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Dear Readers,

This issue of *Argumenta Oeconomica Cracoviensia* confirms the journal as one open to presenting theoretical issues and the results of research on how entities function in the economic system in different conditions, both in the macroeconomic and microeconomic dimensions. A characteristic feature of the development of economic sciences at this stage is the penetration of the disciplines of economics, management and finance. An approach to issues that takes the interplay of these three disciplines into account enables researchers to better recognise their nature and formulate recommendations to be implemented in practice. This trend in the development of the economic sciences has been reflected in the work included in this issue.

An example of just how is the article by Améziane Ferguene and Ibrahim Baghdadi, "Socio-political Governance, Institutional Function and Economic Development", which analyses the concept of new public governance and its importance for a country's socio-economic development. The European Union recommends the implementation of New Economic Management in Member States as an institutional response to the consequences of the most recent financial crisis. However, the authors' considerations go beyond the EU level to more universally address the conditions upon which social development are built – the balance between the various types of public authorities, institutional transparency, the rational use of resources and the building of civil society.

The growth of the capitalist economy is characterized by ever-increasing production and consumption. Production processes are carried out in enterprises, while the model they follow – their objectives – is defined and perceived differently in the market model envisioned in the neoclassical economy and the dialectical perception of economic development, and in a model consistent with the assumptions of classical economics. Apart from how indispensible production may or may not be, as consumption increases, so too does the quantity of waste produced. It cannot be denied that increased consumption is a goal management needs to see met, but nor can we fail to notice the negative effects greater consumption involves. Business

models should therefore take into account environmental protection and, as a consequence, promote sustainable economic development. The increasing amount of waste is not only an important practical challenge, but also leads to a deeper theoretical reflection on the economic goals of human activity, its system of values, including protecting the environment humans occupy. Wojciech Piontek takes an interesting angle on these issues in his article "The Problem of Waste Intensity in Entrepreneurial Business Models".

Another challenge economic theory has addressed in recent years is the human migration prompted, first, by the fall of communism in the early 1990s, then the enlargement of the European Union, which opened up the labour market to the citizens of EU Member States. Migration phenomena – humanitarian, social and economic alike – have intensified in the wake of the wars in the countries of North Africa and the Middle East. Due to the enlargement of the European Union, migration phenomena have been very prominent in Poland. This makes Ewa Genge's theoretical perspective on the issue one of great importance. In her article, "A Longitudinal Study of Polish Attitudes to Emigration: A Latent Markov Model Approach", she evaluates these phenomena with a proven econometric model.

The analysis of time series related to financial phenomena constitutes another methodological challenge. In many cases, the use of standard methods of estimating parameters and predicting phenomena does not yield satisfactory results. Here the model Monika Hadaś-Dyduch proposes for financial forecasting of time series, in her paper "Approximating Financial Time Series with Wavelets", is worth considering.

Assessing the condition of small businesses in the overall economy is made all the more difficult by the lack of full information on the costs they incur and the resulting effects. That lack means economic data must be estimated at a low level of aggregation. In their paper, "An Evaluation of Company Performance Using the Fay-Herriot Model", Grażyna Dehnel, Michał Pietrzak and Łukasz Wawrowski have undertaken just such an estimation. The article evaluates the applicability of this model to the estimation of one of the basic economic values in small enterprises: revenue. The authors' assessment of the financial situation of small business entities in Poland was done on the basis of information contained in the registers of the state administration, the implications of which may form the basis for the critical assessment of the method and model they have used.

To evaluate the situation of economic entities in a given country, it is essential that there be not only reliable not reporting data, but also a system for recording economic events a country. This issue is addressed in an article

written by Sanja Broz Tominac and Kinga Bauer, "Regulations for the Preparation of Financial Statements by Banks in Croatia and Poland", which compares the financial reports of commercial banks in those two countries. The comparative analysis shows that national accounting legislation allows some discretion in financial reporting, in the standards laid down by the IFRS. This issue affects those who use bank financial statements, including investors, regulators and stakeholders. Given that both Poland and Croatia belong to the European Union, it would be desirable to standardise the content of the financial statements of commercial banks, as the authors propose in the article.

In closing, I wholeheartedly recommend these articles to readers, and at the same time extend an invitation to authors, Polish and otherwise, to contribute original articles to future editions of the journal.

Prof. Stanisław Owsiak
Editor-in-chief

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Monika Hadaś-Dyduch

APPROXIMATING FINANCIAL TIME SERIES WITH WAVELETS

Abstract

Financial time series show many characteristic properties including the phenomenon of clustering of variance, fat-tail distribution, and negative correlation between the rates of return and the volatility of their variance. These facts often render standard methods of parameter estimation and forecasting ineffective. An important feature of financial time series is that they can be characterized by long samples. This causes the models used for their estimation to potentially be more extensive.

The aim of the article is to use wavelets to approximate and predict a series. The article describes the author's model for financial time forecasting and provides basic information about wavelets necessary for proper understanding of the proposed wavelet algorithm. The algorithm uses a Daubechies wavelet.

Keywords: prediction, wavelets, wavelet transform, approximation.
JEL Classification: C10, C20, C40.

1. Wavelet Transform

The wavelet transform is the result of the transformation of the operand (the operator's argument, i.e. the function of a given space in itself) under the influence of the operator. Exemplary transforms include the Laplace transform, the Fourier transform, the wavelet transform, the Burrows-Wheeler transform and the Hilbert transform. Wavelet transform is used in this article. There are two ways to determine wavelet transform. Most transforms can only be done using a formula. For example, the Laplace transform of a time function $v(t)$ is calculated by the formula:

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$$V(s) = \int_{-\infty}^{+\infty} v(t) e^{-st} dt. \quad (1)$$

There is a similar formula for the wavelet transform and Fourier transform. The most important difference between Fourier transform and Laplace transform is described by Euler (1744): "While the Fourier transform of a function is a complex function of a real variable (frequency), the Laplace transform of a function is a complex function of a complex variable. Laplace transforms are usually restricted to functions of t with $t > 0$. A consequence of this restriction is that the Laplace transform of a function is a holomorphic function of the variable s. Unlike the Fourier transform, the Laplace transform of a distribution is generally a well-behaved function. Also techniques of complex variables can be used directly to study Laplace transforms. As a holomorphic function, the Laplace transform has a power series representation. This power series expresses a function as a linear superposition of moments of the function. This perspective has applications in probability theory. The Laplace transform is invertible on a large class of functions. The inverse Laplace transform takes a function of a complex variable s (often frequency) and yields a function of a real variable t (time). Given a simple mathematical or functional description of an input or output to a system, the Laplace transform provides an alternative functional description that often simplifies the process of analyzing the behavior of the system, or in synthesizing a new system based on a set of specifications. So, for example, Laplace transformation from the time domain to the frequency domain transforms differential equations into algebraic equations and convolution into multiplication. It has many applications in the sciences and technology" (Korn & Korn 1967). More interesting information about the Fourier transform and the Laplace transform can be found, inter alia, in: (Phillips, Parr & Riskin 1995, Hilger 1999, Carlsson & Wittsten 2017).

As a transformation, the wavelet transform is similar to the Fourier. Both are based on the use of dot product operations of the test signal and the other part, which is known as the "kernel of the transformation". The main difference between them is the kernel. The use of wavelets as the nucleus of the transformation makes it possible to present each continuous function with a certain accuracy expressed by wavelet coefficients.

In the Fourier transform the domain contains time functions and the co-domain contains frequency functions. However, the wavelet transform allows for the transition from a time-value system to a time-scale (frequency) system, which makes it possible to analyze the frequency change in the time

domain. (It should be explained here that moving from the time-value system to the frequency-value system, we lose information about when a given event occurred). The formula for the Fourier transform is given by:

$$V(\omega) = \int_{-\infty}^{+\infty} v(t) e^{-j\omega t} dt. \tag{2}$$

There is one form of the Fourier transform for each category:
– continuous-time Fourier transform,
– continuous-time Fourier series,
– discrete-time Fourier transform,

The fast Fourier transform is a fast version of the discrete-time power signal and does not apply to any of the other transforms. The discrete-time power signal is defined by:

$$V(k) = \sum_{n=0}^{N-1} v(n) e^{-2j\pi nk/N}. \tag{3}$$

The above equation is really an N equation, one for each value of k (Mix & Olejniczak 2003, p. 19):

$$V(0) = \sum_{n=0}^{N-1} v(n) e^{0}, \tag{4}$$

$$V(2) = \sum_{n=0}^{N-1} v(n) e^{-2j\pi n/N}, \tag{5}$$

$$V(N-1) = \sum_{n=0}^{N-1} v(n) e^{-2j\pi n(N-1)/N}. \tag{6}$$

Again, the main difference between wavelet transform and Fourier transform is the kernel. For the kernel, Fourier transformation uses a sinusoidal function (i.e. periodic functions representing one frequency). However, in wavelet transform, the kernel is a wavelet, a special feature limited to certain requirements which must be met to be able to use it for the so-called multi-resolution analysis (e.g. it must have scaling function). There is an infinite number of such functions, and thus also an infinite number of wavelet transformations.

In the article I attempt to approximate a series of wavelets. Wavelets are basic functions for the wavelet transform (see Hadaś-Dyduch 2015, 2016a, 2016b, Hadaś-Dyduch, Balcerzak & Pietrzak 2016). As previously mentioned, the wavelet transform is a transformation similar to Fourier transform, thus "(...) wavelet coefficients can be calculated in the same way as Fourier coefficients, by using basis functions in an inner product calculation.

However, wavelets allow us to use an alternative scheme involving samples of the waveform supplied to a filter-down sample operation. For this, we must have an appropriate filter. Different wavelets are associated with different filters" (Mix & Olejniczak 2003, p. 24).

2. The Haar Wavelet

The Haar transform is one of several wavelet transforms that can be calculated with a formula. "In mathematics, the Haar wavelet is a sequence of rescaled «square-shaped» functions which together form a wavelet family or basis. Wavelet analysis is similar to Fourier analysis in that it allows a target function over an interval to be represented in terms of an orthonormal basis. The Haar sequence is now recognised as the first known wavelet basis and extensively used as a teaching example. (…) The Haar wavelet is also the simplest possible wavelet. The technical disadvantage of the Haar is that it is not continuous, and therefore not differentiable. This property can, however, be an advantage for the analysis of signals with sudden transitions, such as monitoring of tool failure in machines" (Lee & Tarng 1999, p. 241). The formula of Haar transform is given by:

$$c_{00} = \int_0^1 v(t)\, \varphi_{00}(t) dt, \tag{7}$$

$$c_{kj} = \int_0^1 v(t)\, v(t)\, \psi_{kj}(t) dt. \tag{8}$$

The function ϕ_{00} is called the scaling function, and the functions ψ_{kj} are called wavelets. The wavelet function corresponds to a bandpass filter (or a highpass filter). In contrast, the scaling function corresponds to a low-pass filter for approximation (averaging, smoothing the waveform). The scaling function is always assigned to one wavelet function (generating a family of scaling functions as for wavelet functions based on translation and scale).

"There are many wavelet basic functions other than Haar functions, and there is one wavelet transform for each set of basic functions. This is similar to the Fourier transforms, where there are four forms of the Fourier transform, but not similar in that there is a vast array of wavelet basic functions. Another important difference is in the way the coefficients for the wavelet transform are calculated. Most wavelet coefficients are calculated in a different way, using multirate sampling theory. There it is necessary to know only the filter coefficients. This method does not use the basic function" (Mix & Olejniczak 2003, p. 24).

Proposed in 1910 by the Hungarian mathematician A. Haar, the Haar transform is the simplest of the wavelet transforms, and one of the oldest transform functions. The Haar wavelet (Figure 1) is also the simplest possible wavelet.

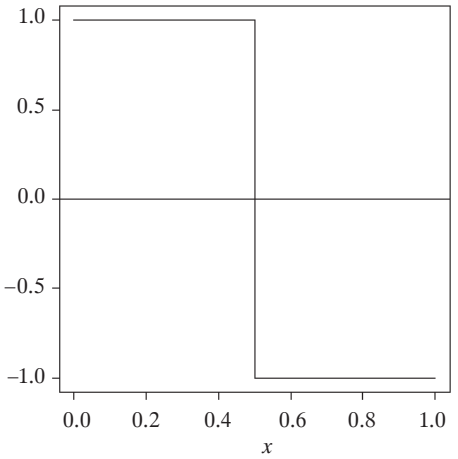

Fig. 1. Haar Wavelet

Source: the author's own elaboration.

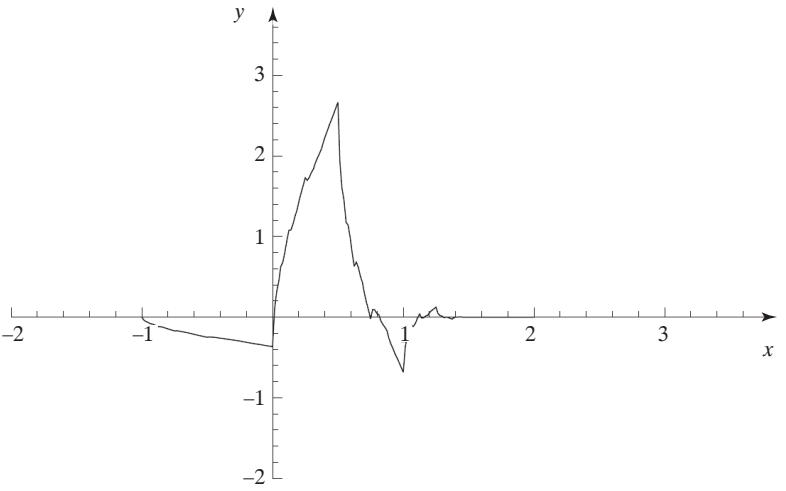

Fig. 2. Daubechies Wavelet

Source: the author's own elaboration.

Apart from the Haar wavelet, there are many other types of waves: Daubechies wavelets, Cohen-Daubechies-Feauveau wavelet, Mathieu wavelet, Legendre wavelet, Villasenor wavelet, to name just a few.

A special case of the Daubechies wavelet (Figure 2), the Haar wavelet, is also known as Db1. With each wavelet type of this class, there is a scaling function (called the father wavelet) which generates an orthogonal multiresolution analysis (see Daubechies 1992).

3. Model Specification

3.1. General Remarks

The aim of this article is to approximate and predict series with wavelets. It draws into one algorithm econometric methods with wavelet analysis. Econometric methods and wavelet transform are combined for the construction of a model that predicts a time series.

The choice of econometric methods for prediction is wide. There are two groups of econometric methods involved: static spatial information system and dynamic system of spatial information.

A static spatial information system presents the relationship between the signal input and output circuit. The relationship is usually constant, but depends on the time. Examining time characteristics in the context of the static does not make sense, because they do not say anything about a system in which there are no state variables. By contrast, a dynamic spatial information system accounts for the position of the object and its inception. This makes it possible to view the changes over time in the maps generated by the system. A geographic information system acquires, processes and shares data containing spatial information and accompanying descriptive information about the objects featured in the portion of the space covered by the system's operation.

From among the available and well-know econometric methods, for this article I chose only one group – adaptive methods. The difference between conventional methods and methods of adaptation include:

1) classical methods:

– stimulus is often far from the threshold,

– stimulus values to be presented are fixed before the experiment;

2) adaptive methods:

– modifications of the method of constant stimuli and method of limits,

– stimulus values to be presented depend critically on the responses that preceded them.

3.2. Algorithm Specification

My algorithm can be presented in the following main stages:

1. A one-dimensional time series is divided into smaller, equinumerous units, keeping the chronology of time.

2. For each series resulting from the division series in the base point 1, we determine the coefficients of wavelet for the following equations:

$$\begin{cases} \sum_{n=0}^{L-1} h_n & = \sqrt{2}, \\ \sum_{n=0}^{L-1} h_n h_{n+2m} & = \delta_m \\ \sum_{q=0}^{L-1} q^k (-1)^k h_{L-1-q} & = 1, \end{cases} \tag{9}$$

where L is filter length, and:

$$\delta_n = \begin{cases} 0 & \text{for} \quad n \neq 0 \\ 1 & \text{for} \quad n = 0 \end{cases}. \tag{10}$$

Signal processing using wavelet transform uses filters. Filter h is called a low-pass filter, which is defined as:

$$h_n = \langle \phi(x), \phi_{1,n}(x) \rangle, \tag{11}$$

$$\phi(x) = \sqrt{2} \sum_{n \in Z} h_n \cdot \phi(2x - n). \tag{12}$$

3. Determine the function approximating each series according to the formula:

$$f(x) = \sum_{l \in Z} c_{j-1,l} \phi_{j-1,l}(x) \sum_{l \in Z} d_{j-1,l} \psi_{j-1,l}(x), \tag{13}$$

where:

$$c_{j,n} = \langle f_j(x), \phi_{j,n}(x) \rangle, \tag{14}$$

$$d_{j,n} = \langle f_j(x), \psi_{j,n}(x) \rangle, \tag{15}$$

$$\psi(x) = \sqrt{2} \sum_{n \in Z} g_n \phi(2x - n). \tag{16}$$

4. Construction of models segmented according to the initial division of the unit series of the base.

5. Determination of theoretical values arising from the specific functions and series unit.

6. The calculation of the final value of the theoretical forecasted variable according to the formula:

$$\hat{f}_t = \frac{1}{k_i}\sum_{j=1}^{k} \hat{f}_{ij}(t), \tag{17}$$

where:

$\hat{f}_{ij}(t)$ is the final theoretical value for period or moment t,

k_i is the number of "segments" of theoretical variable values for the period or the moment t.

