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TOWARDS AN INTEGRATIVE CURRENCY AREA

Abstract

Optimal currency area theory is the supporting knowledge base of the European euro area. However, the euro area does not work seamlessly, and many doubts have arisen in regard to the theoretical foundations of the project and the procedures used to implement it. In particular, the accession of new members remains doubtful. This paper develops a diagnosis and proposes modifications to the theoretical foundations of the optimal currency area in line with recent developments in economic thinking. This progress is focused on the application of a triad of abstract notions – capital, labour, and money – and the use of essential notions, among which labour self--financing is the most significant. The analysis leads to an integrative as opposed to a discriminative currency area. Another aim of this paper is to show how to reshape the existing discriminative euro area as an area involving states that do not fulfill the Maastricht criteria. An integrative area can involve states with different productivity levels, allowing the fixed exchange rate criterion to be withdrawn. In addition, the application of self-financing removes the problem of dominant public debt. A major part of this paper develops a measure of labour productivity and applies it to procedures involving the use of exchange rates.

Keywords: currency area, labour productivity, labour share, exchange rate.

1. Introduction: Theoretical Premises of the Integrative Currency Area Concept

The deliberations included in this paper build upon a new approach to significant economic agendas. First, the key questions are briefly listed and presented. Having established the theoretical foundations of an integrative currency area, section two looks at the labour productivity index as an indispensable tool of economic analysis. Then, parity of labour productivity

is applied to algorithms requiring an exchange rate. In the next step, the discriminative (not integrative) features of the euro area are disclosed. In the final section, the reforms needed to change the euro area into an integrative one are explained. The integrative currency area is open to new members that already belong to the Schengen area.

In recent years, advances have been made that have enriched economic theory. First, the abstract and measurable categories of capital and labour have been better explained and sufficiently modelled. The triad of capital, labour, and money is well recognised and allows for a new description of key economic issues. Money joins the capital-labour tandem as an abstract category that arises as a receivable for work done. Therefore, it is the process of labour that creates money. In line with E. Davar's (2011) evaluation of fiat money, the wage equation of exchange has recently been formulated (Dobija 2011a) and the fundamental principles of economic reality have been identified (Kurek & Dobija 2013). In addition, the principles for measuring human capital and fair compensation have been formulated and tested in papers by M. Dobija (1998, 2000), I. Cieślak (2008, pp. 289–303), W. Kozioł (2011, pp. 47–81), and J. Renkas (2012a, pp. 81–86). Equipped with these issues, a list of premises indicating significant and original theoretical potential is formulated below.

A. Capital means the abstract ability to do work, and this category is absolutely not material but is embodied in resources and tangible and intangible assets. Much of capital is located in human resources. Capital is the potential category that is indispensable to performing work. In addition, capital is measurable (not countable as resources); therefore, its unit is also a measure of asset value, since this term denotes the concentration of capital in assets. Measurability refers to the possibility of assigning a measure to an object – that is, a positive real number consistent with established assumptions.

B. Capital is not creatable. It cannot be created in any way; it may only be transferred to objects through labour. The existing capital located in human resources and assets, however, is exposed to spontaneous and random diffusion. This is a result of the fundamental laws of thermodynamics, particularly the Second Law, which drives the universe, as explained by P. Atkins (2007). These fundamental laws cannot be broken. Therefore, the creation of money (capital) by central banks contradicts the First Law and is thus beyond scientific inquiry (Dobija 2012, pp. 157–90). Furthermore, this is the main reason for many of the economic dilemmas in economies today.

C. Labour, as explained by B. Kurek and M. Dobija (2009), is a transfer of capital embodied in different assets and human resources to targeted locations in distinct products. Therefore, labour is the dynamic side of capital and is a measurable category. Moreover, a unit of labour is a unit of capital. Human labour is measured as the product of power (P) and the duration of labour (Δt). The power of an employee is determined by comparing his or her human capital to that of the employee with the highest human capital, resulting in a positive ratio less than or equal to 1.0. Assigning a position to an employee in a company means determining his / her expected power, which helps to determine the value of the employee's labour in the economic system.

D. A fair monthly or yearly minimum wage (W) for an employee's labour is equal to the value of human capital spontaneously diffused. Research has shown that this is the product of the rate of random diffusion and the employee's human capital (H), such that $W = s \times H$, where the mean value $E(s) = 0.08$ (1/year). This is the main stylised fact frequently present in deliberations. Notably, research shows a consistency between the two ways of determining an employee's minimum compensation – specifically, by measuring labour as a product of power and time versus 8% of employee's human capital (Dobija 2011b; Kozioł 2010b; Renkas 2012b).

E. The capital–labour–money triad of abstract categories shows that money is related to labour and, of course, to capital. Money arises as confirmation of completed labour, and the monetary unit is naturally the unit of labour. Therefore, there is no place in an economy for a central bank with a money-creating function; instead, the economy needs an institution to transfer salaries and wages to the bank accounts of public sector employees. This is the phenomenon of labour self-financing as explained in Dobija (2005, 2007, pp. 89–114). In addition, this new institution should exert strong control over the labour productivity of the economy. Thus, a payer for labour carried out in the public sector is a reformed central bank. This means that taxes can be reasonably declined.

