side remains an issue, or as the case may be the expenses connected with dollarisation. In contrast to members of euroland, which participate in the management of the ECB, members on only the one side of a dollar area would be transferring their monetary sovereignty to a different country – to the USA, which would be acceptable for them only with some difficulty.

Mundell realises that monetary union without political union would at the global level probably be unsuccessful. Equally it is unlikely that the USA would be willing to give up the most successful currency of the 20th century and vice versa other countries are unlikely to adopt the dollar as their currency. Following these statements Mundell considers first the creation of a monetary union comprising two or three zones of stability (the dollar, yen and euro) and subsequently considers what principles its workings could be founded on. Essentially, technical barriers to monetary union comprising three currencies do not exist.[3] The whole system would work on a principle similar to that of a monetary union with a single currency. The system would be most efficient if all three currency zones were connected, but the same procedure may be used also in the case of two currency zones. In the case of the introduction of a world currency Mundell proposes the transformation of the International Monetary Fund into a world central bank, which would guarantee the currency's credibility. The new world currency could in his view be called "intor" or "unor". Each member in the union would fix its currency to the world currency. The world currency would be supported by the three largest central banks and the world central bank would sell or buy the world currency with the aim of lowering or raising the global money supply. In conclusion we state Mundell's interesting analogy between language and currency. Mundell describes language as a medium of communication and currency as a medium of exchange. National, ethnic and liturgical languages still survive; nevertheless a common world language used as a second language in countries would significantly facilitate international understanding. Similarly national and regional currencies will exist also in future centuries, but a common world currency which would be understood as the second most important currency of each country, and by means of which payments would be executed throughout the world, would in Mundell's view contribute substantially to peace and a raising of prosperity, welfare and improved efficiency in the functioning of international currency relations.

Robert A. Mundell's most important works:

- The international currency system: conflict and reform (1965)
- Man and economics (1968)
- International economics (1968)
- Monetary theory: interest, inflation and growth in the world economy (1971)

As co-editor:

- The monetary agenda for the world economy (1983)
- Global imbalance (1990)
- Debt, deficit and efficiency (1991)
- Building a new Europe (1992)
- Inflation and growth in China (1996)

[3] Mundell proposes the following mechanism – one of the three currencies would be selected as a pilot currency, which could be the currency with the largest currency base, at present the dollar. Other currencies would fix their exchange rate to it. Mundell further proposes a 9-member committee FED, which would include 4 Americans, 3 Europeans and 2 Japanese. The members of the committee should be independent of their governments (similarly as in the case of the governing board of the ECB). An expanded FED would decide on restricting or loosening credit in the currency zone. A further step would be the agreement on a common inflation target.