7. The solution to the problem:

$$Min\left\{\sqrt{\frac{1}{n}\sum_{t=1}^{n}((a\hat{y}_t + (1-\alpha)y_{t-1}) - y_t)^2}\right\} \tag{18}$$

on the assumption $\alpha \in \langle 0,1 \rangle$.

8. Prediction errors.

The article is used to approximate Daubechies wavelet. In contrast to Haar's simple-step wavelets, which exhibit jump discontinuities, Daubechies wavelets are continuous. As a consequence of their continuity, Daubechies wavelets approximate continuous signal more accurately with fewer wavelets than do Harr's wavelets, but require intricate algorithms based upon a sophisticated theory. The Daubechies wavelets are a family of orthogonal wavelets characterised by the maximal number of vanishing moments for some given support. With each wavelet type of this class, there is a scaling function which generates an orthogonal multiresolution analysis. Furthermore, each Daubechies wavelet is compactly supported. The Daubechies wavelets are neither symmetric nor antisymmetric around any axis, except for Db1, which is in fact the Haar wavelet. It is not possible to satisfy symmetry conditions given all the other properties of the Daubechies wavelets (see Daubechies 1992).

The Daubechies wavelets begin by approximating the samples by the scaling function of the multiples of shifted basic building blocks:

$$\tilde{f}(r) = a_{-2}\phi(r+2) + a_{-1}\phi(r+1) + a_0\phi(r) + \ldots + a_2 n_{-1}\phi(r - [2^n - 1]), \tag{19}$$

where:

$$\psi(r) = -\frac{1+\sqrt{3}}{4}\phi(2r-1) + \frac{3+\sqrt{3}}{4}\phi(2r) - \frac{3-\sqrt{3}}{4}\phi(2r+1) + \frac{1-\sqrt{3}}{4}\phi(2r+2), \tag{20}$$

$$\psi(r) = 0 \text{ for } r < -1 \text{ or } r > 2, \tag{21}$$

$$\phi(r)=\frac{1+\sqrt{3}}{4}\phi(2r)+\frac{3+\sqrt{3}}{4}\phi(2r-1)+\frac{3-\sqrt{3}}{4}\phi(2r-2)+\frac{1-\sqrt{3}}{4}\phi(2r-3), \quad (22)$$

$$\sum_{k\in Z}\phi(k)=1, \quad (23)$$

$$\varphi(r)=0 \text{ for } r\le 0\vee r\ge 3, \quad (24)$$

$$D_j=\{k2^j : k\in Z\}, D=\bigcup_{j\in Z}D_j=\bigcup_{j=0}^{\infty}D_j. \quad (25)$$

Shifts $\varphi(r-l)$ or $\varphi(r)$ by integers $l < -2$ or $l > 2^n - 1$ equal zero where $0 \le r \le 2^n$, and consequently do not affect the approximation of $\hat{f}$.

Here are the following steps to find approximation (see Mix & Olejniczak 2003):

1. Start at the beginning of the waveform and compare to wavelet by correlation.
2. Shift the wavelet to the right and repeat step 1. Do this until you have covered the entire signal.
3. Scale the wavelet and repeat steps 1 and 2.
4. Repeat steps 1 through 3 for all scales.

By a combination $\hat{f}$ of shifted building blocks φ and wavelets ψ, Daubechies wavelet can approximate a function f, which may represent any signal. A simple and common choice of the coefficient a_k consists in setting, for each $k \in \{0, \ldots, 2^n - 1\}$, $a_k := s_k$, the corresponding approximation (see Yves 1999):

$$\tilde{f}=\sum_{k=0}^{2^n-1}s_k\varphi(\mathrm{r}-k) \quad (26)$$

nearly interpolates f at the sample points $s_k = f(k)$.

4. Data to Be Supplied to the Algorithm

The research was based on a series of financial exchange rates established by the National Bank of Poland. Quotations of the value of three currencies' (Czech crown, Romanian leu and euro) were from the period 1st January 2000 to 31st May 2016. As Figures 3, 4 and 5 show, the exchange rates varied widely in the period considered.

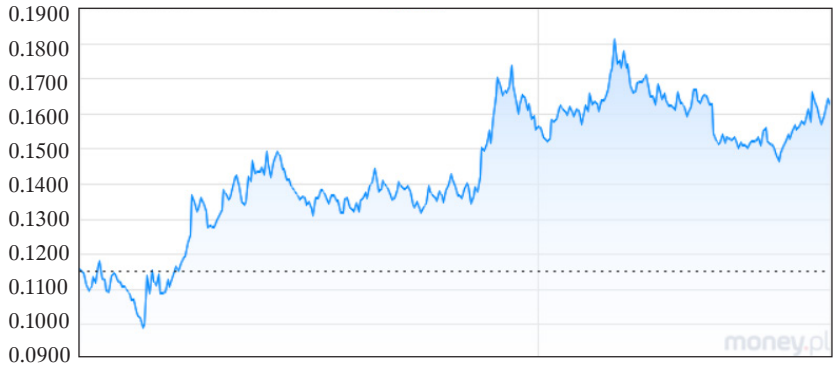

Fig. 3. Chart for the Czech Crown in the Period 2000-01-01 to 2016-05-31

Source: http://www.money.pl/pieniadze/nbparch/srednie/. Accessed: 1 June 2016.

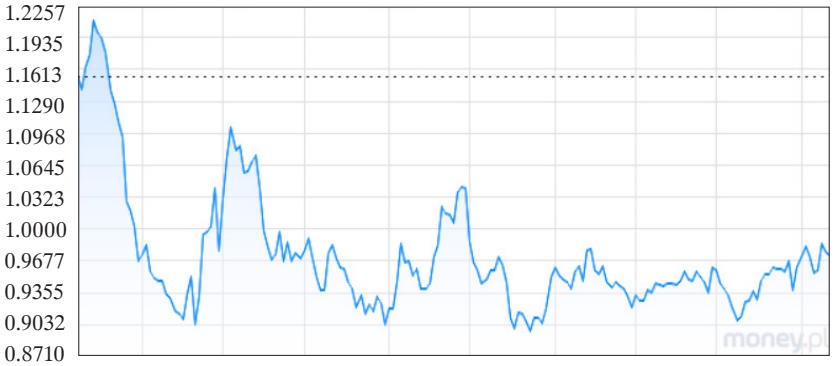

Fig. 4. Chart for the Romanian Leu in the Period 2000-01-01 to 2016-05-31

Source: http://www.money.pl/pieniadze/nbparch/srednie/. Accessed: 1 June 2016.

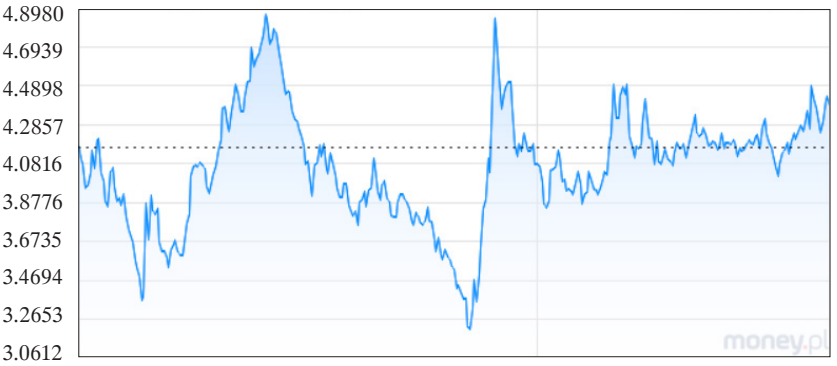

Fig. 5. Chart for the Euro in the Period 2000-01-01 to 2016-05-31

Source: http://www.money.pl/pieniadze/nbparch/srednie/. Accessed: 1 June 2016.

5. Results and Discussion

Prediction series for one period forward using wavelets provided fairly good results, which is best illustrated by the results quoted below: The *RSME* error was 0.98% for the Czech crown, 0.87% for the Romanian leu and 0.79% for the euro.

The value of the prediction error depends on many factors, among them the method used to expand the series input data to calculate the wavelet coefficients. In the results cited above, the polynomial method is:

$$\begin{aligned} p(r) = p_0 + p_1(r - [2^n - 1]) + p_2(r - [2^n - 1])(r - [2^n]) + \\ + p_3(r - [2^n - 1])(r - [2^n])(r - [2^{n+1} - 1]). \end{aligned} \tag{27}$$

For comparison, Table 1 shows the results obtained by using other methods. The following methods (assuming that the initial series has the form: $p_0, p_1, p_2, \ldots, p_{2^n-2}, p_{2^n-1}$):

– method 1:

$$\underbrace{0, 0, 0, \cdots, 0}_{\text{extension}}, \underbrace{p_0, p_1, p_2, \cdots, p_{2^n-2}, p_{2^n-1}}_{\text{series}}, \underbrace{0, 0, 0, \cdots, 0}_{\text{extension}}, \tag{28}$$

– method 2:

$$\underbrace{p_{2^n-1}, \cdots, p_0}_{\text{extension}}, \underbrace{p_0, p_1, p_2, \cdots, p_{2^n-2}, p_{2^n-1}}_{\text{series}}, \underbrace{p_{2^n-1}, \cdots, p_0}_{\text{extension}}, \tag{29}$$

– method 3:

$$\underbrace{p_0, p_1, p_2, \cdots, p_{2^n-2}, p_{2^n-1}}_{\text{extension}}, \underbrace{p_0, p_1, p_2, \cdots, p_{2^n-2}, p_{2^n-1}}_{\text{series}}, \underbrace{p_0, p_1, p_2, \cdots, p_{2^n-2}, p_{2^n-1}}_{\text{extension}}, \tag{30}$$

– method 4:

$$\underbrace{p_0, p_1, p_2, \cdots, p_{2^n-2}, p_{2^n-1}}_{\text{series}}, \underbrace{p_{2^n-1}, \cdots, p_0}_{\text{extension}}, \underbrace{p_0, p_1}_{\substack{\text{short} \\ \text{extension}}}. \tag{31}$$

The need to extend the series input data to determine the wavelet coefficients appears in the case of filters. Length L is greater than 2. This follows from the fact that the calculation of the wavelet coefficients of expansion for the last element of the finite signal filter should, in theory, go beyond the signal. However, this did not occur.

Depending on the method used to extend the series, various prediction errors can be produced.

Table 1. Results

Currency	The method of extending the series				
	I	II	III	IV	Polynomial
Czech crown	2.21%	2.10%	1.75%	1.61%	0.98%
Romanian leu	2.51%	2.25%	1.84%	1.31%	0.87%
Euro	3.1%	2.95%	2.01%	1.11%	0.79%

Source: the author's own calculations.

For this study I have used Daubechies wavelet. The study I have described in this article could be used as an introduction to further research, with subsequent algorithms being built upon the ones reported here. Innovative algorithms will be extended by different algorithms, including those presented in (Biernacki 2007, 2009). Other analyses of wavelet analysis are presented, among others, in (Hadaś-Dyduch 2015, 2016b, 2016c), which also presents comparative analyses and interesting conclusions.

7. Conclusions

The article has described the series prediction and approximation using wavelet. The research was based on Daubechies wavelet. Daubechies wavelets, based on the work of I. Daubechies, are a family of orthogonal wavelets defining a discrete wavelet transform and characterized by a maximal number of vanishing moments for some given support. While Daubechies wavelets were used for this study, other wavelets including the Meyer, Morlet, Haar or "Mexican hat" can all be used. Wavelet analyses must have finite energy and an average value of zero. As a result, they take the form of short-term oscillations.

This article has not compared the results with other prediction models, because the purpose of the study was not to evaluate and select the best model prediction, but to present my own model for prediction and presentation approximation of financial time series using wavelets.

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Abstract

Aproksymacja szeregów czasowych z falkami

Finansowe szeregi czasowe wykazują charakterystyczne własności. Wśród nich można wymienić m.in.: występowanie zjawiska grupowania wariancji, leptokurtyczność rozkładów stóp zwrotu (tzw. grube ogony rozkładu) oraz ujemną korelację pomiędzy stopami zwrotu a zmiennością ich wariancji. Zjawiska te powodują, że w wielu przy-

padkach stosowanie standardowych metod estymacji parametrów i prognozowania nie przynosi zadowalających rezultatów. Ważną cechą finansowych szeregów czasowych jest fakt, że szeregi finansowe charakteryzują się długimi próbkami, co powoduje, że stosowane do ich estymacji modele mogą być bardziej rozbudowane.

Celem artykułu jest aproksymacja i predykcja szeregów finansowych z falkami z uwzględnieniem tzw. efektów brzegowych. W artykule opisano autorski model prognozowania finansowych szeregów czasowych oraz przedstawiono podstawowe informacje o falkach niezbędne do właściwego zrozumienia proponowanego algorytmu falkowego. W autorskim algorytmie wykorzystano falkę Daubechies.

Słowa kluczowe: predykcja, falki, transformata falkowa, aproksymacja.

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AN EVALUATION OF COMPANY PERFORMANCE USING THE FAY-HERRIOT MODEL*

Abstract

Information about monthly characteristics of the small business sector is currently provided mainly by sample surveys conducted, among others, by the Central Statistical Office. Sample size enables parameters of interest to be estimated with acceptable precision only at the country or voivodeship level or by NACE section. The growing demand for reliable estimates at a low level of aggregation is the motivating force behind research into the application of indirect methods of estimation based on auxiliary sources of information. Hence, the article seeks to evaluate the possibility of applying the Fay-Herriot model to estimate one of the basic economic variables that characterise small business, i.e. revenue, based on information collected in administrative registers maintained by the Ministry of Finance.

Keywords: small area estimation, indirect estimation, administrative registers, Fay-Herriot model, economic statistics.
JEL Classification: C40, C51.

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1. Introduction

Sample surveys are undoubtedly among the most important sources of monthly information and statistics about the small business sector. Such data are provided thanks to, foremost, sample surveys conducted by the Central Statistical Office (GUS). For purposes of estimation, it is necessary to consider such issues as sample size, survey design and estimation methodology, because these determine what kind of cross-classifications the estimates can be broken down into. Sample surveys conducted by GUS are based on relatively small sample sizes, which is why their results, calculated from direct estimators, are only released as aggregate estimates. The sample size in the biggest survey carried out for purposes of short-term business statistics, the DG1 survey, is sufficient to precisely estimate parameters only at the country and voivodeship level, or by section of business classification. Estimates at a lower level of aggregation, for smaller units, or for finer cross-classifications are much less reliable as a result of the high variance of estimators used to obtain them, or their pronounced bias (Dehnel 2015). Beyond that, classic estimation methods cannot be used to calculate estimates for domains with no units in the sample.

Recent years have seen a growing demand for detailed information at the level of local and regional units. This demand is expressed not only by government agencies, both local and national, but also by businesses. However, survey-based data currently provided by GUS do not meet the needs of all interested users. This is because they cannot be used to produce reliable direct estimates at a low level of aggregation, for local or regional units of territorial division or for detailed cross-classifications. While this situation could be solved by increasing the sample used in the survey, doing so would increase the cost and the duration of the survey administration. Such a modification is contrary to the principles of the modernisation of official statistics. It is therefore necessary to find tools that will enable official statistics to meet the demand expressed by users without the need to modify how the survey is administered. One possible solution is to modernise the currently used estimation methodology by relying on new techniques offered by small area estimation (SAE). SAE comprises a growing set of methods known as indirect estimation. Unlike classic survey sampling estimation methods, indirect estimators use all kinds of auxiliary information from outside a given domain or period of interest in order to improve estimation precision. This process is referred to as borrowing strength. This approach makes it possible to exploit information from a small sample, or, in special

cases, an empty sample, by supporting estimation with data from non--statistical sources without additional costs to provide reliable estimates at a low level of aggregation. Before indirect estimation methods can be widely implemented in official statistics, they must be evaluated in empirical studies to identify what is possible and beneficial in Polish conditions. The present article is intended as a contribution to this evaluation. It investigates the possibility of applying the Fay-Herriot model to estimate the mean monthly revenue of small businesses by voivodeship and NACE section, based on information collected in administrative registers.