The modernised economy is perceived as a three-sector entity. There is a business sector (private or public), a public (or budget) sector financed from taxes, and a household sector. In line with the approach introduced here, the public sector should be financed in two ways, partly by tax revenues in the case of purchasing and maintaining assets and partly by the self--financing of labour (i.e. by a reshaped central bank). The first part comes from tax revenues, while the second part, as it concerns human labour, does not require tax revenues but correct action by the central bank instead.

For example, a school building is financed and maintained by taxes, while teacher compensation is paid by the central bank. Weapons are bought with money collected from taxation, but the remuneration for soldiers is transferred by the central bank (Fig. 1).
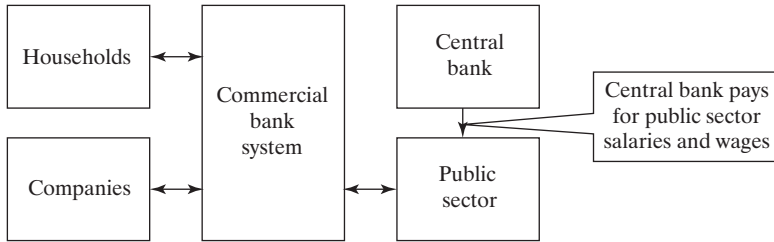

Fig. 1. Position of the Central Bank in a Reshaped Economy
Source: Dobija (2011a).

The private sector is financed by revenues from sales of products. Self-financing is not involved in this case, despite the fact that it also appears in background. The household sector is perceived as the place where human capital grows. Therefore, the new economy guarantees full household employment to families (mainly mothers), with at least minimum pay as compensation for having and maintaining children – no longer than for five or six years, however. Wages are financed by tax revenues, although they can be self-financed as labour productivity grows.

2. Labour Productivity as a Significant Economic Category

Labour productivity (Q) is computed as the quotient of real GDP to the total cost of labour (W) in the given economy, thus $Q = GDP/W$. Q is an important indicator, having many applications in the quantitative description of an economy. The main applications of Q have been introduced by M. Dobija (2011a) and in other studies (Jędrzejczyk 2012, 2013; Jędrzejczyk & Dobija 2013). By definition, Q forms relationships with GDP as follows:

$$GDP = GDP\frac{1}{Q} + GDP\frac{Q-1}{Q} = W + GDP_A. \qquad (1)$$

The above formula introduces GDP as two parts. The first (W) belongs to all employees; the second is assigned to assets. This sheds some light on GDP as the sum of all employees' earnings plus the part belonging to assets

(depreciation + interest + rents + an appropriate portion of companies' income) and correlates to the third method of measuring *GDP*.

In reshaped form, the relationship is as follows:

$$1 = \frac{1}{Q} + \frac{Q-1}{Q} = \frac{W}{GDP} + \frac{GDP_A}{GDP} = L_S + A_S, \tag{2}$$

where: $W/GDP = 1/Q = L_S$ is the labour share according to a new definition (*W* is total compensation in the economy). $GDP_A = A_S$ is the share of *GDP* assigned to assets. The labour share L_S is redefined in respect to the labour share known from the theory of production described by C. McConnell and S. Brue (1986, pp. 463–65) as a fairly stable category. The labour share is related to econometric models of production, and the numerator contains only the total value of compensation for employees in production processes (Schneider 2011, pp. 3–4). However, in this case, labour share equal to $1/Q$ has a numerator determined by *W*, which denotes the pay (with all related costs) of all employees (the first and the second sector). $L_S = 1/Q$ is also the stable labour share.

Both *GDP* and *Q* are significant determinants of exchange rates. *Qs* computed for a selected group of countries (Table 1) reveal their stability and their ability to order economies according to labour productivity. *Q* values are computed in two steps in Table 1. The first step calculates *Q* for the USA in a direct manner using data from the Bureau of Labour Statistics. Compensation (*W*) is adjusted by decreasing the part paid as tax for financing salaries in the public sector. The second step relies on the application of a formula (16) that takes into account the free market exchange rate.

Table 1. Values of *Q* for a Selected Group of Countries

Country	2006	2007	2008	2009	2010	2011	2012
USA	3.458	3.470	3.560	3.500	3.452	3.648	3.620
Japan	3.069	3.093	3.186	3.433	3.279	3.448	3.329
UK	3.204	3.517	3.444	3.082	3.095	3.216	3.279
Switzerland	3.534	3.645	3.748	3.650	3.509	3.498	3.850
Germany	3.305	3.380	3.389	3.276	3.169	3.158	3.350
Czech Republic	2.055	2.204	2.355	2.210	2.134	2.356	2.252
Poland	1.881	1.992	1.854	1.869	1.903	1.935	1.958
China	1.415	1.512	1.685	1.762	1.768	1.777	1.886

Source: Computations using the Groningen Total Economy Database, OANDA – Exchange Rate Converter, and Bureau of Labour Statistics.

The *Q* indicator synthesises many important variables. The complexity of *Q* can be shown by forming quantitative descriptions of activities in the real economy. This includes both production processes in the private sector and all paid work in the whole economy. The market value of such economic performance (production) may be expressed as follows:

$$P = K(1 + r) = K\left(1 + \frac{Z}{K}\right), \tag{3}$$

where: *K* denotes the overall costs of production expressed in historical cost, *r* is the cost profitability factor, and *Z* is the periodic income. Let us note that the fraction *Z/K* can be expressed as a function of ROA (return on assets). Since $K/A = w$, so $K = wA$, where *A* denotes assets and *w* is the ratio of turnover.