The article has three main parts. The first describes data sources used for estimation and provides details of the empirical study. The second is devoted to methodological considerations of the analysis while the third part summarises and interprets the results of the study.

2. Data Sources

The empirical study conducted for this article was based on data from a business survey called DG1, the largest short-term survey in Poland. The target population for DG1 includes all legal persons and units without a legal personality employing at least 10 persons. It is a sample survey, with the sample including 98,000 units. Of those, medium-sized and large units employing over 49 people accounted for 18,000 companies, while the remaining 80,000 companies were small businesses employing between 10 and 49 people. All medium-sized and large units participate in the survey, while at least 10% of the sample comprised small units. Hence, the sample contains about 30,000 small businesses.

The DG1 survey is carried out to collect information about basic measures of economic activity in companies on a monthly basis. DG1 is in fact a monthly report providing essential data about each business unit, its activity and products and inventories. The data can be divided into two categories. The first contains information used to identify each business unit: its name, address, statistical ID number (REGON) and main activity by business classification. The second category contains characteristics of economic activities, such as sales revenue (from goods and services), number of employees, gross wages, wholesale and retail sales, excise tax and product--specific subsidies.

3. Description of the Study

The empirical study was limited to small businesses employing between 10 and 49 people that were active in May 2012. The dependent variable in the model was monthly revenue received by small businesses in June 2012. The auxiliary variable was revenue, whose value was determined based on information from the administrative register for December 2011. This study design was dictated (and restricted) by the availability of administrative information, which is released to the Central Statistical Office with several months' delay. Estimates for June can therefore be based on data from, at best, December of the previous year. In addition to data from administrative registers, estimation was also based mainly on a 10% sample of small businesses taking part in the DG1 survey.

Mean monthly revenue of companies employing between 10 and 49 persons was estimated for 16 voivodeships and 4 major NACE sections:

– "Manufacturing",
– "Construction",
– "Wholesale and retail trade" (Trade),
– "Transport and storage" (Transport).

To estimate the parameter of interest, an attempt was made to apply the classic Fay-Herriot model developed in small area estimation. Direct estimates obtained with the classic Horvitz-Thompson estimator were used as a point of reference for the study results. By comparing direct and indirect estimates, it was possible to evaluate the gain in precision resulting from the use of the non-standard method of estimation.

The precision of estimates obtained with the direct Horvitz-Thompson estimator and the classic Fay-Herriot model was assessed by the coefficient of variation expressed as a ratio of the standard error to the estimate. It was calculated using linearisation under simple random sampling. The theoretical basis for the classic Fay-Herriot model, the direct Horvitz-Thompson estimator and the coefficient of variation to be used as a measure of precision will be discussed in the next section of the article, which details the methodological aspects of the study.

4. Estimation Methods

4.1. Direct Estimation

The most common estimator in survey methodology is the Horvitz-Thompson estimator (hereinafter HT) (Horvitz & Thompson 1952).

Consider sample s drawn from population U, where s_d is a subsample from domain d. Counties in domains meet the condition $n_d < N_d$, where n_d denotes sample size in domain d and N_d is the population size of domain d. Under simple random sampling, each unit i in the sample has been assigned a sample weight – w_i – which is an inversion of the first order inclusion probability. The estimator of the mean in domain d is given by the formula:

$$\hat{y}_d^{HT} = \frac{1}{\hat{N}_d} \sum_{i=1}^{n_d} y_{di} w_{di},$$

where $\hat{y}_d^{HT}$ is the estimated mean of the variable of interest y in domain d and $\hat{N}_d = \sum_{i=1}^{n_d} w_{di}$.

The direct estimator is design-unbiased and design-consistent assuming that $n_d \to \infty$. Nevertheless, it is highly ineffective for domains in which n_d is very small; and it is impossible to calculate direct estimates for non-sampled domains where $n_d = 0$ (Guadarrama, Molina & Rao 2016).

To deal with the inefficiency of the direct estimator in the case of small sample size, indirect estimation methods are used. These techniques utilise data from different sources, such as censuses or administrative registers, connected with the target variable and thus improve estimation. Such a procedure is called "borrowing strength" and is the basis of small area estimation. This paper presents and examines just one of the many approaches – the Fay-Herriot model.

4.2. Fay-Herriot Model

The Fay-Herriot model was originally developed for income estimation in small domains in the USA (Fay & Herriot 1979). However, because of its simplicity and good empirical properties, it is used to estimate many other indicators, especially the poverty rate (Pratesi & Salvati 2008, Wawrowski 2014). The Fay-Herriot model is an area level model and relies on covariates measured at the domain level. Here is the general form of this model:

$$\hat{y}_d^{HT} = x'_d \beta + u_d + e_d,$$

where $\hat{y}_d^{HT}$ denotes direct estimates of the variable of interest, x'_d is a vector of auxiliary variables, β is a vector of regression parameters, u_d is a domain random effect, independent and identically distributed $(0, \sigma_u^2)$, and e_d is an independent random error $(0, \psi)$.

It is assumed that sampling variance ψ is known, though in practice it is estimated. Likewise, random effect variance σ_u^2 also needs to be estimated. This can be done using various methods, such as the moment estimator, maximum likelihood estimator (ML) or restricted maximum likelihood (REML). These methods are based on the iterative approach. If no positive solution is found, then $\hat{\sigma}_u^2 = 0$ and, thus, there are no random effects in the model. After these components are estimated, the empirical best linear unbiased predictor (EBLUP) is determined with this formula:

$$\hat{y}_d^{FH} = \hat{\gamma}_d \hat{y}_d^{HT} + (1 - \hat{\gamma}_d) x'_d \hat{\beta}.$$

The equation shows that Fay-Herriot estimates can be expressed as weighted averages of direct estimates and regression estimates. Weight:

$$\hat{\gamma}_d = \frac{\hat{\sigma}_u^2}{\hat{\sigma}_u^2 + \hat{\psi}_d}$$

measures the uncertainty of describing the estimated variable using the regression model. If sampling variance $\hat{\psi}_d$ is small, then weight $\hat{\gamma}_d$ is large. This means that EBLUP relies on direct estimates when they are accurate and takes model estimates otherwise (Boonstra & Buelens 2011). Regression parameters are calculated in the following way:

$$\hat{\beta} = \left(\sum_{d=1}^{D} \hat{\gamma}_d x_d x'_d \right)^{-1} \sum_{d=1}^{D} \hat{\gamma}_d x_d \hat{y}_d^{HT}.$$

For non-sampled domains and when $\sigma_u^2 = 0$, a Fay-Herriot model estimate is equal only to the regression part of EBLUP.

4.3. Precision Assessment Method

The precision of estimates can be determined by calculating the mean square error. For direct estimation, it can be calculated using the Taylor series method, while for the Fay-Herriot model, the MSE estimator Rao described in Chapter 7 can be used (Rao 2003). As a comparative measure of precision, the *CV* indicator is given by:

$$CV_d = \frac{\sqrt{MSE_d}}{\hat{y}_d}.$$

This ratio indicates the share of the estimation error in the value of the target variable estimate. Smaller *CV* values are desirable.

5. Estimation Results and an Assessment of Their Precision – Income Estimation

This study sought to estimate the mean revenue of businesses by voivodeship and selected NACE sections. The analysis focused on companies employing fewer than 49 people and conducting business activity classified into 4 NACE sections: "Manufacturing", "Construction", "Wholesale and retail trade" (Trade) and "Transport and storage" (Transport).

Before performing the estimation and analysing the results, it was first necessary to calculate the descriptive statistics of the sample by voivodeship and NACE section. Table 1 contains sample sizes for each domain. All 16 of Poland's voivodeships were sampled for each section.

Table 1. Sample Size by Voivodeship and NACE Section

NACE	N	Min	Q1	Mean	Median	Q3	Max
Manufacturing	16	129	154	245	220	331	442
Construction	16	41	53	93	78	128	193
Trade	16	131	158	256	216	294	563
Transport	16	20	24	40	30	47	101

Source: based on data from the DG1 survey.

The sample distribution can be divided in two parts. For "Construction" and "Transport", the mean sample size was below 100 units, while for "Manufacturing" and "Trade" it was above 200 units. The greatest variation in sample size across voivodeships can be observed for companies classified in NACE under "Manufacturing", and the least variation for "Transport". The largest median sample size is recorded for "Manufacturing", followed by "Trade". In the case of the latter, two voivodeships were outliers with considerably larger sample sizes than the rest: Mazowieckie and Śląskie. The other two NACE sections, "Construction" and "Transport", are characterised by much smaller sample sizes. The median sample size for "Construction" is 78 units, and for "Transport" 30. For "Transport", one voivodeship – Mazowieckie, with 101 entities – had a considerably larger sample size.

Nevertheless, such sample size diversity does not necessarily mean the precision indicator will be likewise varied, as Table 2 shows.

Table 2. *CV* of Direct Estimates of Mean Revenue (in %)

NACE	N	Min	Q1	Mean	Median	Q3	Max
Manufacturing	16	9.4	11.4	17.2	13.1	16.1	48.5
Construction	16	7.1	14.3	16.3	15.9	20.3	25.4
Trade	16	8.1	10.5	15.2	13.9	17.5	30.7
Transport	16	11.9	15.5	22.7	19.9	27.8	55.8

Source: based on data from the DG1 survey.

While the trade sector was represented by the largest number of enterprises, the smallest variance of estimates was observed in the construction sector. For all NACE sections, the maximum *CV* value exceeds 20%, which the Central Statistical Office regards as the threshold above which results should be published only as aggregate data (*The Methodology…* 2011). In this case, there are 18 cross-classifications (16 voivodeships × 4 sections) in which *CV* exceeds this level, accounting for 28% of all cells. For this reason, the Fay-Herriot model will be applied as a tool to improve the reliability of mean revenue estimates.

The first step in performing small area estimation is to identify the auxiliary variables that can be utilised in the model. Based on the available data and a literature review, mean revenue from an administrative register was chosen as the predictor. In this approach, parameters of the Fay-Herriot model were estimated for each NACE section. Estimated β parameters with *p*-values (in brackets) and random effects variance are presented in Table 3.

Table 3. Estimated Parameters of the Fay-Herriot model

Parameter	Sector			
	Manufacturing	Construction	Trade	Transport
β_0	1,002.83 (0.3050)	908.14 (0.1768)	2,050.48 (0.1790)	–485.39 (0.7350)
β_1	0.52 (0.0047)	0.38 (0.0035)	0.49 (0.0002)	0.70 (0.0007)
σ_u^2	146,551.50	150,315.70	0	0

Source: based on data from the DG1 survey and the administrative register.

All β_1 parameters have a positive sign and they are statistically significant. This means that mean revenue in the administrative register is positively correlated with mean revenue in the DG1 survey. It should be noted that

random effects variance σ_u^2 could be calculated only for two sections – "Manufacturing" and "Construction". For "Trade" and "Transport", no estimation method returned a positive solution. Fay-Herriot model estimates of mean revenue in these cases will be based only on the regression component – that is, no random effect for voivodeships is observed. Such estimates will be characterised by better precision – smaller *CV* values, but at the expense of higher bias. For manufacturing and construction, it is assumed that estimated σ_u^2 can be used to obtain mean revenue estimates that are optimal in terms of precision and bias.

Figure 1 shows mean revenue estimates obtained directly, with the Horvitz-Thompson estimator, and indirectly, using the Fay-Herriot model.

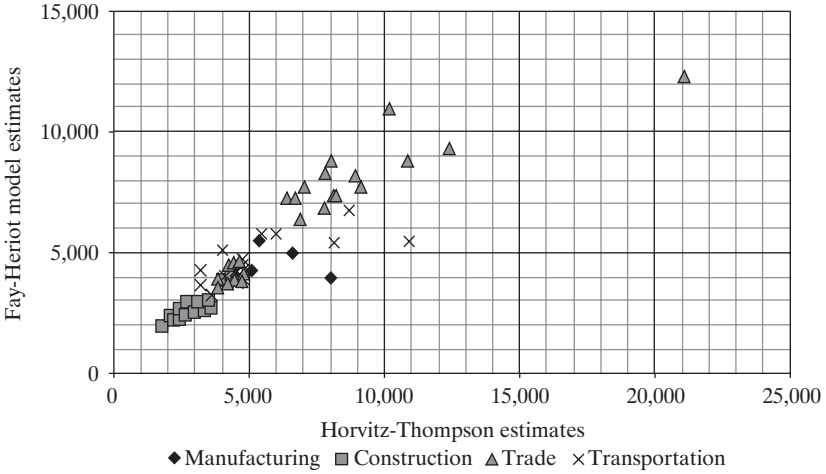

Fig. 1. Comparison of H-T Estimates and F-H Model Estimates

Source: based on data from the DG1 survey and the administrative register.

Estimated values of mean revenue are grouped by NACE section. Note that construction is characterised by the smallest revenue values, followed by transport and manufacturing, with the highest level of mean revenue estimated for trade. In general, direct and indirect estimates have similar values. Mazowieckie voivodeship is the only outlier. In this case, the direct estimate of mean revenue was 21,000 PLN, which was reduced by the Fay--Herriot model to 12,000 PLN. This property of indirect estimation is known as shrinkage. Figure 2 presents the distribution of the precision indicator *CV*.

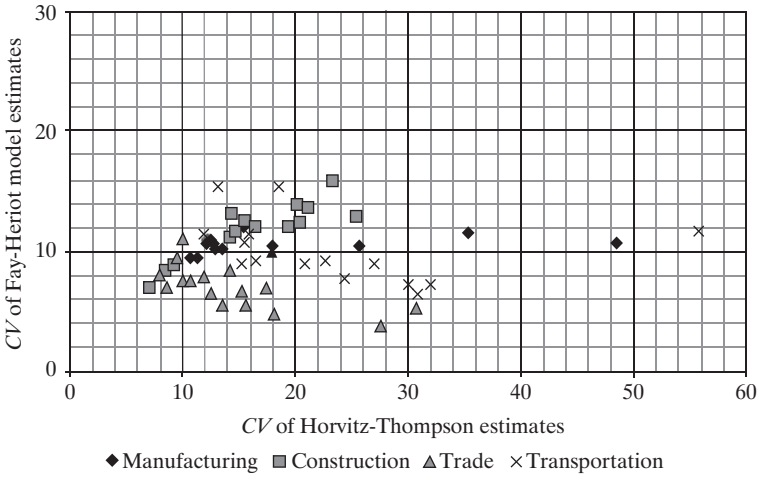

Fig. 2. Comparison of the Precision of H-T Estimates and F-H model Estimates

Source: based on data from the DG1 survey and the administrative register.

The Fay-Herriot model yields similar results but with better precision. In almost all cases, indirect estimation has contributed to reducing mean square error. The biggest difference between direct and indirect estimates – a decrease in *CV* from 28% to 4% – can be observed for Lubelskie voivodeship in the trade sector. There are three cases where the precision of the direct estimator is better than that of the indirect one: estimates for Pomorskie and Warmińsko-Mazurskie voivodeships in the trade sector and Kujawsko-Pomorskie voivodeship in the transport sector. Because these differences are very small, e.g. a rise from 13% to 15%, indirect estimates are still below the threshold of acceptability. That, in turn, is because for these NACE sections the algorithm was unable to obtain positive random effects variance. Nevertheless, *CV* values for all mean revenue estimates obtained with the Fay-Herriot model are below 20%.

The distribution of mean revenue estimates across voivodeships is shown, in Figure 3, based on the direct estimator and, in Figure 4, based on the Fay--Herriot model.

In general, the spatial distribution of estimates is very similar in both cases; however, direct estimates of average revenue are characterised by greater variability than model-based estimates. Final results obtained with the Fay-Herriot model are described below. For manufacturing, the lowest estimates can be seen in Łódzkie and Podkarpackie voivodeships – appr. 3,200 PLN. Businesses with the highest mean revenue are based in Śląskie

Fig. 3. Spatial Distribution of Direct Estimates of Mean Revenue

Source: based on data from the DG1 survey.

voivodeship (appr. 5,000 PLN) and in Mazowieckie voivodeship (appr. 5,500 PLN). In the construction sector, the lowest mean revenue estimate was calculated for Opolskie voivodeship, at 1890 PLN while the leading voivodeships in this sector are Mazowieckie (3,810 PLN) and Wielkopolskie (4,370 PLN). The highest estimates of mean revenue of all four sectors were obtained for the trade sector. Estimates exceed the 10,000 PLN threshold in two voivodeships: Zachodniopomorskie (10,888 PLN) and Mazowieckie (12,322 PLN). At 6,422 PLN, the lowest value of mean revenue was estimated in Warmińsko-Mazurskie voivodeship, which returned almost half the value calculated for Mazowieckie, despite the fact that the two regions neighbour one another. For the transport sector, the lowest mean revenue (3,344 PLN) was estimated for Podkarpackie, much of which is situated in the mountains. At 7,049, the highest revenue was estimated for Pomorskie voivodeship, with its well-developed maritime transport most likely to thank.