Thus, the fraction *Z/K* is arrived at by the following formula:

$$\frac{Z}{K} = \frac{Z}{wA} = \frac{ROA}{w}.$$

Now we divide total cost *K* into two parts, $W + R$, where *W* denotes total compensation and *R* denotes the remaining costs:

$$P = (W + R)\left(1 + \frac{ROA}{w}\right). \tag{4}$$

After reformulating the above equation, we obtain:

$$P = W\left(1 + \frac{R}{W}\right)\left(1 + \frac{ROA}{w}\right). \tag{5}$$

The turnover ratio of production costs *R* to assets is identified by *z*, so $R/A = z$, and $R = z \times A$. Moreover, human capital theory describes a fundamental relationship concerning compensation and human capital *H*: $W = u \times H$, where *u* denotes the level of compensation and *H* refers to the value of human capital. Taking all these formulas into account, we arrive at the final form of output as the nonlinear function of economic variables:

$$P = W\left(1 + \frac{Az}{uH}\right)\left(1 + \frac{ROA}{w}\right) \approx We^{\frac{zA}{uH} + \frac{ROA}{w}}. \tag{6}$$

Here *A/H* denotes a variable of the technical equipment of labour, and *u* is the level of employee compensation. From the above equation we can see that labour productivity *Q* is presented as follows:

$$Q = \frac{P}{W} = \left(1 + \frac{Az}{uH}\right)\left(1 + \frac{ROA}{w}\right). \tag{7}$$

The above formula shows that, on one hand, Q can be computed as a simple quotient (if relevant data are available), while, on the other hand, Q is a synthesis of many important factors involved in successful economic performance. In the simplest interpretation, Q is information on what value of production is generated by one money unit of wages. Writing formula (6) in the form (6a):

$$P = uH\left(1 + \frac{Az}{uH}\right)\left(1 + \frac{ROA}{w}\right) \tag{6a}$$

one can solve the above equation for variable (u) by applying the fixed point theorem. In the case of business units, this equation has been successfully solved by W. Kozioł (2010a, pp. 191–95) by applying an iteration process. This is possible because the value of a firm's assets is determined in the balance sheet. This is not the case in the macroeconomy, where many difficulties arise in asset valuation. In addition, it is known that the bottom limit for fair compensation is 8% of employees' human capital; this figure determines the basic constant correct pay, but bonus pay can increase it. As research conducted in Poland and Ukraine has shown, a typical payoff ratio u is about 10% in an averagely prospering company (Kozioł 2010b, pp. 280–90; Renkas 2013, pp. 151–61).

From a macroeconomic point of view, it is clear that indicator Q is convenient in controlling inflation. Since $Q = GDP/W$, if Q declines, inflation must grow. For the same reason, Q is a good tool for controlling the size of the public sector. Control limits total compensation in this sector. Because $W = W_{priv} + W_{publ}$, by having a fixed Q and determined W_{priv}, one can arrive at the W_{publ}. As has been presented in previous research (Dobija 2011a), Q is an indispensable indicator in the wage equation of exchange and also serves to determine the total sum of credit money issued by the commercial banking system in a given year.

Taken together, *GDP* and Q are a good indicator of a country's economic condition and position relative to other countries. This indicator undermines the claim of rapid convergence between developing and developed countries. In Table 1, we can see that China experienced *GDP* growth by increasing labour productivity. Poland had remarkable growth in 2007, but Q did not grow between 2007 and 2012 due to pay increases after much public protest.

3. Labour Productivity Parity as the Main Determinant of the Average Value of Exchange Rates

3.1. The Main Formulas

The main relationship linking the exchange rate and the parity of labour productivity measured by Q has been determined by Dobija (2001, 2002, pp. 56–94), and recently additional research has been done by M. Jędrzejczyk (2012). The essential finding of this research was is the average value of the exchange rate (ER) in some period is a function of the parity of Q. The formula is as follows:

$$ER\,[\text{zł}/\$] = \frac{S_P}{S_A} \times \frac{Q_A}{Q_P},\tag{8}$$

where: zł – name of the currency unit in Poland, \$ – name of the currency unit in the USA, A – USA, P – Poland, and S – average pay per employee. Statistical research recently carried out by M. Jędrzejczyk (2012) showed that hypothesis (8) should not be refused.

There are more significant relationships composed of GDP and Q that are useful in the translation of economic variables, such as wages, prices, and GDP. Maintaining the same notations, we can write natural equations (W – denotes total compensation in the economy):

$$GDP_P = W_P \times Q_P,\tag{9a}$$

$$GDP_A = W_A \times Q_A.\tag{9b}$$

Now the above equations are divided:

$$\frac{GDP_P}{GDP_A} = \frac{W_P}{W_A} \times \frac{Q_P}{Q_A}.\tag{10}$$

Then:

$$GDP_P[\text{zł}] = \frac{W_P}{W_A} \times \frac{Q_P}{Q_A} \times GDP_A[\$].\tag{11}$$

Then, dividing total compensation W by the number of employees L (expressed in the form 1.0) we get a formula with the average compensation per employee S:

$$GDP_P[\text{zł}] = \frac{S_P}{S_A} \times \frac{L_P}{L_A} \times \frac{Q_P}{Q_A} \times GDP_A[\$].\tag{12}$$

Now, dividing GDP by the number of employees, we get the significant equation:

$$GDPE_P[\text{zł}] = \frac{S_P}{S_A} \times \frac{Q_P}{Q_A} \times GDPE_A[\$], \tag{13}$$

where *GDPE* denotes *GDP* per one employee.

In equation (13) we write cipher 1.0 in the form:

$$GDPE_P[\text{zł}] = \frac{S_P}{S_A} \times \left\{ \frac{Q_A}{Q_P} \times \frac{Q_P}{Q_A} \right\} \times \frac{Q_P}{Q_A} \times GDPE_A[\$]. \tag{14}$$

Now, applying formula (8), we get a significant formula that explains the link between American and Polish *GDPE*:

$$GDPE_P[\text{zł}] = ER\left[\frac{\text{zł}}{\$}\right] \times \frac{Q^2{}_P}{Q^2{}_A} \times GDPE_A[\$]. \tag{15}$$

Reshaping the above formula, we get the connection between the exchange rate and parity of *Q*, and in addition a third way of computing *Q*:

$$ER\left[\frac{\text{zł}}{\$}\right] = \frac{Q^2{}_A}{Q^2{}_P} \times \frac{GDPE_P[\text{zł}]}{GDPE_A[\$]}. \tag{16}$$

Labour productivity *Q* and the productivity indicator *GDPE* play an indispensable role in explaining the exchange rate trend, which is the most important conclusion.

3.2. Several Examples of Translation of Selected Economic Variables

Patterns (13) and (16) show how to compute economic variables applying the exchange rate and how to estimate the average value of the exchange rate if necessary. For example, in order to estimate Polish *GDP* per employee in 2011, one can use formula:

$$GDPE_P[\text{zł}] = ER\left[\frac{\text{zł}}{\$}\right] \times GDPE_A[\$] \times \frac{Q^2{}_P}{Q^2{}_A} = 3.22 \times \$106\,733 \times \frac{3{,}834}{13.30} = 99\,074 \text{ zł}.$$

The direct computation gives an estimation: $100\,526$ zł ($1492\,207 : 14\,844 = 100\,525.90$ zł).

The second example concerns translation of the minimum wage. Knowing that the statutory minimum wage (increased for mandatory pension payment) in the USA is \$7.25 plus a 6.02% pension payment, we can compute an adequate wage for Poland. Since:

$$ER\left[\frac{\text{zł}}{\$}\right] = \frac{S_P}{S_A} \times \frac{Q_A}{Q_P}, \tag{17}$$

so:

$$S_P[\text{zł}] = ER\frac{\text{zł}}{\$} \times \frac{Q_P}{Q_A} \times S_A[\$] = 3.22 \times \frac{1.953}{3.648} \times (7.25 \times 1.062) = 13.27 \text{ zł.}$$

The relevant minimum wage for Poland is therefore 13.27 zł. The expectation that the minimum wage could be an issue of directly applying the exchange rate is not correct. Then we would get 3.22 zł/$ × $7.25 × 1.062 = 24.79 zł, which is a senseless value in relation to the Polish economy today. In fact, the actual Polish statutory minimum wage is 9.31 zł per hour and is only 73% of pay, being consistent with human capital measurement theory. Nevertheless, it is adequate to the small value of Q that represents the level of Polish labour productivity. Minimum pay in the USA is close to 100% consistency with human capital theory. A minimum wage of 13.27 zł would also represent 100% consistency.

3.3. The Labour Share and the Average Value of the Exchange Rate

The inverse value of the indicator Q is $1/Q = W/GDP$, and in this form it is the labour share defined in the context under consideration. Denoting $L_S = 1/Q$ and putting $Q = 1/L_S$ into pattern (8), we get a new expression determining the average value of the exchange rate:

$$ER_P[\text{zł}/\$] = \frac{S_P}{S_A} \times \frac{Q_A}{Q_P} = \frac{S_P}{S_A} \times \frac{L_{SP}}{L_{SA}}. \tag{18}$$

This shows that the two parities together determine the exchange rate trend, namely, the parity of average compensation in economies and the parity of the labour share as defined above.

Interpretation of the labour share L_S is now clear. The lower L_S is, the better the economy. This results from the fact that if $L_S = 1/Q$ is equal to 1.0, so Q is also 1.0. This would also mean that it is a primitive economy, where $GDP = W$, that is to say, employees earn only for compensation and nothing is left for assets. In this case, the asset share is zero. The common view is slightly different. S. Bentolila and G. Saint-Paul (1998) write:

(…) Until recently, the labour share did not often generate an interest among neoclassical economists, partly because its constancy has been taken as a granted "stylised fact of growth". On the other hand, the labour share is very much present in the political debate as a measure of how the "benefits of growth" are shared between labour and capital. For example, its decline since the mid-1980s is often used by unions in Europe as an argument against policies of wage moderation, and by governments in order to justify increased taxation of profits. (…)

A progressive economy means that the economy is well equipped with assets and that these are productively used. A big labour share means that the country is poor. In the USA, Q_{2012} is estimated at 3.648, thus $1/Q \approx 0.274$, and this is a rather small labour share. The asset share is 0.726. This means that the USA is equipped with a notable variety of assets and the country also has significant means to maintain and improve these assets. On the other hand, it is common knowledge that in the USA employees are rather well paid.