Fig. 4. Spatial Distribution of the Fay-Herriot Model Estimates of Mean Revenue
Source: based on data from the DG1 survey and the administrative register.

6. Conclusions and Further Research

The aim of the study reported in this article was to produce reliable estimates of the mean revenue of Polish companies employing fewer than 50 people and conducting activity classified in one of four selected NACE sections.

The estimates obtained using both approaches are very similar, but direct estimates display greater variability. Moreover, by applying the Fay-Herriot model and taking advantage of auxiliary variables from the administrative register it was possible to produce estimates at a previously unpublished level of aggregation, with acceptable precision expressed by *CV* values below 20%. The lowest mean revenue can be observed in the "Construction" section and the highest in the "Trade" section. In "Manufacturing", the highest values of revenue were estimated for Śląskie and Mazowieckie

voivodeships, in "Construction" they were for Wielkopolskie, in "Trade" again for Mazowieckie, and in "Transport" for Pomorskie.

Further research will focus on estimating other variables, such as company expenditures or losses. The authors will also consider the use of the multivariate Fay-Herriot model proposed by Benavent and Morales (2015), which can be applied when no positive solution of random effects variance can be found.

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Abstract

Ocena działalności przedsiębiorstw z wykorzystaniem modelu Faya-Herriota

Informacje dotyczące miesięcznych charakterystyk sektora małych przedsiębiorstw obecnie pochodzą głównie z badań reprezentacyjnych prowadzonych m.in. przez GUS. Wielkość próby umożliwia precyzyjne oszacowanie parametrów jedynie dla całego kraju i województw bądź w przekroju sekcji PKD. Rosnąca potrzeba dostarczenia wiarygodnych szacunków na niskim poziomie agregacji skłania do prowadzenia badań dotyczących zastosowania pośrednich metod estymacji wykorzystujących dodatkowe źródła informacji. Stąd też celem artykułu jest ocena możliwości zastosowania modelu Fay-Herriota do oszacowania jednej z podstawowych charakterystyk ekonomicznych dotyczących małych przedsiębiorstw, jaką jest przychód, na podstawie informacji zawartych w rejestrach administracyjnych prowadzonych przez Ministerstwo Finansów.

Słowa kluczowe: statystyka małych obszarów, estymacja pośrednia, rejestry administracyjne, model Faya-Herriota, statystyka gospodarcza.

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Ewa Genge

A LONGITUDINAL STUDY OF POLISH ATTITUDES TO EMIGRATION: A LATENT MARKOV MODEL APPROACH

Abstract

Latent class analysis can be viewed as a special case of model-based clustering for multivariate discrete data. When longitudinal data are to be analysed, the research questions concern some form of change over time. The latent Markov model is a variation of the latent class model that is applied to estimate not only the prevalence of latent class membership, but the incidence of transitions over time in latent class membership.

In 2004, Poland joined the European Union, prompting a number of Poles to leave the country. To examine this event, a model-based clustering approach for grouping and detecting inhomogeneities of public attitudes to emigration from Poland was used. It focuses especially on latent Markov models with covariates, which additionally made it possible to investigate the dynamic pattern of Poles' attitudes to emigration for different demographic features. depmixS4, Rsolnp and LMest packages of R were used.

Keywords: latent Markov model, panel data, model-based clustering, emigration.
JEL Classification: C33, J11.

1. Introduction

On 1 May 2004, ten new countries with a combined population of almost 75 million joined the EU. Since that time, the EU has formed a huge political and economic area with 450 million citizens and included three former Soviet republics (Estonia, Latvia and Lithuania), four post-communist countries (Poland, the Czech Republic, Hungary and Slovakia), a former Yugoslav republic (Slovenia) and two Mediterranean islands (Cyprus and

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Malta). In 2007, Romania and Bulgaria, who were not ready to join in 2004, were admitted. In 2013 Croatia joined the EU.

Closer attention has been devoted to issues of economic migration in Poland since 2006, when it was discovered that mass emigration from Poland and the country's growing economy might lead to a shortage in its workforce (i.e. Budnik 2007, White 2011, Witek 2010).

At least 2.5 million young Poles have left during the past decade, with 300,000 returning, according to the statistics office. After Poland's accession to the European Union, the amount of declared emigration continued to increase. In 2012, 275,603 emigrants officially departed. However, the number of emigrants is considerably underestimated, because we do not have complete insight into the volume of temporary and irregular emigration. Different reports show that it was undeclared emigration that became particularly pronounced during this period and accounted for the majority of emigrants. The temporary migration studies carried out by the Central Statistical Office in 2011 show that for every 1000 inhabitants of Poland, 52 worked abroad for longer than three months, which amounts to 2,017,501 temporary Polish emigrants.

Poland ranks first among postcommunist countries in the number of emigrants it sends forth and the emigration rate[1] (see Figure 1 and Table 1). In comparison with all of the countries that joined the EU in 2004, Poland is fifth, following Cyprus, Lithuania, Latvia and Malta. However, the emigration rate in Poland is currently unprecedented, and has not only remained high, but is growing, while the rate in Lithuania and Latvia have been falling since 2010 (Table 1)[2].

The most common destinations for Polish migrants are the UK, Ireland, Germany, the Netherlands and Sweden (especially for temporary migration). The causes of emigration from Poland are not only economic, but also social, one of the most important reasons cited being the lack of opportunities for self-expression, self-realisation, and interesting creative work.

Emigration poses a serious threat to Poland's socio-economic development. Firstly, it exacerbates the current negative demographic indicators (low birth rate, stagnant average lifespan), which will cause the absolute number of the population to fall. Most young Poles have gone to Britain, where Polish census figures showed Polish women are twice as likely

[1] The number of registered departures from the country for a permanent stay abroad divided by the number of residents.

[2] Data that allow for international comparisons of migration flows in EU countries are available from the European statistics agency, Eurostat.

to have children than in their native country. There is also the threat of the loss of national identity.

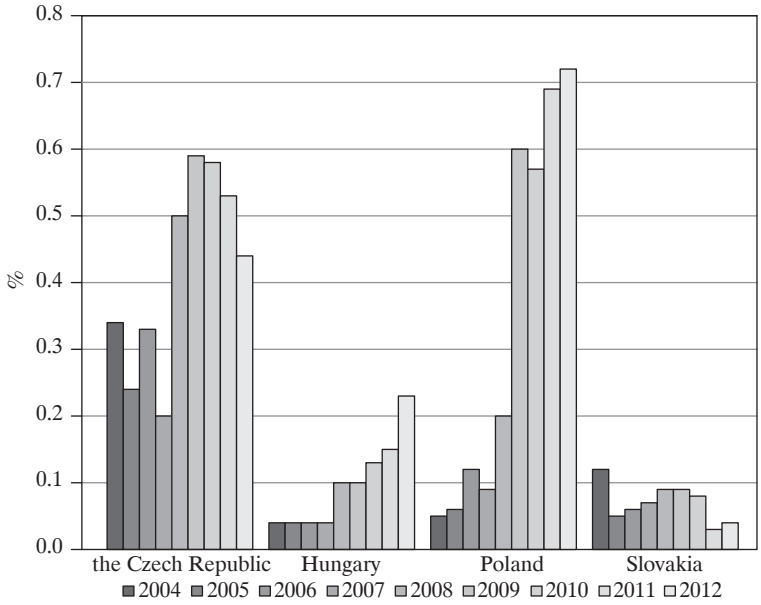

Fig. 1. Emigration Ratio in Post-communist Countries in 2004–2012

Source: author's own calculations based on Eurostat data.

Table 1. The Emigration Ratio for Countries that Joined the UE in 2004 (in %)

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012
The Czech Republic	0.34	0.24	0.33	0.20	0.50	0.59	0.58	0.53	0.44
Estonia	0.21	0.34	0.41	0.33	0.33	0.35	0.40	0.47	0.48
Cyprus	0.87	1.36	0.92	1.50	1.35	1.23	0.52	0.58	2.10
Latvia	0.89	0.78	0.76	0.70	1.23	1.77	1.87	1.46	1.23
Lithuania	1.11	1.73	0.98	0.93	0.80	1.21	2.65	1.76	1.37
Hungary	0.04	0.04	0.04	0.04	0.10	0.10	0.13	0.15	0.23
Malta	–	–	0.47	1.24	0.91	0.94	1.01	0.92	0.96
Poland	0.05	0.06	0.12	0.09	0.0	0.60	0.57	0.69	0.72
Slovenia	0.41	0.43	0.69	0.74	0.60	0.92	0.78	0.59	0.70
Slovakia	0.12	0.05	0.06	0.07	0.09	0.09	0.08	0.03	0.04

Source: author's own calculations based on Eurostat data.

Secondly, changes in the population's age structure directly affect the country's economy. A falling working-age population reduces the state budget and social security budget revenues. The declining workforce and the decreasing number of employed residents also affects the quality and availability of healthcare, which are funded by taxpayers. Moreover, the demand for such services is increasing as the population ages.

Thirdly, the departure of well-educated citizens shrinks the country's intellectual potential and diminishes the opportunity to master and develop advanced technologies and innovations.

To mark Poland's more than 10-year anniversary of EU membership, a model-based clustering approach to detect inhomogeneities of public attitudes to emigration from Poland was used. Despite numerous studies, the Polish migration situation is murky, and, because statistical data record only the officially declared migration, the actual emigration rate remains unclear. Therefore, our empirical research was based on systematic sociological research conducted by Czapiński and Panek (*Diagnoza społeczna 2013*… 2014) in Poland. A particular focus was placed on the latent Markov models with covariates, which additionally made it possible to investigate the dynamic pattern of Polish attitudes to emigration for different demographic features.

2. Definition

The initial formulation of the latent Markov (LM) model introduced by Wiggins (1973) has been developed in several directions, and applied in a number of fields (Bartolucci, Montanari & Pandolfi 2015, Genge 2014, van de Pol & Langeheine 1990, Vermunt, Langeheine & Böckenholt 1999, Visser & Speekenbrink 2010). The LM model represents an important class of models for the analysis of longitudinal data when response variables are categorical. The LM model analyses $P(\mathbf{y}_i)$, the probability function of the vector of responses over time by means of a latent transition structure defined by a first-order Markov process. For each time point t, the model defines one discrete latent variable constituted by K latent classes (which are referred to as latent states).

The model given in (1) relies on two main assumptions: first, it assumes that the latent state transitions occurring over time are modeled using the first-order Markov chain. Second, the latent states are connected to one or more observed response variables via a latent structure with conditional densities. The latter assumption implies that the observations in time t

depend only on the latent states at time t and is often referred to as the local independence assumption, which is the pillar of latent structure models.

Let y_{it} denote the response of subject i at occasion t on response variable j, where $1 \leq i \leq n, 1 \leq t \leq T, 1 \leq j \leq J$, and $1 \leq y_{itj} \leq M_j$, where n is the number of subjects, J is the total number of response variables and M_j is the number of categories for response variable j. The vector of responses for subject i at occasion t is denoted as $\mathbf{y}_{it}$ and the vector of responses at all occasions as $\mathbf{y}_i$.

The latent Markov model can be defined as follows:

$$f(\mathbf{y}_i) = \sum_{x_0=1}^{K} \sum_{x_1=1}^{K} \dots \sum_{x_T=1}^{K} P(x_0) \prod_{t=1}^{T} P(x_t \mid x_{t-1}) \prod_{t=0}^{T} P(y_{itj} \mid x_t). \quad (1)$$

The LMM is characterised by three probability functions:

1) $P(x_0)$ – an initial-state probability, i.e. the probability of having a particular latent initial state at $t = 0$,

2) $P(x_t \mid x_{t-1})$ – a latent transition probability, i.e. the probability of being in a particular latent state at time point t conditional on the latent state at time $t - 1$.

$$\mathbf{A} = \begin{bmatrix} a_{11} & \dots & a_{1K} \\ \vdots & \vdots & \vdots \\ a_{K1} & \dots & a_{KK} \end{bmatrix} \quad (2)$$

Assuming a homogenous transition process with respect to time, the latent transition matrix of transition probabilities a_{sr} was achieved, with $s, r, \dots, K$ denoting the probability of switching from latent state s to latent state r.

3) $P(y_{itj} \mid x_t)$ – a response probability, i.e. the probability of having a particular observed value on response variable j at time point t conditional on the latent state occupied at time point t.

When transitions are added to the latent class model, it is more appropriate to refer to the classes as states. The word class is more associated with a stable trait-like attribute whereas a state can change over time. This is especially useful when a model contains covariates $\mathbf{z}_i$. In depmixS4 package of R, a generalised (multinomial) model logit link function for the effects of covariates on the transition probabilities is employed (see e.g. Agresti 2002, Vermunt 1997). In this case, each row of the transition matrix is parameterised by a baseline category logistic multinomial, meaning that the parameter for the base category is fixed at zero.

The maximum likelihood estimation of the parameters of LM models involves maximizing the log-likelihood function $L(\mathbf{y}) = \sum_{i=1}^{n} \log P(\mathbf{y}_i)$. This

problem can be solved by means of the Expectation-Maximisation (EM) algorithm (Dempster, Laird & Rubin 1977). The E step computes the joint conditional distribution of the $t + 1$ latent variables given the data and the current estimates of the model parameters. In the M step, standard complete data ML methods are used to update the unknown model parameters using expanded data matrix with the estimated densities of the latent variables as weights.

The EM algorithm, however, has some drawbacks: it can be slow to converge, and applying constraints to parameters can be problematic. It can be seen that computation time and computer storage increase with the number of points, which makes the standard EM algorithm impractical or even impossible to apply with more than a few time points (Vermunt, Langeheine & Böckenholt 1999). Therefore, the depmixS4 package of R uses a special variant of the EM algorithm for LM models, called Baum--Welch or forward-backward algorithm (Baum et al. 1970, Paas, Vermunt & Bijmolt 2007).

An important modeling issue is choosing the proper number of states, which is typically based on information criteria such as the Bayesian Information Criterion (BIC) (Schwarz 1978) or Akaike Information Criterion (AIC) (Akaike 1974).

3. Example

The analyses presented below are based on social diagnosis questionnaires. The social diagnosis (objective and subjective quality of life in Poland) is a diagnosis of the conditions and quality of life of Poles as they report it.

The project takes into account all the significant economic – and not strictly economic – aspects of the life of individual households and their members. The project is interdisciplinary, drawing on the work of the main authors of the Social Monitoring Council, which is made up of economists, a demographer, an insurance specialist, a psychologist, sociologists, a health economics expert and statisticians. The social diagnosis is based on panel research with the same households taking part every few years.

Questionnaire items about Polish emigration were considered. The data concern one dichotomous outcome variable y_1 and one multinomial y_2 outcome variable measured at five different times (every two years, i.e. 2005, 2007, 2009, 2011, 2013)[3]. Unfortunately, the information was not complete

[3] Only those two variables are given at five occasions.

for any of the years. Therefore, 538 complete observations were considered at each point of time. In total, there is information on $n = 2690$ cases. The public dataset is available at www.diagnoza.com (see also *Diagnoza społeczna 2013*… 2014).

All computations and graphics in this paper have been done in the depmixS4 (Visser & Speekenbrink 2014) package of R.

The following variables (questions) were used in the analysis for the years 2005, 2007, 2009, 2011 and 2013:

y_1 – Do you plan to go abroad within the next two years in order to work?

y_2 – To which country (economic emigration target)?

The following covariates were also analysed:

z_1 – education[4],

z_2 – age[5],

z_3 – social-professional status[6],

z_4 – occupation (active and inactive)[7].

In the first question, respondents could choose one of two options: yes or no. In the second question, the following countries were considered: Austria, Belgium, Denmark, Finland, France, Greece, Spain, the Netherlands, Ireland, Luxemburg, Germany, Portugal, Sweden, UK, Italy, other UE countries, Norway, the US, Canada, Australia, other countries.

A reasonable theoretical approach might indicate that there are two latent states of survey respondents: emigration enthusiasts and emigration sceptics. Supporters of emigration will tend to respond favourably to the prospect of leaving the country, with the reverse being the case for emigration sceptics. One might further expect that "changing one's mind" and moving into the other group is a function of each individual's education, occupation, social-professional status and age. This hypothesis can be investigated using a latent Markov model.