4. How to Evaluate Fairness of Compensation

Knowledge about fair compensation for labour is needed, among others, in order to create a currency area that is able to integrate countries with different levels of labour productivity. Translation of an amount of compensation into a number of new currency units cannot be a mechanical activity. Measurement of an employee's human capital determines a way of establishing a fair minimum wage.

Just as *GDP* growth is not a perfect measure of wellbeing, nor does a bigger labour share indicate that compensation is fair. Fairness of compensation is properly evaluated with human capital theory. An employee's constant pay ought to be not less than 8% of his or her human capital (*HC*). Together with fringe benefits, compensation reaches 10% of employees' *HC*. This level of compensation allows for the protection of human capital (8%) as well as modest but steady development (2%). This is a natural state of affairs not only in well-developed countries but also among many employees of developing countries working in fields such as oil or ore mining and processing, the power industry, and machine production.

A feature of developed countries is that the level of the statutory minimum wage is consistent with the above prediction of 8% of an employee's *HC*. This is the case in the USA in respect of the minimum wage (see Table 2), but it is not in case in Poland. This country is too poor, since Q is less than 2.8 (Dobija 2011b). A useful function describing the relationship between Q and the percentage of consistency (*CON*) is as follows:

$$CON = 56.24 + 85.30 \times \lg_{10}(Q)$$

The computations in Table 2 concern teenagers (17 years old in the USA and 18 years old in Poland).

Some comments about data interpretation are needed. The first concerns the calculations for the USA. In line 9, there is 94% consistency between legal and theoretical pay. In fact, many states and cities establish a higher

minimum wage. In addition, the use of one value for the cost of living for the whole country raises the value of *HC*. The cost of living involves only indispensable costs necessary for normal *HC* growth. Therefore, it is assumed that the percentage of consistency is 100%. The second comments concerns the monthly amount of pensions. Line 15 indicates that the cost of living per person over the whole period of life exceeds the indispensable, initial cost. A pension fund collected over 43 years under the condition that the capitalisation rate is 3% results in an amount of $305,403 per person. Thus, a rough estimation gives the following amounts: $305403: (20 × 12) = $1273. This means that, even without interest from an existing fund, over 20 years the pension is on the level of an earned wage.

Table 2. Estimation of Human Capital and the Minimum Wage for the USA and Poland (2012)

	Economic Variable	USA	Poland
	Computation of Human Capital and Fair Pay		
1	Estimated indispensable monthly cost of living (four- or five-person family)	$500	700 zł
2	Period of continuous compounding (t)	17 years	18 years
3	Capital $H(p) = k(\exp[pt] - 1)/p$, $p = 0.08$, $k = 12 \times \$500$	$217,215	333,173 zł
4	Yearly cost of labour $W = s \times H(p)$, $E(s) = p$	$17,377	27,054 zł
5	Monthly cost of labour $W/12$	$1448	2254 zł
6	Statutory minimum wage (176 hour × $7.25)	$1276	1386 zł
7	Employer payment for pension fund	6.2%	18%
8	Legal cost of labour	$1355	1636 zł
9	Percentage of consistency	94% (100%)	73%
	Family Revenues and Pension Funds		
10	Family (2+2 persons)	2 parents	2 parents
11	Earnings (2×1448 in the USA)	$2896	4508 zł
12	Assumed pension payment (20%)	$579	902 zł
13	Assumed healthcare payment (10%)	$290	451 zł
14	Funds for cost of living	$2027	3156 zł
15	Cost of living per person (line 14: 4)	$507	788 zł
16	Years of capitalising the pension fund (3% capitalisation rate), FV – future value	60 years	65 years
17	FV (3%, 43 years) per person	$ 305 403	–
18	FV (3%, 47 years) per person	–	542 664 zł

Source: own computations.

In the case of Poland, we see that the minimum wage computed in line with human capital theory is 2254 zł per month. This is equal to 12.80 zł per hour (2254 zł: 176 hours). The value of 12.80 zł is close to the 13.27 zł calculated on the basis of the minimum wage for the USA using pattern (17). Both calculations are made using two entirely different theories of human capital measurement and correct translation with the exchange rate.

The estimations are correct and could be consistent with reality provided that economies operate in the correct manner. However, in reality, central banks create money from nothing, without a link to labour. Therefore, crises and inflation disperse the value of funds. In addition, real compensation is not always consistent with the theory of human capital measurement. In the real economy, the principle of capital conservation, as explained in (Dobija & Kurek 2013), is often not respected, and pay that is appropriately proportional to human capital is not always a firm rule. In both cases under consideration, 10% of wages is intended for healthcare.

5. Discriminative or Integrative Currency Area?

The theory of optimal currency areas (OCA) assumes that the productivity of economies in the considered area is similar. It is a consequence of the requirement of a fixed exchange rate or, in other words, the parity of labour productivity. A good indicator of productivity is Q; thus, Table 3 clearly maps the situation in the euro currency area. This area was formed by all the initial EU members except for the United Kingdom and Denmark, which opted out of the euro. Table 3 presents the values of Q in the chosen year of 2006. Interpretation of the data confirms the suggestion of B. Beachill and G. Pugh (1998) regarding a "two speed" Europe. In fact, the countries that introduced the euro area in 1999 (with the exception of the UK and Denmark) have a labour productivity of over 3.2 and thus belong to the first speed group, while the countries whose Q close to 2.2 belong to the second speed group. Table 3 also shows countries in a third group, with a Q of less than 2.0. Let us use Greece, which has been a member since 2001, as an illustrative example. The value of Q for Greece was computed on the basis of pattern (16) using the exchange rate. In 2006 it was already a member of the euro area, so the euro/dollar exchange rate has been applied. This slightly increases Q; thus, Greece is placed in the second group.

The third group includes members of the euro area such as Portugal and candidates such as Poland. These countries are under great pressure

to adjust to all the required conditions determined by the euro convergence criteria, known as the Maastricht criteria.

Table 3. Selected European Countries and Their Labour Productivity (2006)

1 < Q < 2		2 < Q < 3		3 < Q < 4	
Poland	1.881	Greece	2.081	Germany	3.325
Estonia	1.678	Slovenia	2.266	Switzerland	3.534
Portugal	1.845	Spain	2.165	United Kingdom	3.204
Slovakia	1.758	Italy	2.493	France	3.201
Hungary	1.946			Belgium	3.345
Czech Republic	1.955			Holland	3.437
				Denmark	3.433

Source: Dobija (2008).

An optimal currency area is, by definition, based on a geographical area that adopts a fixed exchange rate regime or a single currency within its boundaries. Therefore, the Maastricht criteria require (a) that standardised inflation shall be no more than 1.5% higher than the unweighted arithmetic average of similar inflation rates in the three EU member states with the lowest inflation and (b) that the applicant country shall have succeeded in keeping its monetary exchange rate within a $^+/_-$ 15% range of an unchanged central rate for two years. These two criteria can be expressed in labour productivity categories as (a) the indicator Q should not decline and (b) the Q value of the applicant country should be not less than the Q value of euro area members, or Q parity should hold.

The last condition is almost impossible to achieve for a state with a small Q. A state with a Q close to 2.0, such as Poland, has a *GDP* of about 1500 billion zł, and compensation in the public sector amount to about 130 billion zł per year. The total cost of labour is estimated at 1500/2.0 = 750 billion zł. If all public sector compensation was to disappear, W would be 620 billion zł. Then $Q = 1500/620 = 2.419$, and Poland would belong to the second group of countries and would be far from the 3.2 level. In this scenario, successful accession to the euro area is doubtful.

The second barrier to successful accession is debt financing. It is common knowledge that, in the present dominant theory of money, the budget deficit is natural. There is a choice: either the central bank creates money by fiat or labour creates money, and therefore labour is self-financing (a potential solution). In practice, this means that the central bank is the payer of

compensation for the public sector. Then the existence of budget deficits is the result of poor government. Since economies nowadays work according to the first mode, the existence and the growth of the budget deficit is natural. How, then, is the budget deficit financed? The money is borrowed from citizens, as is the case in Japan, or is borrowed on the international markets. In the second case, the state is dependent on the aggressive behaviour of international money market players. Poland finances most of its debts on the international market. J. Osiatyński (2010, pp. 217–19) indicates that only 20% of Poland's needs are financed by domestic sources.

These deliberations show that the euro area is designed to be discriminative. In fact, the theory of the optimal currency area proposed by R. Mundel (1968, pp. 177–86; 2000) and other authors posits a discriminative area that does not adopt states as they are. Therefore, the post-accession position of states with rather low productivity and international debt financing is weak and getting worse. This is the case with Greece and Portugal and will be the future of Poland if the authorities enforce accession against widespread opinion to the contrary. The moment of accession switches off the adjustment function of inflation (diffusion of the purchasing power of wages, rising tax inflows, and a declining exchange rate of the national currency, which drives the economy), leading to economic difficulties.

In a *New York Times* opinion column entitled "Revenge of the Optimal Currency Area" (24 June 2012), Paul Krugman wrote:

The creation of the euro was supposed to be another triumphant step in the European project, in which economic integration has been used to foster political integration and peace; a common currency, so the thinking went, would bind the continent even more closely together. What has happened instead, however, is a nightmare: the euro has become an economic trap, and Europe a nest of squabbling nations…. The disadvantages of a single currency come from loss of flexibility. It's not just that a currency area is limited to a one-size-fits-all monetary policy; even more important is the loss of a mechanism for adjustment. For it seemed to the creators of OCA, and continues to seem now, that changes in relative prices and wages are much more easily made via currency depreciation than by renegotiating individual contracts. Iceland achieved a 25% fall in wages relative to the European core in one fell swoop, via a fall in the krona.

A question arises in light of this insight. Is it possible to organise and maintain an integrative currency area that is able to involve and admit states with a variety of labour productivity levels? Such an area should enable these countries to enjoy faster development thanks to more dynamic socio-

-economic processes. This question also concerns the issue of the opportunity for introducing a global currency with a common monetary unit.