The optimal number of states was chosen using information criteria for the basic model (Collins & Lanza 2010), so two latent states were chosen.

[4] 1 – primary/no education, 2 – vocational/grammar, 3 – secondary, 4 – higher and post-secondary.

[5] 1 – up to 24 years, 2 – 25–34 years, 3 – 35–44 years, 4 – 45–59 years, 5 – 60–64 years, 6 – 65+ years.

[6] 1 – public sector employees, 2 – private sector employees, 3 – entrepreneurs/self-employed, 4 – farmers, 5 – pensioners, retirees, 7 – pupils and students, 8 – unemployed, 9 – other professionally inactive.

[7] 1 – legislators, senior officials and managers, 2 – professionals, 3 – technicians and associate professionals, 4 – clerks, 5 – service workers and shop sales workers, 6 – skilled agricultural and fishery workers, 7 – craft and related trades workers, 8 – plant and machinery operators and assemblers, 9 – elementary occupations, 10 – armed forces.

Parameters of the two states were estimated using the EM algorithm. In further analyses, the significance of the coefficients was tested. For the two states, only age and occupation coefficients were significantly different from 0. By examining the estimated state-conditional response probabilities, it was confirmed that the model indentified the two groups, with 8% in the pro-emigration group and 92% in the anti-emigration group. The smaller latent state was labelled "emigration enthusiasts" and the bigger group "emigration sceptics".

Latent state 1, emigration supporters, was characterised by a very high probability (98%) of a positive response to the first question about emigration. This state also returned the highest percentage (40%) of respondents prepared to work in Ireland and in Germany (20%), 7% in the US, 6% in Spain, 6% in the Netherlands, 2% in Austria and 2% in Denmark.

In contrast, those in latent state 2, emigration sceptics, were characterized by a low probability (1%) of a positive answer to the first variable. Of those from this group who were prepared to go abroad, nearly everyone (99%) indicated it would be to the US[8].

A further relevant set of information provided by the LM model is represented by the latent transition matrix **A**, which shows the probability of switching from one latent state to another. The results on Polish attitudes to emigration are reported in Table 2. The values on the main diagonal of the transition matrix represent "state persistence" – that is, the probabilities of remaining in a particular state. For example, the probability of staying in latent state 1 is $a_1 = 0.18$, while the probability of remaining in state 2 $a_{22} = 0.93$ is very high. The out-of-diagonal a_{sr} values indicate the probabilities of the emigration state switching: for instance, the attitude to emigration is not well represented by latent state 1 at time $t + 1$ and it is not very likely a persistence of this ready to emigration state but rather a switch to the emigration sceptics state $a_{12} = 0.82$.

It is also interesting that people who are not so ready to leave Poland at time t will not change their mind at time $t + 1$ with probability $a_{22} = 0.93$, indicating their behaviour is stable. They may also shift with the lowest probability to the emigration group represented by state one ($a_{21} = 0.07$).

The final model that was fitted to these data was another two state model with the addition of a covariates effect on the transition probabilities. Whether the effect of education and age modified emigration was the point of interest.

[8] The parameters of an LM model without covariates were also estimated. The estimated class--conditional response probabilities were quite similar to those for the LM model with covariates.

Table 2. Latent Transition Probabilities

State	State 1	State 2
State 1	0.18	0.82
State 2	0.07	0.93

Source: author's own calculations in R.

The hypothesis test showed that the separate variables of age and occupation had an influence on the transition probabilities (these covariates are statistically significant).

To interpret the estimated generalized logit coefficients of covariates, the transition probabilities were calculated and plotted at varying levels of age and occupations. In Figure 2, the estimated transition probabilities are given separately for each age category and level of occupation.

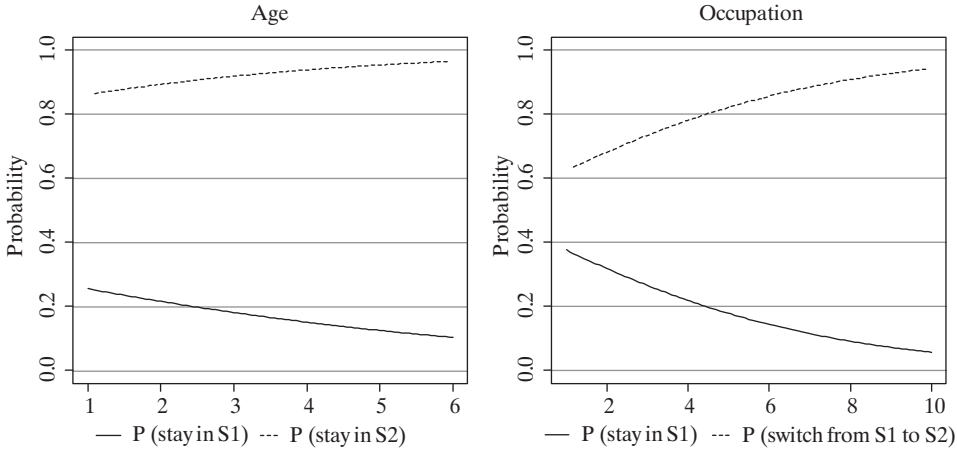

Fig. 2. Predicted Transition Probabilities for Age and Occupation Covariates

Source: author's own calculations in R.

As expected, the probability of remaining in state 1 decreases with age while the probability of remaining in state 2 increases with age (see the left panel of Figure 2). Due to space limitations, not all of the figures are presented here. However, the probability of changing one's attitude to willingly working abroad (a switch from state 2 to state 1) decreases with age while the probability of switching from state 1 to state 2 increase with age. It is likely older people would be less willing to emigrate as they might find adjusting to a new country more difficult than younger people do.

As far as the second significant covariate is concerned, respondents with higher positions are more likely to stay in the emigration state; on the other hand, the lower the position, the higher the probability of switching to state 2 (see the right panel of Figure 2). However, regardless of the position, respondents are very likely to belong to state 2 (a little bit higher for people with the lower position level) and to switch to state 1 (a little bit higher for people with a higher position level).

4. Conclusion

It might be supposed that emigration was a very common phenomenon because of EU borders opening or economic crisis. Despite two decades of uninterrupted growth in their country, however, Polish people are still leaving.

A latent Markov model was used to analyse Polish attitudes to emigration since the country's EU accession. The focused was especially on the variant of an LM model with covariates which additionally made it possible to investigate the dynamic pattern of Polish attitudes to emigration for different demographic features. By examining the estimated class- conditional response probabilities, it was confirmed that society could be divided into two groups. Two states of Poles were found – a pro-emigration state, which was the smaller of the two, and an anti-emigration state. The influence of covariates on the transition probabilities were also shown, representing the stability of behaviours. One hopes that the individuals in the small group of people that is ready to leave the country will change their minds after the latest statistics are released (the National Crime Agency showed the number of potential victims of trafficking last year increased by 22% over 2012 figures). The highest number of people trafficked into the UK (the most popular country of Polish emigration) came from Romania and most of them were sexually exploited. Poland was the most likely country of origin for people facing labour exploitation.

Poland has a negative migration balance. Nevertheless, according to Eurostat, citizens of other countries made up only 0.1% of the Polish population in 2011 – the lowest percentage in the entire EU. Most non-EU immigrants (both legal and otherwise) come from Ukraine, Belarus, Russia, Moldova and Armenia. Ukrainians consistently receive the greatest number of temporary residence permits, as well as settlement permits. They are also the biggest migrant group on the Polish labour market. Poland has successfully integrated thousands of people who have come to Poland from

Eastern Europe and have made a home here. Some have Polish roots or have relatives in Poland, like the group recently evacuated from Donbass, fleeing the fighting with Russia-backed separatists.

However, according to a study in 2013 by the Centre for Research on Prejudice – a professional academic centre at the University of Warsaw – as many as 69% of Poles do not want non-white people living in their country. They fear other religions and traditions. A vast majority believe that immigrants take work away from Poles and that their presence is detrimental to the economy. It's a view shared more broadly in Eastern Europe, despite insignificant migrant flows in all of Poland's eastern neighbours.

Poland's migration policy can generally be described as relatively restrictive and is addressed towards non-EU citizens, mostly from neighbouring Eastern European countries. Poland needs a complex endeavour to identify migrants who really need to be protected and to prepare centers that would house them. Concerning mentality, it may be supposed that public debate or an immigration campaign (explaining the moral and formal obligations of EU countries) will bring changes in the future.

Future research could be done to analyse migration data using a variant of the Latent Markov model including time-constant and time-varying covariates as well, where both initial-state and transition probabilities are allowed to differ for each latent state (Bartolucci, Farcomeni & Pennoni 2013).

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Abstract

Analiza nastawienia Polaków do emigracji z wykorzystaniem ukrytych modeli Markowa

Modele mieszanek, których składowe charakteryzowane są przez rozkłady prawdopodobieństw, reprezentują tzw. podejście modelowe w taksonomii. Obecnie coraz popularniejsze są modele mieszanek w analizie danych panelowych, w której celem jest

już nie tylko podział obserwacji na homogeniczne grupy, ale również pewna analiza zmian w czasie. W takim przypadku stosowane są ukryte modele Markowa.

W 2014 r. minęło 10 lat od przystąpienia Polski do Unii Europejskiej. Okres taki pozwala na dokonanie analizy nastawienia Polaków do emigracji. Celem badań jest podział Polaków na klasy o podobnym nastawieniu do emigracji w latach 2004–2013. Analiza empiryczna przeprowadzona została za pomocą ukrytych modeli Markowa z uwzględnieniem zmiennych towarzyszących. Wykorzystane zostały pakiety depmixS4, Rsolnp oraz LMest programu R.

Słowa kluczowe: ukryty model Markowa, dane panelowe, podejście modelowe w taksonomii, emigracja.

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SOCIO-POLITICAL GOVERNANCE, INSTITUTIONAL FUNCTIONING AND ECONOMIC DEVELOPMENT

Abstract

As macroeconomic stabilisation and structural adjustment policies have not been particularly successful, it becomes increasingly necessary to consider the role of additional economic parameters in the growth process. In this context, governance (the balance of powers, rational resource management, transparency of rules, involvement of civil society, etc.) has become inextricably linked to the analysis of the development of the countries of the South. Closely related to that of institutions, this notion of governance is a polysemous one. In spite of that, the concept of governance is currently the core question in debates about how international financial organisations use the idea of "good governance". This paper examines the need for "good governance" as a prerequisite for growth and development for developing countries and studies the possibilities of economic convergence at the international level (i.e. developing countries catching up with industrialised ones) based on the influence of socio-political variables on local governance.

Keywords: growth, development, governance, institutions, conditional convergence, developing countries.
JEL Classification: E02, O11, 055, 043.

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1. Introduction

For thirty years, following a rather pronounced weakness in economic activity in the developed world (Europe and Japan especially) and faced with difficulties in creating a sustainable economic recovery, economists have revived the important role of institutions in economic dynamics. Whereas mainstream models of the past (those of R. Harrod/E. Domar and R. Solow) left no room for the concept of institutions, this concept has during recent decades become a focus in many analyses and reflections.

At another level, significantly different results of the development policies in developing countries have prompted many economists to ask the question of why some countries (albeit a minority) become NICs (newly industrialized countries), while far more numerous others stagnate, their development deadlocked and malfunctioning. In trying to answer this question, economists have turned to more closely studying the interactions between political structures and economic performance. In other words, they address the issue from the perspective of governance.

To scrutinize the role of institutions and governance in growth and development, we adopt a three-part plan. The first part will define the main concepts. The definitions will be fairly comprehensive with respect to the concepts of "institutions" and "governance", both of which are central to the paper, while the concepts of "partnership", "regulation & co-regulation", and "participatory democracy" will be more succinct. In the second part, we will look at how the relationship between institutions and growth in general (developed countries, countries in transition and developing countries) are apprehended in economic theory. The third part focuses on developing countries, and expounds the broad lines of the development approach in terms of "governance", a much elaborated approach not only in the programmes of international organisations but also in the analysis of many independent theorists (i.e. who have no professional relation with these organisations).

2. Institutions, Governance and Related Notions: Definitions

2.1. Institutions

In the ordinary meaning, "institutions" are organisations that establish the rules of behaviour in different fields of social life, and ensure they are effectively implemented. The ARCEP (Electronic and Postal Communications Regulatory Authority) and the CSA (Superior Audiovisual

Council) are two examples in France; the WTO (World Trade Organization) is another type of institution functioning on the international level. This ordinary meaning of insitution, however, is not the only one, nor is it favoured by institutionalist theory.

In the institutionalists' meaning, and particularly in the meaning of T. Veblen (1970, p. 125), institutions are "prevailing habits of thought, common approaches to the particular relations and particular functions of the individual and the society". In other words, they define the customs, practices, rules of behaviour, and legal principles on which social life is based.

This approach encompasses several movements of economic analysis beyond the new institutionalism, including the school of regulation and the school of conventions, among others. For the adherents of these movements, institutions cover the standards, procedures and conventions, be they official or non-official, explicit or implicit, codified or tacit, which underline the behavior of all economic players. As apprehended, the role of institutions is particularly important if we are to understand how markets (commodity, capital and labour markets) actually function. On the other hand, these same institutions allow us to understand the persistence, in this era of globalisation, of the huge socio-economic differences between nations, to the extent that they significantly influence the public policies of different States. The influence of institutions on economic growth and development have given them great importance for several governments and international organizations, including the World Bank and the International Monetary Fund, which popularized the notion (Stein 2008).

The revitalization of institutionalism in social sciences has for three decades been accompanied by a proliferation of research analysing contemporary economic dynamics based on the role of institutions. Among these, two are of particular note:

– *Institutions, Institutional Change and Economic Performance* of D. North (Nobel Prize in economics in 1993), published in 1990 by Cambridge University Press. This book clearly shows how the performance of economic organisations is heavily dependent on the development of institutions;

– *Varieties of Capitalism: the Institutional Foundations of Comparative Advantage*, by P. Hall and D. Soskice, published in 2001 by Oxford University Press. This book shows how the various relationships between enterprises and their environment (administration, educational and scientific institutions, social partners, to name a few) configure the capitalism of each country.

Recently, the influence of institutions on economic development has been the subject of numerous debates, especially when it concerns institutions that maximise market freedom and protect private property rights (Ostrom 2007), also known as "better" institutions or Global Standard Institutions (GSIs), found in Anglo-American countries. According to H.-J.Chang (2011), GSIs are institutions that inherently favor the rich over the poor, capital over labour, and finance capital over industrial capital. This drives us to wonder about the real role of these institutions in the development of poor countries, especially when international organisations such as the World Bank, the IMF, the WTO, the OECD (Organization for Economic Cooperation and Development), the World Economic Forum and other influential financial and economic organisations, which are dominated by developed countries, ultimately oblige developing countries to improve governance by adopting GSIs in order to obtain aids and loans (Kapur & Webber 2000).

2.2. Governance

The notion of governance appeared, for the first time, in the early 1980s in the speeches of American specialists in business management. Through this notion, they intended to reflect the shift, in industrialised societies, to a new phase of capitalism: the passage from a managerial to a patrimonial model. "Corporate governance" is the term used to define an emerging trend within large firms represented by a new balance of power, in the direction of empowering shareholders to intervene in the decision-making, at the expense of the managers. Over the years, and especially since the end of the 1980s, with the rise of New Institutional Economics, the scope of the concept of governance has been gradually extended. However, from the late 1990s institutions have become the focus in the debate on economic development, with the rise of the idea that poor-quality institutions are behind the economic problems in developing countries. Nonetheless, there remains no consensus on a single definition of governance or institutional quality.

On the one hand, governance has been applied to organizations other than companies, including universities, hospitals, social services, and public authorities. For all these organisations, the aim is to implement what is called "good governance", which is a mode of rational resource management, based on the control of the decision-making process and a thorough understanding of the motivations of the different players who have, to varying degrees, small amounts of power. In sum, the question for any organisation, be it

private or public, is how to manage, regulate and, when necessary, reform complex systems and procedures. In the specific case of the public sector, the problem introduced by the concept of governance, and which is widely debated today, is whether one must – or must not – generalise the norms of the New Public Management. This means applying to public administrations a management mode modelled after management of private enterprises.

On the other hand, the scope of the notion of governance has gone beyond the industrialised economies to reach developing countries. In developing countries, the need for "good governance" has been introduced – or otherwise imposed – by international financial institutions, in particular the World Bank (*Governance and Development*… 1992, *Entering the 21st Century*… 1999). Starting from the basic consideration that the projects of development that they finance fail, in many cases, under the weight of bureaucratic obstacles and clientelism, and also due to the frequent diversions of external aid, the World Bank, the IMF and other international financial organisations have conditioned, since the early 1990s, their new aid packages to the implementation of the rules of "good governance". In practical terms, the "good governance" such as the World Bank and the IMF call for in developing countries covers six dimensions for managing development projects in transparency, both in the conception of these projects and their evaluation at different stages of their implementation (see Kaufmann, Kraay & Mastruzzi 2010). The six dimensions include voice and accountability, political stability and the absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption.

Departing from the World Bank and the IMF's definition of "good governance" as a liberally-minded orientation (the disengagement of the State for the benefit of the private sector, restrictions on public spending, strong international economic openness) that is far from achieving unanimous support among theoreticians and practitioners of development, and which has often been identified as an excuse for adopting liberal policies promoted by the "Washington Consensus". The question is then whether "good governance" is a precondition for growth and development and whether this applies for poor countries the same as for rich countries.

In this context, the positive causal relationship between, on one hand, "good governance" and, on the other, growth or development has been studied by several researchers: D. Kaufmann, A. Kraay and M. Mastruzzi (2008), K. P. Huynh and D. T. Jacho-Chavéz (2009), J. K. Sundaram and A. Chowdhury (*Is Good Governance*… 2012). Particularly, using nonparametric methods and the World Bank's governance measures,

K. P. Huynh re-examined the conventional insight that a positive relationship exists between governance and growth. M. Kurtz and A. Schrank (2007) critically assessed the work of D. Kaufmann, A. Kraay and M. Mastruzzi on the positive causal relationship between "good governance" and growth. For these authors, growth and development improve governance, rather than vice versa. Furthermore, J. K. Sundaram and A. Chowdhury have concluded in their research, published by the United Nations (*Is Good Governance*… 2012, p. 24) that "rapid economic growth and transformational development in China and Vietnam pose a challenge for those who believe that 'good governance' is a prerequisite for accelerating economic growth". This fact was previously elaborated by M. H. Khan (2010), who asserts that good governance is not a necessary precondition for development.

In the same vein, the empirical evidence shows that governance has improved in countries only with development, which again opens the debate over the need for the World Bank's six standards, GSIs, IPRs (intellectual property rights), etc., and whether these rights and standards should still be considered indicators of "good governance", especially when no theories of economic development support the claims of the good governance promoters. On the other hand, as international donors base the financial aid they grant to poor countries on the right implementation of "good governance", how would it be possible for these countries to converge economically and catch up with the rich countries? To answer this question, we refer to N. Meisel and J. Ould Aoudia (2007) who argue that the root of the problem resides in "good governance" proponents who presume a binary world in which all countries have the same set of institutional characteristics. At the same time, according to these authors, poor countries score badly due to corruption, lack of democracy, state failure, market failure, etc., which prevent them from catching up with the wealthy countries.

In short, if "good governance" is a prerequisite to growth and development, improving scores on governance indicators should enable poor countries to catch up.

2.3. Partnership

Since the late 1980s, the concept of partnership has been applied in France to describe the new contractual relations that, through decentralisation, are being put in place between the State, local authorities and public enterprises (e.g. state/region, state/enterprise contracts). It is also used to explain the new relationships being established between the companies themselves: in the context of intensified competition due to globalisation, companies

are invited to develop joint cooperation programmes, particularly R&D (research and development) ones. It is relevant to note that inter-enterprise collaboration does not replace the existing relations of competition, but is simply added to them; this is why these new partnerships are sometimes dubbed "coopetition" (a neologism combining the words cooperation and competition).

Furthermore, and perhaps more significantly, the concept of partnership refers to the increasingly established collaborations between the public and private sectors, known as Private Public Partnership (PPP). PPP has driven economic growth and development for several developing countries. The best example is the steady growth the Indian economy has exhibited thanks to collaboration between the corporate world and the public sector in several domains including new technologies and software and the Mumbai airport It is worth noting that this partnership succeeded thanks to the country's democratic government.

From this perspective, partnership and governance have to be interpreted in close conjunction with one another. Unlike the classical concept of government, governance entails the abolition or, at least, the gradual weakening of the border between the public and private spheres. Moreover, good governance requires "building effective partnerships of institutions and networks to tackle emerging global, national and local issues" (*Building Partnerships*… 2000, p. 3). This partnership, based on interaction between public and private spheres, civil society organisations and stakeholders, is an essential ingredient for "good governance". In the same context, seven guidelines for building a successful partnership for good governance were provided by the UN (*Building Partnerships*… 2000):

– widening the scope of participation to include all relevant stakeholders,

– finding commonalities and comparing perspectives,

– linking stakeholders proactively to maximize outcomes and economies of scale,

– building capacity of all stakeholders in their inter-relationships,

– developing mutually supportive policies, processes and operations,

– establishing moving targets of success and measures of approaching success and building on successes.

To sum up, the concept of "good governance", being based on the participation of all members of the society in decision making, fosters effective relationships and partnership of institutions and networks independently from their nature, whether they are private or public. The implications of PPPs on the economy have been translated into economic

growth and development, especially in the presence of democratic governance promoting society's participation in decision-making.

2.4. Regulation and Co-regulation

Due to technological and institutional changes, the world economy is becoming increasingly complex. Each player in the economy – businesses, financial institutions, educational institutions, research centers, trade unions, public administrations, NGOs and associations – thus finds itself tied inextricably with other actors. These links can exert a tremendous influence on their dynamism and even survival. How are these links organised, and how the partnerships and the necessary compromises between the stakeholders of a project negotiated? For an answer, we must examine the issue of regulation. At the sectorial level, various regulatory bodies have been established. Two examples from France are the AMF (Financial Markets Authority) and the ARCEP (Electronic and Post Communications Regulatory Authority). Analysis of how these institutions function shows that the enforcement of a regulation is easier when different stakeholders of a given sector or entity (companies, public authorities, associations, etc.) are engaged in its elaboration. That is why the concept of co-regulation recently emerged in the economics literature, and tends increasingly to prevail over the more conventional concept of regulation.

2.5. Participatory Democracy

Participatory democracy reflects an increasingly strong aspiration among citizens and civil society players to be directly involved in developing and implementing public policies at all levels of social life (on the local, national and international levels with, for example, the so-called "alter-globalization movement"). Often associated with the idea of grass-roots' governance, this concept is, from a theoretical perspective, often opposite to that of representative democracy, which excludes direct citizen participation for the benefit of elected delegates who have democratic legitimacy to represent the people (see Baogang 2012). However, it is clear that, at the local level, participatory and representative democracies are not necessarily incompatible. This is evidenced by numerous examples of neighbourhood boards and other local civic initiatives in Europe. Elsewhere, for example in Porto Alegre (Brazil), the actors of civil society intervene actively in municipal management, at least according to the information issued from the different World Social Forum meetings that took place there.

2.6. Authority

If present trends favour good governance, partnership, co-regulation and participatory democracy, what is the meaning of authority? In modern, democratic societies, authority is embodied by institutions led by officials or representatives whose power is undisputed, being legitimized by the procedures by which it has been granted: either election or appointment by the majority according to clear rules and criteria. However, this pattern is today undergoing disruption. Due to the effects of the political and social transformations of the last fifty years (universal schooling, skilling of the workforce, the growing complexity and sophistication of employment, empowerment of women, etc.), subordinates less and less accept the role of simple executors of leaders' decisions, in which they do not participate. Therefore, the notion of authority is evolving to become less hierarchical and is relying more on consultation and involvement of all concerned stakeholders in the process of decision-making and the implementation of what has been decided.

3. The Role of Institutions in Economic Growth

3.1. General Remarks

To frame these reflections more generally and cut a long story short, the two main approaches of economic growth are: the "naturalistic" approach and the "institutionalist" approach. Supporters of the first approach maintain that geographical conditions are determinants in economic growth (in its weakness as well as in its strength). Adherents of the second approach believe institutional factors play the central role.

Empirical studies on extensive period of history appear to favour the institutionalist approach, but our ambition is not to close definitely this debate. Rather, the most important thing here is to establish two matters. First, there are "good" and "bad" institutions, and second, only effective institutions foster socio-economic progress, while ineffective ones restrict or even prevent it. How do different economic theories cast the role of institutions in the dynamics of growth? To answer this question, we next review institutionalist theory itself, endogenous growth theories, regulation theory and public choice theory.

3.2. The Role of Institutions according to Institutionalist Economists

Aside from D. North (1990), P. Hall and D. Soskice (2001), who have already been cited, R. Coase (1998), B. J. Loasby (1999), M. Rutherford (1996), W. J. Samuels (*Institutional Economics*… 1988) and O. E. Williamson (2005, 2010, 2014, 2015) are prominent institutional economists. For them, it is not the accumulation of capital (human and/or technological) that determines long-term economic growth, but rather the social institutions (conventions, standards and procedures) which govern the relationships between stakeholders. This is so because these conventions, standards and procedures – the result of social evolution – play a crucial role in the level of production and transaction costs (i.e. the costs associated with negotiating contracts and the search for relevant prices, to name two) and, consequently, in the profitability of the economic activities and the motivations of various stakeholders to achieve it.

In other words, by laying down the ground rules of economic life, institutions have a significant impact in creating incentives for economic players (individual, SMEs, large firms, etc.) to engage fully in activities at the core of economic growth: production, investment, training, research, innovation. For example, depending on whether the social promotion in a particular country is on the basis of competence and merit or, in contrast, on the basis of birth and/or clan affiliation (i.e. nepotism or favouritism), individuals will not be motivated, to the same extent, to invest in their education, nor to perform innovate and take risks. As explained by D. North (1990), if the institutions of a country are such that the enrichment comes mainly through piracy, pirates associations would multiply there.

In the light of the institutionalist perspective, legislative and judicial dimension in economic dynamics cannot be underestimated. Indeed, due to resource scarcity, conflicts of interest frequently arise between individuals and groups of individuals, not to mention conflicts between wider and more or less structured human communities (e.g. classes, nations). In the absence of commonly accepted rules of law, these conflicts are settled by pure physical violence, the destructiveness of which (material and human), together with the climate of uncertainty that it establishes, harms economic growth. Hence, it is essential that an institutionalised system of laws and legal rules be created to restore a minimum level of order and certainty, without which it is impossible to have a sustainable process of production and wealth creation.

Finally, to further highlight the role of institutions in understanding the processes of growth, it is important to clarify that the institutional evolution is a relatively slow process. Ineffective institutions, or even ones that are harmful from an economic point of view, could be resistant to reform and change. Indeed, once embedded in practice, conventions, norms and standards can be difficult to convert, not only due to the psycho-social pressures that impede any social change, but because it is in the interests of some to maintain the institutional status quo. The corollary is obviously growth that is slow-paced and never reaches its full potential, with the economy growing at sub-optimum levels. In order to find the optimal growth path, institutional reform, conceived as the construction of new rules to promote greater transparency, stability and trust, becomes essential. The study of the main determinants of growth, development and economic convergence of poor countries lead us to conclude that differences in prosperity across countries are due to differences in economic institutions. In the same vein, D. Acemoglu and J. Robinson (2010) believe that the main determinants of per capita income gaps are differences in the countries' economic institutions. They wrote, "understanding underdevelopment implies understanding why different countries get stuck in political equilibria that result in bad economic institutions. Solving the problem of development requires a radical reform of these institutions" (Acemoglu & Robinson 2010, p. 28). As a final point, since economic convergence of poor countries occurs through its institutions, these countries would be well advised to undertake a deep revision of their sociopolitical structure in order to craft the suitable reform that empowers institutions and facilitates their functioning. This would help them catch up with their wealthier counterparts.

3.3. The Role of the Institutions according to the Theories of Endogenous Growth

For theorists of endogenous growth (Aghion & Howitt 1998, 2009, Lucas 1988, Romer 1986), the main sources of growth are: accumulation of knowledge and human capital, learning by doing (i.e. learning through experience), technological innovations, have a training infrastructure in place, research and development, communication. All these elements play a key role in economic growth, because they generate "positive externalities", or beneficial effects for many economic entities, if not for society as a whole.

However, it is not in the logic of the market to pay the producers of these positive externalities, particularly knowledge externalities. In fact, innovators get nothing as a market return, for their discoveries. To copyright, they must

protect their inventions with patents, which requires an institutional logic of property protection, instead of that of the market (commonly called "Laisser--Faire" logic). Furthermore, to encourage innovation, the State may adopt any of the following incentives: tax mechanisms in favour of innovators, help build infrastructure and the establishment of legal instruments which support research & development within businesses both private and public.

At the same time, penalise the producers of negative externalities such as pollution runs counter to market logic. Polluters pay nothing to compensate for the environmental harm they cause. This makes it necessary for public authorities to intervene: the State in developed countries, on behalf of the long-term collective interest and the preservation of ecology, implements anti-pollution standards (subsidies, pollution permits, regulations, etc.), emission performance standards (congestion charge, vehicle excise duty, etc.) and tax offending companies (Landfill tax, environmental tax, etc.). These taxes on pollution, which environmental protection champions seek to extend to all countries, are not an effect of the free-play of market laws but of the intervention of the State, which is a matter of institutional regulation. However, while all OCDE countries have adopted the polluter pays principle, there has been no widespread public action to shape the distribution of property rights for scarce environmental resources.

All in all, for the theorists of the endogenous growth (at least for some of them), public intervention is needed to reduce negative externalities while stimulating positive ones. Due to the inefficiency of the market in providing the social optimum, public intervention is justified and has become necessary to change the institutional environment in favour of economic growth and social welfare. In a certain way, this analysis confirms the core thesis of the institutionalist theorists who support the idea that institutions, by influencing the main factors of growth and the behaviours of economic players, play a central role in the dynamics of economic growth.

3.4. The Role of Institutions according to Regulation Theorists

The school of regulation – M. Aglietta and L. Berrebi (2007), R. Boyer (2004) – has been developing in France since the end of the 1970s. It encompasses an original analysis of the dynamics of the modern economy, structured around three central concepts: "regime of accumulation", "mode of regulation" and "institutional forms". Institutional forms are of great interest to us because they highlight the importance of the relationship between institutions and economic growth. Through their analyses, the regulation theorists have identified five basic institutional forms:

– the monetary regime (or monetary constraint regime): currency is considered a fundamental form of social relations,

– the wage relation (or the configuration of the relation between capital and labour): envisaged as the ways in which firms attract and retain workers,

– the form of competition, which shows how "the relations between a set of fractioned centers of capital accumulation are organised" (Boyer 2003, p. 82),

– the form of the State: the form state intervention takes in the economy,

– the form of international integration: the mode of relationships between the nation-state and the rest of the world.

Applying this analytical framework to the period of exceptional prosperity that the Western world has known since World War II, regulation theorists have developed the notion of a Fordism mode of growth, in which institutions play an important role. So important has it been, in fact, that the regulation approach is often described, quite rightly, as the "historical and institutional approach".

This Fordism mode of growth is characterised by a set of virtuous patterns achieved through the action of specific institutions. For example, at the level of worker remuneration, the indexation of wages on labour productivity, ensured through the institutional framework of what is called officially "collective agreements", allows a fair distribution of the productivity improvements between capital and labour. This fair distribution, by promoting a regular increase of the purchasing power of the lower and middle classes, induces steady growth in consumer demand and investment (including by households), with the positive effects it has in terms of further expansion of production.

3.5. The Role of Institutions according to the Theory of Public Choice

The theory of public choice was mainly developed in the United States in the 1960s and 70s, particularly with the works of A. Downs (1957), J. M. Buchanan and G. Tullock (1962), M. Olson (1971), J. M. Buchanan (1984a, 1984b), etc. It can be defined as the economic analysis of the failures of the State based on the gap between "what governments can do and what governments are doing" (Buchanan 1984a). In other words, it highlights the failures of governments and public institutions in certain aspects, when they are subject to assessment according to an ideal standard of efficiency and fairness. The same criticism can be levelled at "homo-politicus", i.e. anyone with a role in decision-making who seeks to maximise his (or her) own interest, which may differ sharply from that of the collectivity.

Given these characteristics, the theory of public choice uses the tools and models of economics that it applies to politics, public economy and decision--making authorities (governments, public institutions, etc.), with the aim of providing an explanation or an understanding of the complex institutional interactions within the decision-making system. Of course, the underlying question concerns the effects of institutional action on economic growth. If the key decision-makers act solely in own their specific interests, economic growth will be very uneven.

Methodological individualism, or taking into account the behaviour of players, their motivations, is a position of significant privilege. Each individual is determined by his utility as expressed by a set of preferences. The matter is then to put together the individuals who have different preferences. At the economic level, this problem can be addressed easily: an individual who prefers bananas to apples will be able to exchange his apples for bananas. At the political level, the exchange is much more complex and has been the subject of extensive and varied research: the economic theory of democracy (Downs 1957), the theory of bureaucracy (Tullock 1965), the theory of clubs (Buchanan 1965), the theory of justice (Rawls 1971). The theory of public choice can consequently be addressed from multiple angles, including the electoral system, the role of pressure groups and public finance (Buchanan & Musgrave 2000).