6. Hypothesis of an Integrative Currency Area

A hypothesis is a weak theory that requires proof. The theory of an integrative currency area is firmly based upon the fundamental principles of reality, as discussed in previous studies by M. Dobija and B. Kurek (2013). These fundamental laws, as underlined by P. Atkins (2007), determine the nature of reality. The theory of an integrative currency area (ICA) is consistent with fundamental laws. However, to be ultimately confirmed, it must be successfully implemented in practice.

The first and most important assumption behind the creation an integrative currency area is a change in the monetary system. Adjusting the monetary system to the fundamental principles of reality requires major changes to the procedures of "money creation." As explained in a previous study by M. Dobija (2011a), "money creation" is generally a flawed concept, since nobody can create money representing value, as nobody, in reality, can create energy. Therefore, the most important point of the reforms is to extinguish cash money in its present understanding as a product of the central bank. Cash money could be used for a transitional period as a form of work receivable, which an employee keeps in hand instead of in a bank account. In any case, in the first step, the central bank would have to stop issuing any new cash money.

The road to a deficit-less economy requires essential reform of the central bank. Following transformation, this institution would become positive and indispensable. The reformed economy would also require two additional functions to be performed. The first would be to control productivity both in the private and public sectors, resulting in *de facto* control over inflation and over the stability of the exchange rate to some extent. The second responsibility of the central bank would be entirely new: to pay the wages and salaries of the employees in the public sector. The central bank would be the only institution authorised to transfer wages and salaries to these employees' accounts held in commercial banks. An additional function related to the two mentioned above would be control over remuneration in the public sector and its consistency with the valuation of human capital.

In the above scenario, the central bank has nothing in common with the commercial banking system. It is no longer a lender of last resort. Instead of being a steady source of destruction in the economy, this institution,

after reform, becomes a symbol of the money-goods economy, which serves humanity through the self-financing of labour. As the payer of public sector employees, the reformed central bank releases citizens from debt and the majority of taxes. The second important function of a reformed central bank is the intelligent control of productivity. The indicator Q should constantly grow. Both functions are strongly connected, since control of productivity determines total payments for the public sector.

The next task of a state that wants to belong to a common currency area is to control compensation such that it is consistent with human capital. The state authorities must have control over payments and earnings. Since labour is the transfer of human capital to products, the value of labour depends on the level of human capital. The conclusion of this theory is that the constant pay of the employee ought to not be less than 8% of the employee's human capital. Models of compensation consistent with human capital theory also include employee intellectual capital, experience capital, and even creativity capital. The level of compensation should be supported by the existence of variety in employee capital in action, since the compensation should be equal to the value of the labour.

It is a fact that states with a Q of over 3.0 (Table 3) have a Gini coefficient of less than 0.3 (e.g. France has 0.28). On the other hand, Poland, with a Q of less than 2.0, has a Gini value of 0.35, and Ukraine, with a small Q of 1.65, has a value of 0.45 (Koshulko 2012). States belonging to the group where $Q \geq 3.0$ have statutory minimum pay that is consistent with human capital theory, whereas in Ukraine it is only 65% consistent (Renkas 2012c, pp. 189–220). Intelligent control of compensation aimed at consistency with human capital theory will ensure greater order in the economy as a result of lower inflation and more justice. This will increase citizens' purchasing power and companies' profitability. Both actions will require an acknowledgement of the fact that the money unit is in fact a labour unit and that labour is in fact the transfer of earlier collected human capital to products.

7. How an Integrative Currency Area Could Work: Poland as a Candidate

Logic analysis is a tool for examining whether a new theory is compact and not contradictory. Let us assume that Poland, with a Q of less than 2.0, wants to join the euro currency area. Meanwhile, the European Union decides to undertake necessary reforms, and the Maastricht criteria are abandoned. Poland is not able to maintain either a fixed exchange rate or

debts not exceeding the stated limits. The direction of the reform is clear: the European Central Bank is dissolved and the national central banks no longer create any cash money; instead, their function is changed to that of a payer of compensation for public sector employees. They are authorised to transfer the monthly pay of each employee into his or her commercial bank account. At this point, the existing euro area is ready for the accession of such a member as Poland. The overall position of the euro area is also improved, since the public debt ratio no longer grows.

The Polish preparation for accession requires two actions. The first is to reshape the central bank as the institution supervising labour productivity through its payer function. The second is to design a method for translating the values of the Polish monetary unit into the euro. The most important issue is the translation of wages, with a particular focus on the minimum wage, since this is a pillar of the compensation system. The problem of translation is not simple because, as was shown earlier, direct application of the exchange rate does not preserve value where productivity levels are different. This is the case with regard to Poland and the euro area.

One solution is to use a known percentage of pay consistent with human capital measurement. This is a rough approach, since the cost of living after accession is not known. By estimating the cost of living, one can calculate human capital $H(p)$. Then the formula for the minimum wage is: $M = a \times s \times H(p)$, where M is the annual minimum wage (including pension fund payments), a is the percentage of consistency, $s = 0.08$ is a random ratio of human capital diffusion, p is the constant of potential economic growth, and $p = E(s)$. Thus, in line with current data, $M = 0.73 \times 0.08 \times H(p) = 0.0584\, H(p)$. Assuming that product prices are translated at the mean value of the exchange rate, it is possible to compute the $H(p)$ but the government should be prepared to adjust the minimum wage to the changing cost of living.