The first theme refers to the questions of the legitimacy of the government and elected representatives: why do some individuals have authority over some others? The analyses in terms of bureaucracy and pressure groups highlight the interactions between public interests and private interests: is there a common public interest for all. Or can one accept the (liberal) proposal according to which the public interest is simply the sum of private interests? This issue is essential to determine the growth strategy that institutions should favour. The problem is then to define the actions that can improve or, contrary, worsen society's overall situation. Public choice theory proves the impossibility of applying Pareto optimality, and emphasizes the role of pressure groups, whose actions are particularly visible in tax policy, trade policy, the financing of development projects, and generally hamper society's growth and well-being.

G. Stigler (1971) exposes the problem by analysing regulation as a traded service between (on one hand) policy makers and public sector employees (providers) and (on the other hand) industry executives (requesters). For Stigler (1971, p. 11), "If the representative denies ten large industries their special subsidies of money or governmental power, they will dedicate

themselves to the election of a more complaisant successor: the stakes are that important". On the other hand, the requesters wish on their side to protect themselves from competition, particularly the foreign. In this context, Stigler (1971, p. 5) considers that "the second major public resource commonly sought by an industry is control over entry by new rivals". This approach is known as the theory of the capture of the regulation, because "the regulator" becomes an agent entirely at the service of the interests of the requesters.

In *The Calculus of Consent*, J. M. Buchanan and G. Tulloch (1962) discuss what could be called "good society policy", or the foundation on which good governance should be based. First of all, "It is essential that it be understood that those characteristics which are «desirable» in the behavior of a person or persons are wholly independent of those characteristics that are «desirable» in an institutional structure" (Buchanan & Tulloch 1962, p. 216). The approach in terms of public choice is oriented towards the institutional organisation of social activity, and has a clear relationship with what Enlightenment-era philosophers called for. According to a widely accepted principle, one considers it crucial to take into account a set of ethical and moral criteria in public choices. On the other hand, institutions must stand above the single-market reality of self-interest. In other words, they must avoid conflicts of interest by placing the collective interest at the center of their actions and by eliminating the possibility for individuals or specific groups to impose external costs on all members of society. Human nature being what it is, Buchanan (1984b) proposes to constitutionally restrict the power of the rulers in order to avoid the short-term vision of policy makers (the main objective of an elected official is to ensure his own re-election). It would look at establishing limits within which the political authorities and rulers could act, and regulations which would prevent elected officials from allowing their own personal interests to prevail. This issue is particularly important in monetary and fiscal policies. Therefore, Buchanan (1984b) proposes a constitutional limit on tax rate increases, public expenditure and the size of government. Moreover, he insists, the need for a balanced budget must never be forgotten.

This is how the institutionalist theories and those of endogenous growth, regulation and public choice analyse the relationship between institutions and growth. Nevertheless, from the economic standpoint, the experience shows that only certain kinds of institutions play a positive role. The questions are then: what are good and bad institutions? And how can one distinguish between the two categories?

To briefly answer these questions, one can say that, from an economic standpoint, good institutions are those which fulfil the following functions or criteria:

1. On the legal level, they ensure the respect of the property rights of each individual, regardless of his social class, which has theoretically the effect of stimulating the spirit of entrepreneurship and, therefore, the participation of the individual or groups of individuals in economic life.

2. On the political level, they frame the exercise of power by the elites and persons in authority, with the aim of preventing them from abusing their prerogatives in order to distort the rules of the game and, thus, unduly appropriating the fruits of the efforts of others (by corruption, embezzlement, nepotism).

3. On the social level, they promote a fair and rational income distribution, with the goal of avoiding the double pitfall of a high concentration of wealth in the hands of a minority and excessive assistance for the disenfranchised. The result is generally better mobilisation of resources and a greater participation of everyone in the collective effort.

4. On the cultural and human level, they promote equal opportunity for different members of the community, regardless of their family or social background. This encourages individuals to actively engage in their training (intellectual and professional) and in that of their children.

Ultimately, are poor-countries poor because of their bad institutions? Experience and observations demonstrate that broad institutional differences between countries have influenced their growth and development. Hence, to understand why poor countries are poor, one should study the functioning of their institutions, the political structure of these countries and the mode of governance (democratic, participatory, or autocratic) that shape the work of institutions. There is no evidence that democracy leads to growth and development (like in Spain after 1980, Botswana in the 1960s, Mauritius in the 1970s) as growth in China has occurred under dictatorship. However, nor is there evidence that autocratic regimes are associated with growth, though several sub-Saharan African and Latin American countries have experienced growth under an autocracy.

Eventually, if dysfunctional institutions are associated with a lack of growth and development, would institutional reforms help to solve such a problem? According to D. Acemoglu and J. Robinson (2010, p. 15), “making or imposing specific institutional reforms may have little impact on the general structure of economic institutions or performance if they leave untouched the underlying political equilibrium”. Acemoglu and Robinson

illustrated their point of view with three examples: 1) the rapid growth of dictatorial China since 1978, 2) the democratic growth in Great Britain in the 19th century, and 3) the example of Botswana in the 1960s. For these authors, growth in China occurred because the political equilibrium changed towards providing more power to reforming institutions. On the other hand, growth in Britain in the 19th century came thanks to the empowerment of institutional change through the expansion of democratic rights and growing investment in education. Finally, Botswana it witnessed the fastest rate of economic growth in the world for more than three decades due to its economic and political institutions (Robinson & Parsons 2006).

In sum, institutional reform in poor and rich countries alike requires political dynamics that empower institutional change. This empowerment may take different forms (more liberty and independence, expansion of democratic rights, investment in education, etc.) based on the political equilibrium that prevails in these countries, and is likely to contribute strongly to the successful convergence of poor countries if accompanied with "good governance". This issue arises with particular acuity in a large number of developing countries, due to the behaviour of a large number of the ruling elite.

4. Good Governance and Development in Developing Countries

4.1. General Remarks

In comparison with the traditional neoclassical approaches, endogenous growth theories, in rehabilitating the economic role of the State, undoubtedly represent important progress. However, these theories present some limitations, the most important of which is the exclusion of extra--economic parameters of growth, particularly political parameters. In other words, the glaring weakness in these new growth theories (and in all of the neoclassical-inspired theories) is the failure to consider the socio-political environment in which economic players operate including the exercise of power, management of social conflict and political balance of power, to name three.

Nevertheless, awareness of this limitation, though it occurred late, is now real. Indeed, for approximately three decades we have been witnessing a genuine rediscovery of socio-political phenomena by economists, especially the neoclassicists (Marxists and, to a lesser extent, Keynesians have always integrated power relations and social contradictions in their analyses of the economic dynamics in capitalism). The increase since the early 1990s of works on growth incorporating the impact of political and

social variables (Przeworski & Limongi 1993, Alesina & Perroti 1994, Barro 1996, Varoudakis 1996) confirms a return to political economy as defined by the founders of the classical school. However, this rediscovery of the political and social dimensions of the growth process is not limited to academic and theoretical analyses. The international financial institutions, for their own reasons, have greatly contributed to the inclusion of the political and social aspects in the analysis of economic growth. Because of the failures that have often sanctioned their structural adjustment programmes in developing countries, the World Bank and the IMF would be well advised to review their approach and pay greater attention to the terms under which their stabilisation plans are implemented and, above all, to the social and political consequences of these plans.

It is in this context (theoretical and practical at the same time) that these two institutions have developed, for the sake of developing countries, a new "Political Economy of Reform". This economy has "good governance" as its central axis, which is defined simply as a set of effective principles of government, as well as "the manner in which power is exercised in the management of a country's economic and social resources for development" (*Governance and Development*… 1992, p. 1).

Although the liberal orientation of the policies advocated by the World Bank and the IMF is questionable, the notion of good governance is very relevant and useful in terms of a renewed approach to the economic development of developing countries. We will expound this notion, but first clarify the idea of the rediscovery of the political and social dimensions in recent analyses of growth and development.

4.2. The Importance of the Socio-political Dimension in Recent Research and the Hypothesis of "Conditional Convergence"

One of the central issues discussed by R. Solow (and widely debated by economists) is the industrialised countries of the North being caught up by the developing countries of the South. Among the supporters of the Solow model, some have argued the assumption of a "conditional convergence", which means the gap between poor and rich countries does not close automatically, but is subject to social and political conditions for its effective realization.

From this standpoint, an important question emerges: would the catch-up of rich countries by poor ones be thwarted in presence of, not only, internal obstacles that hinder growth, but also, a bad governance that dominates poor countries? Bad governance must be understood to mean:

– corrupt practices, predation and favouritism,
– the lack of appropriate regulation of social, ethnic and religious rivalries,
– the abuse of human rights (including the right to property),
– the shortcomings in the fight against poverty and inequality.

If obstacles lie primarily at the socio-political level, the process of convergence becomes possible, if not probable, through the establishment of a better-quality governance model in the poor or developing countries, a model that provides appropriate answers to the above four issues. In any case, this is the perspective outlined by the proponents of the Solow model.

This assumption of "a catch-up" conditioned by the implementation of good governance in developing countries has been explored more deeply in various economists' works. These authors seek to identify closely the weight and impact of socio-political variables in the dynamics of growth and development. Among these works, the following deserve special attention:

– A. Alesina and R. Perroti (1994), who do not confirm the popular belief that political democracy has a positive influence on economic development. In other words, an authoritarian regime can do worse or better than a democratic one. However, political instability has a negative effect on the process of economic growth;

– on the basis of a fine empirical study of the relations between democracy and development, R. J. Barro (1996) establishes a non-linear relationship between the two. This relationship can be summarised by a simple proposal: if little or no democracy is harmful to the economic development in the countries of the South as elsewhere, too much democracy seems to be also, due to the disorders that often occur during the period in which democracy is learned, which may take a shorter or longer period of time;

– C. Clague, P. Keefer, S. Knack and M. Olson (1996), who emphasise the positive role respect for property rights plays in economic development, be the political system democratic, authoritarian or even dictatorial;

– finally, A. Varoudakis (1996), who through a close study of the relationship between the practices of government and economic development, clearly shows how the practices of predation at the top of the State (theft or looting of public property) thwart or even completely block economic growth.

Ultimately, through these different works, the central proposal that emerges, explicitly or implicitly, is as follows: if developing countries adopt good-quality systems of governance of their public affairs (i.e. based on transparency, the respect for civil liberties and property rights); and those systems are accompanied by socio-political reforms and institutional

empowerment, there is no doubt that their pace of development will accelerate to the point that the convergence hypothesis and, therefore, the process of catching up the economically developed countries becomes not only possible, but probable in the long run.

4.3. Calling into Question the International Economic Organizations

As a result of the difficulties encountered during the implementation of The IMF's stabilisation plans and of the World Bank's structural adjustment plans, critics of the two institutions have been numerous and very stern during in recent decades. These critics issued both from outside and inside of these institutions, as evidenced by the work of J. Stiglitz (2002) and, though less known, that of W. Easterly (2001), two economists who have worked for a long time at the World Bank.

The Critique of the Washington Consensus

As an academic intervening from the outside, P. Krugman has denounced the Washington Consensus, an ideological corpus developed in the early 1990s by the economist J. Williamson. The Consensus gathers, around the IMF and the World Bank, most of the finance ministers of the industrialised countries, main investment funds, large banks and various think-tanks. Stated as absolute truth, the central argument of this corpus is that developing countries cannot prosper economically without fulfilling two conditions: to integrate into the world economy by liberalising their international exchanges; and to implement sound monetary and fiscal policy, meaning avoiding any expansionary economic policy, which would be equivalent to a monetary expansion and/or to worsening of the public finance deficit.

Although free-trade advocate P. Krugman (Nobel Prize in 2008 and initiator of the new theory of international trade) clearly does not consider full integration into the world economy as a *sine qua non* condition for economic takeoff. Regarding economic policy, he is inspired by Keynesian analysis and precludes the reasoning according to which monetary and financial stability would be the source of prosperity (Krugman 1999). From his point of view, this is evidenced by the experience of Argentina which, having respected scrupulously during the 1990s the recommendations of the IMF (up to pegging its currency to the U.S. dollar), did not escape a major crisis in the early 2000s which very nearly destroyed it economically.

Krugman is joined in criticising the measures recommended in mainstream economic thought by D. Rodrik (2012), who also highlighted

their limits. According to his analysis, the G7 (group of seven most industrialized countries) ended up imposing its own development standards, which have been adopted by major international economic organisations. However, these standards do not always fit the conditions of developing countries. For example, compliance with the standards set by the WTO for integration within it requires greater financial means than the annual budgets of many poor countries of the South. On this basis, Rodrik calls into question the positive effects of international free trade on the growth and development in these countries. Therefore, although they do not share the same analysis on free trade (unlike Rodrik, Krugman believes in the virtues of free trade), they share a critical position on what the "unique thought" summarised in the Washington Consensus means.

WTO, an Inadequate Vision of Free Trade

"I understand the Principle of Comparative Advantages" and "I advocate Free Trade", P. Krugman wrote in "Is Free Trade Passé?" (1987, p. 131). Krugman believes that if only one doctrine were accepted by all economists, it would be free trade. Thus, it is not wrong to say that, in general, participation in international trade is beneficial to different countries. However, the problem lies in how free trade is apprehended. J. M. Siroën (2000), in "Existe-t-il une théorie hétérodoxe du libre échange?" (Is there a heterodox theory of free trade?) exposes the differences between the vision of academic economists and that of international institutions such as the WTO and the IMF. If both visions share a belief in the superiority of free trade, they diverge in their analysis of the accurate source of the gains obtained, thanks to international exchange.

International organisations (WTO, IMF, etc.) maintain that the gains from free trade come thanks to exports. This stand in contrast to academic theory (or at least the strain initiated in the 19th century by D. Ricardo and continued today by neo-Keynesians like P. Krugman and J. Stiglitz), which holds that the advantages of international trade for partners are attributable to imports. In an attempt to summarize the approach of academic economists of international trade, J. M. Siroën (2000) considers that in a territory where the factors of production are given in quantity and quality, regardless of their price (hypothesis of elasticity of supply factors), openness to international trade improves the income if it results in an increase in imports. This approach is in line with the classical Ricardian analysis whereby each country must specialise in the production of goods for which it has a comparative advantage. In this framework, the country can benefit

from its significant productivity in the production of the good for which its comparative advantage is indisputable in order to buy more of other goods it does not produce.

On the other hand, the dominant approach today (that of the WTO and IMF) can then be formulated in such terms. "In a territory where the supply of production factors is elastic with respect to their demand, the opening to international exchange improves the economic situation if it results in an increase in exports" (Siroën 2000, p. 36). Obviously with such a formulation, it is easier to "promote" free trade between nations. This difference may, *a priori*, seem thin, if the analysis remains at the theoretical level. But the problem appears when one considers the economic policy recommendations inspired by these two visions. Indeed, when the matter concerns economic policy recommendations, a big gap exists between the two approaches: whereas the second approach advocates reciprocity of trade opening, in the first approach (the Ricardian vision), reciprocity is not a prerequisite, for it is always in the interest of a country to open, regardless of what the other countries can do.

Moreover, during debates on strategic trade policy in the United States in which he took part in the 1990s, P. Krugman defended the point of view that even if free trade has lost its aura (notably in favour of industrial policy in Europe and protectionism in Southeast Asia), it remains the best of applicable policies. On this basis, he has reservations on the multilateral trade agreements which, because of their protection clauses (subsidies, safeguard clauses, "anti-dumping measures", etc.), cannot lead to anything other than a short-term reduction of the overall well-being of the countries involved.

We could continue the presentation of analysis criticizing international organisations, but the above two arguments seem sufficient to recognise the limitations of their approach to economic development, based mainly on the integration in international trade. Certainly, one can recognise for such an approach a number advantages in terms of extending markets, decreasing costs of production thanks to the rise in the scale of production and productivity gains. However, these benefits do not occur for only marginally competitive developing countries, and, in all cases, not under the conditions established by the WTO, nor on the basis of the policies it advocates.

Finally, for poor countries, good governance is not necessarily the one advocated in the framework of the "single thought" of major international institutions. As a matter of fact, the World Bank determined a positive correlation between the composite index of "good governance" and

economic growth using general indicators that, regrettably, do not consider the particularities and challenges of different countries. This worsened the divergence between the expectations from "good governance" and its real impact on economic performance. For proof, we need look no further than the difficulties encountered by most countries of the South that applied IMF or the World Bank recommendations.