Accurately establishing the compensation system for employees in the business sector is the task of management. This task is accomplishable provided management has knowledge about exchange rates and translations. It is not accomplishable as a one-off action; rather, it is a process of adjustment. The same can be said in respect of the public (budget) sector. There, compensation should be more unified, so its general framework should be recognised and arrived at by the government. Finally, the legal arrangement of receivables and liabilities should be translated at the current value of the exchange rate.

At the designated time, the new currency is introduced in Poland, and the country becomes a member of the euro area. Poland is already a member of the Schengen[1] area, so its citizens enjoy free movement as borders no longer exist. Joining the Schengen area is the first fundamental step towards integration. Accession to the Schengen area showed that Polish citizens did not emigrate in large numbers to Western countries. Therefore, one can expect that the introduction of the euro will not change these attitudes. Migration is caused mainly by substantial unemployment and low wages, which do not allow for the preservation of human capital. Reshaping the central bank – that is, changing monetarism to labourism – gives major hope that unemployment will decrease. Of course, one can expect an increase in the dynamics of socio-economic processes in the enlarged euro area. Young, dynamic, and clever citizens may decide to move to other countries to seek better earnings; this is neither a new nor an unusual scenario.

Many papers have analysed the cost-benefit agenda of accession to the OCA, among them a study by L. A. Rici (2008). This is a significant agenda in the case of the OCA, as is known from theory and practice (e.g. Greece, Portugal, and others). In the case of the ICA, on the other hand, costs do not arise at all. The reshaping of the central bank as an institution that serves the economy and society should be done in every case, since scientific economics is compatible with the fundamental laws of reality, wherein no institution can generate capital from nothing. The sun and photosynthesis are the original sources of capital. Then labour leads to profits. Nature ensures that the economy is a positive non-zero sum game, from which all agents can benefit provided that intellectual capital is working well. Statistical research conducted by B. Kurek (2011, 2012) has shown that the risk premium is close to 8%. This is a roughly similar to the average return on assets. The ICA does not generate costs; it simply applies intellectual capital to generate obvious benefits. Therefore, the European ICA will potentially be very attractive for all states in the neighbourhood of the prime euro area. The design is clearly determined: necessary political reforms, then accession to the Schengen area, and finally required economic reform in order to access the European ICA.

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[1] The free movement of persons is a fundamental right guaranteed by the EU to its citizens. Every EU citizen is entitled to travel, work, and live in any EU country without special formalities. Schengen cooperation enhances this freedom by enabling citizens to cross internal borders without being subjected to border checks. The border-free Schengen area guarantees free movement to more than 400 million EU citizens, as well as to many non-EU nationals, businesspeople, tourists, and other persons legally present on EU territory (European Commission 2013).

8. Summary and Conclusion

This paper aimed to introduce the theory of an integrative currency area. The first section presented the current state of knowledge in respect of economic principles, particularly the theory of money. This knowledge established the foundations of ICA theory. The second section summarised the category of labour productivity and its appropriate indicator. Use of the labour productivity indicator to explain exchange rate trends and interpretation of the labour share were the central themes of the next section. The discriminative nature of the euro OCA – that is, the notion that a member state should operate with a Q of over 3.2, when most aspirant countries have significantly lower indicators – was addressed in the fourth section. A brief description of the theory of ICA was included in the fifth section, while the sixth exemplified the accession of Poland to a European ICA.

Overall, these deliberations imply one main conclusion. Although the idea of European integration is good in theory, monetarism impairs the idea of natural dynamics. Monetarism is a symptom of obstacles that put all efforts in jeopardy. Progressive economics replaces monetarism with labourism in view of the fact that, in line with fundamental scientific laws, labour is the process of transferring value. Thus, money is the confirmation of completed labour, and labour is self-financing. Therefore, reshaping the central bank as an institution working in accordance with the laws of nature opens the way to economic welfare, and a European ICA is a step towards advancement.

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Abstract

Teoretyczne podstawy integracyjnego obszaru walutowego

Teoria optymalnego obszaru walutowego stanowi teoretyczną podstawę strefy euro. Jednakże ta strefa walutowa nie działa sprawnie. Pojawia się wiele wątpliwości dotyczących jej teoretycznych podstaw i procedur implementacyjnych, w szczególności w odniesieniu do akcesji nowych państw o niższej produktywności pracy. W artykule przedstawiono teoretyczną diagnozę i odpowiednie modyfikacje teorii optymalnej strefy walutowej na podstawie głębszego rozeznania natury kapitału i kursu walutowego. Istota zmian ogniskuje się na triadzie abstrakcyjnych pojęć kapitał – praca – pienią-

dze, co prowadzi do uznania, że praca sama się finansuje. W takiej perspektywie strefa walutowa staje się integrująca i może nawet jednoczyć kraje, które nie spełniają kryteriów z Maastricht. Do tej strefy mogą przystępować kraje o różnym poziomie produktywności pracy pod warunkiem stałego jej zwiększania. Problem deficytu budżetowego i długu publicznego zostaje rozwiązany przez zastosowanie samofinansowania pracy w sektorze publicznym. Wiele miejsca w artykule poświęcono miernikowi produktywności pracy i jego parytetowi, jako determinancie trendu kursu walutowego.

Słowa kluczowe: obszar walutowy, produktywność pracy, udział pracy w PKB, kurs walutowy.