It may therefore be assumed that the vision of the development reduced to its economic dimension promoted by the international organizations is not sustainable in the long run as it focuses on governance reforms that are difficult for developing countries to implement, rather than focusing on economic policy reforms that would facilitate the work of institutions, meet the expectations of donors and, at the same time, ensure a minimum level of satisfaction for local populations. Based on what proceeded, it became urgent to determine whether "good governance" should still be considered a criterion of good institutional performance and a condition for international aid. If so, what guidelines of "good governance" and what reforms should be adopted by developing countries?

Departing from the fact that international donors care for the economic prosperity and development of poor countries, they should not impose governance reforms that overwhelm these countries or hinder their development plans. Going back to the question of the new definition of "good governance", we suggest that poor countries should select, from the list of reforms imposed by donors, those that directly advance their development, bearing in mind that development will subsequently enhance governance, instead of wasting their resources, time and efforts on applying potentially inadequate, ineffective and sometimes unnecessary reforms that may delay the development process and consequently obstruct local governance.

4.4. Good Governance, a Means to Renewing the Approaches and Practices of Development in the South

The criticisms of the traditional development conceptions have undeniably produced change. The purely economic approach has been abandoned by the World Bank and IMF in favour of greater attention to the social and political effects of their macroeconomic stabilisation programnes and structural adjustment plans, as well as to the institutional contexts of their implementation. In short, for the IMF as well as for the World Bank, "good governance" is now the watchword for combating poverty, as it is, more broadly, the key response to the challenge of development in the context of globalisation.

What does this evolution mean? As seen above, at the basic level "good governance" is associated with a set of management principles of public affairs. First and foremost among them is respect for human rights, the fight against corruption, and a total transparency in project realisation and assessment. Likewise, the implementation of these principles has become one of the major conditions for gaining access to international financial aid.

However, this first aspect is not the only one. Following the authors who have deepened the analysis of this concept – and whose works have in large measure inspired the World Bank and the IMF – we can say that "good governance" comes consequently through three central issues that focus on how development policies are designed and carried out and on how the affairs of the State are handled at the various levels of administrative organisation (Isham, Kaufmann & Pritchett 1997):

– the first question concerns the nature of public policy: Which public policies should be given priority, in order to foster and accelerate the mechanisms of economic growth?

– the second deals with the modes of decision-making and of the implementation of the measures once the decisions are taken: how should decisions concerning economic policy and structural reforms be made and applied at each level of implementation?

– the third issue concerns the assessment of the effectiveness of public policy choices: to what extent do the decisions taken and effectively implemented enable the specific objectives targeted to be achieved? To what extent are they efficient in boosting the development of the country being assisted?

It is in the light of the responses to these three questions that the World Bank, the IMF and other international and regional financial institutions appreciate the quality of governance that characterises a country. Depending whether this quality is considered good or bad, new loans are granted or not to the applicant countries.

What about this new approach of development that is based on governance and real attention accorded to the role of the socio-political dimension in economic processes? It is clear that the problematics of governance – be it institutional, cultural or socio-political – is moving towards better coverage of the specificities of different countries. From this point of view, it is undeniably a step forward in the understanding of development processes (even if, some theoreticians and experts in development do not share the liberal credo of the international financial institutions). That being clear, we may raise two reservations against this approach: the first at the

methodological level, the second at the practical level, and concerning the legitimacy of the international organisations' power.

At the methodological level, the criticism focuses on the process of integrating into economic reasoning (and, even, in econometric models) parameters which cannot be easily measured or quantified. Indeed, statistically evaluating the impact on the economic growth of various socio-political variables is a very complicated, and potentially problematic task, it requires the integration of socio-political exogenous factors in the analysis of economic growth. Nevertheless, the limit of such a way of operating is that the economist (and with him the boss of the IMF or the World Bank he advises) is unable to genuinely deal with socio-political, cultural and institutional data as variables that are separate from economic ones (both in their nature and in their action). Because of that, this approach is often challenged by specialists of other social disciplines, who criticize it as being too faithful to the economic logic which, by focusing on quantity at the expense of quality, often misses the essential point in the understanding of social and societal developments.

From this point of view, the great challenge today facing the economists' community of growth and development is this: how to integrate, in the theories and models of growth and development, the specific role of variables as diverse as political institutions, cultural and symbolic traditions, and social and ethnic antagonisms? And, how to clearly distinguish between the variables which contribute positively to growth and development and those which hinder or even block them?

Concerning the practical level, the debate deals with the legitimacy of the new prerogatives vested in the international financial institutions in matters of assessment of the quality of governance in different countries. As has been said, with the new conditionality, loans are granted or not granted to a country depending on how the World Bank and the IMF assess its governance-related efforts (i.e. public expenditures, respect for democratic freedoms, political stability, transparency, fighting corruption). However, what is the legitimacy of extending to the political field the prerogatives of the Bretton Woods institutions?

Without doubt, the governance-based approach in loan granting has the advantage of adapting the financial assistance programmes to the economic and socio-political contexts of the country receiving assistance. Thus, for countries in Africa, the World Bank has for about twenty years made commendable efforts to better coordinate development projects with the institutional, political and socio-cultural specificities (mobilisation of ethnic

and religious solidarity, valorisation of cultural heritage, rehabilitation of traditional skills).

However, the limit of this approach is that it grants the international financial organisations excessive interventionary power. These organisations no longer withhold judgements on sensitive points of public affairs management in many developing nations: the system of government, constitutional texts, the importance of the public sector, prudential rules in bank funding. However, assuming that these international organisations have the necessary technical skills to make authorised assessments on various economic issues (which remains to be determined), they certainly lack the political legitimacy to interfere intimately in the nations' internal political functioning.

5. Conclusion

Eighty-one years after the publication of *The General Theory of Employment, Interest and Money* (Keynes 1936), and despite recent developments in the world economy, the State is again playing a central role in the issues of growth and development. Nevertheless, some safeguards that have been highlighted, particularly by the theory of public choice, are essential to the implementation of "good governance" and consequently to the developing countries of the south catching up with the industrialised countries of the north. Institutional issues are all as important as economic ones. Experience demonstrates that the main institutional characteristics of countries influence their growth and development, while the dysfunction of these institutions is often associated with economic stagnation. Therefore, to understand the successful convergence of some poor countries and the failure of others to catch up, one should study the institutional functioning of these countries, and more specifically their political structures and modes of governance.

Although there is no evidence that democracy is associated with growth and development, the convergence of poor countries is quite possible if they demonstrate an ability to overcome their socio-political problems and implement "good governance". The examples that demonstrate this fact are less and less exceptional. Aside from the fact that institutional reform requires a political transformation to empower institutional change, two questions remain. First, whether the ruling classes of the developing countries which remain poorly governed will accept the need to implement these essential changes or if they will instead continue to focus on private

interests over the larger good. Second, whether international institutions will accept partial implementation of reforms that could better help the advancement of development of poor countries based on their own priorities, not the priorities imposed on them. Only time will provide an answer to these crucial questions.

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Abstract

Zarządzanie społeczno-polityczne, funkcjonowanie instytucjonalne i rozwój ekonomiczny

Polityka stabilizacji makroekonomicznej i dostosowania strukturalnego nie odniosła szczególnych sukcesów, dlatego coraz większego znaczenia nabierają rozważania na temat roli dodatkowych parametrów ekonomicznych w procesie wzrostu. W tym kontekście zarządzanie (równowaga sił, racjonalne gospodarowanie zasobami, przejrzystość zasad, zaangażowanie społeczeństwa obywatelskiego itp.) stało się nierozerwalnie związane z analizą rozwoju krajów rozwijających się. Mimo wieloznaczności terminu „zarządzanie", skądinąd ściśle związanego z pojęciem instytucji, koncepcja zarządzania jest obecnie zasadniczą kwestią w debatach na temat sposobu, w jaki międzynarodowe organizacje finansowe wykorzystują ideę „dobrego zarządzania". Autorzy analizują potrzebę „dobrego zarządzania" jako wstępnego warunku wzrostu i rozwoju krajów rozwijających się oraz możliwości konwergencji gospodarczej (tj. dogonienia państw uprzemysłowionych przez kraje rozwijające się) na poziomie międzynarodowym, opierając się na wpływie zmiennych społeczno-politycznych na zarządzanie lokalne.

Słowa kluczowe: wzrost, rozwój, zarządzanie, instytucje, warunki konwergencji, kraje rozwijające się.

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REGULATIONS FOR THE PREPARATION OF FINANCIAL STATEMENTS BY BANKS IN CROATIA AND POLAND

Abstract

This paper examines the similarities and differences in the financial reporting of banks in Croatia and Poland. It analyses the legal regulations governing bank financial reporting in the two countries. While both countries belong to the European Union, thanks to certain freedoms in national legislation, some differences in the banks' financial reporting have occurred. The same IFRS and elements of financial statements resulting from these standards apply to both countries. Banks in Poland apply national rules in cases not regulated by IFRS, while banks in Croatia are required to apply IFRS according to accounting law. In Poland, banks produce a report on activities that accompanies annual financial statements, while those in Croatia do not. There are also some differences regarding the types of banks that operate in the two countries, i.e. Croatia has no cooperative banks.

Keywords: financial reporting, bank regulation, bank, Croatia, Poland.
JEL Classification: M41, G21.

1. Introduction

Numerous scientific studies have emphasised the importance of trust in banks. Research is conducted from a range of angles on banks as public institutions, e.g. to determine factors affecting trust (e.g. Fungáčová, Hasan & Weill 2016, Wójcik-Jurkiewicz 2015), experience derived from the global

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economic crisis (e.g. van der Cruijsen, de Haan & Jansen 2016), the role of quality and the availability of bank financial statements (e.g. Bauer 2015).

The daily activities of banks are associated with the occurrence of various types of risk. Given the importance of banks for the entire financial system, more and better ways of measuring risk and how to manage it effectively are required. Banks are obliged to comply with numerous regulations, including those relating to financial reporting.

As units of public trust, banks should prepare and publish financial reports of high quality that are useful to the users of the information they present. In the light of today's globalisation and the accompanying unrestricted flow of goods, people and money, it is important to know national regulations affecting the security of business transactions. It is also important to ensure that bank financial statements in the countries of the European Union are comparable.

This paper examines the similarities and differences in financial reporting of banks as units of public trust operating in different countries. Conducted in Croatia and Poland, the study focuses on the analysis of legal regulations governing different types of banks and the resulting differences and similarities in their financial reporting. The research itself is more important than the comparison of legislation in both countries. While differences in national accounting systems is unavoidable, the fact that the banks function in a global economy means market participants will have to deal with these differences. Awareness of the differences could help increase efficiency on an international scale. Finally, the paper evaluates and identifies solutions for better bank accounting solutions.

Both Croatia and Poland are relatively new members of the European Union. Poland became a member on May 1, 2004, while Croatia followed suit July 1, 2013. EU membership has a significant impact on legal regulations governing financial reporting. Member States, however, have some freedom, which can result in differences in the financial statements produced by banks. The research method used for this paper was a study of the literature, with a particular comparative analysis of the most important laws affecting the form of financial statements of banks in Croatia and Poland.

2. Bank Regulation

2.1. Bank Regulation in Croatia

In Croatia, the regulatory basis for bank supervision is the Act on Credit Institutions (*Zakon o kreditnim institucijama*) and the Act on Solvency

Requirements for Credit Institutions and Investment Companies (*Uredba (EU) br. 575/2013 o bonitetnim zahtjevima za kreditne institucije i investicijska društva*). The Act on Financial Conglomerats (*Zakon o financijskim konglomeratima*) and the Act on Credit Unions (*Zakon o kreditnim unijama*) are also relevant for banking and financial supervision in the country.

The Croatian National Bank sets standards for credit institutions and credit unions for their business. The standards are established primarily through legal acts, with different directions and recommendations also a factor. Through the CRD IV regulatory package, Basel II standards are transferred into EU directives (acts and directives). CRD IV came into force on 1st January 2014, though some new regulations are slated to gradually come into force between 2014 and 2019. The acts are part of secondary legislation that must be applied by all EU members.

Directive 2013/36/EU of the European Parliament and Board of 26th June 2013 on accession of activities of credit institutions and solvency supervision of credit institutions and investment companies is a part of CRD IV and transferred into Croatian legislation through the Act on Credit Institutions (*Zakon o kreditnim institucijama*) and legislation according to that law.

In July 2011, it was modified and updated by a Resolution on the public disclosure of financial reliability requirements of credit institutions (Narodne Novine, no. 1/2009, 75/2009 and 2/2010) to comply with Directive 2010/76/EU of the European Parliament and Committee of 24th November 2010. Modifications and updates of the Resolution are effective from 1st January 2012, while credit institutions should publish information according to that Resolution as of 30th June 2012. This Resolution prescribes categories and the essence of information on risk exposure and a risk management system, the obligations for public disclosure, the extent, criteria and frequency of public disclosure, and the periods of time for the public disclosure of information. It applies to credit institutions located in the Republic of Croatia that have the permission of the Croatian National Bank to operate in the country.

There is also guidance on international standards concerning the market situation, legal norms of other countries and recommendations of relevant supervisory bodies. The guidance is addressed to credit institutions or other competent bodies. The Croatian National Bank grants decisions and informs the European Banking Authority (the EBA) in prescribed time.

While 25 commercial banks, 1 savings bank, 5 housing savings banks and 23 credit unions (as of October 2016) currently operate in Croatia, this paper considers only commercial banks.

2.2. Bank Regulation in Poland

The current state of the Polish banking system is a result of the economic transformation that took place in Poland after 1989. This transformation led to the formation of law regulating the way specific banking entities function (Jaworski & Iwanicz-Drozdowska 2013).

The main legal act regulating bank activity in Poland is the Banking Act of 29 August 1997, and all subsequent amendments. According to the Act: "a bank is a legal person incorporated with the provisions of law, acting on the basis of authorisations to undertake banking acts that expose to risk the financial resources entrusted to it under any redeemable title" (art. 2).

Banks in Poland can be incorporated either as state banks, cooperative banks or banks in the form of joint-stock companies. The only state bank in Poland is Bank Gospodarstwa Krajowego (BGK), which was founded in 1924, is fully owned by the State Treasury, and is today subject to a separate act – the Act on Bank Gospodarstwa Krajowego of 14 March 2003. Its role is to support governmental socio-economic programmes realised in order to facilitate entrepreneurship and infrastructural or housing investments (*Bank Gospodarstwa Krajowego*… 2015). At the end of 2015, there were 626 banking entities in Poland:

– 38 commercial banks,
– 27 credit institutions branches,
– 561 cooperative banks.

In accordance with Regulation (EU) No. 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms, "a credit institution is an undertaking the business of which is to take deposits or other repayable funds from the public and to grant credits for its own account" (art. 4, section 1, item 1). A credit institution branch is "a place of business which forms a legally dependent part of an institution and which carries out directly all or some of the transactions inherent in the business of institutions" (art. 4, section 1, item 17).

This paper analyzes only the commercial and cooperative banks. Although there are many more cooperative banks in Poland, it is the commercial banks that play the key role in the country's banking system, as evidenced by the fact that roughly 90% of deposits received and loans extended fall to them (Krasodomska 2015, p. 113).

The Banking Act distinguishes between the banks only on the basis of their legal form and does not differentiate between universal and specialist

banks. Thus, before a specialist bank can operate in Poland, the supervisory authority must issue a license specifying the bank's range of activity, which is subject to other regulations.

The activity of cooperative banks is regulated not only by the Banking Act but also other acts. A cooperative bank is a cooperative, the operation of which is regulated in Poland by the Banking Act, the Act on the Functioning of Cooperative Banks, Their Associations and on Associating Banks and the Cooperative Act (the Banking Act, art. 20). Thus, it is first a bank, but also a cooperative. Cooperative banks can be established by natural persons (at least 10) or legal persons (at least 3). Cooperative banks in Poland are located primarily in towns that are the main seats of municipalities and the larger regional economic centers (Jarocka 2005, p. 217).

Currently in Poland, cooperative banks offer basic bank services that do not differ much from the services delivered by commercial banks. The main difference between cooperative banks and commercial banks is that, despite their ubiquity, cooperatives command only a small share of banking market assets (roughly 9%). The share of in-house funds is ca. 9%, in credits and loans granted to the non-financial sector ca. 8%, in deposits 10%, and in employment 20%. The cooperative banking sector comprises two cooperative banks and two associating banks (Gniewek 2016, *Raport o sytuacji banków…* 2016). The majority of cooperative banks operate in small towns, where they are usually the only institution offering banking services, so they play a much more central role than might be depicted by their share in the sum of deposits and credits of the Polish banking system.

According to the Polish Banking Act, banks in Poland can also function under the name "kasa". In Poland, there are Spółdzielcze Kasy Oszczędnościowo-Kredytowe (Cooperative Savings and Loan Societies). From a legal point of view they are not banks, though they pursue similar activities.

The activities of banks in Poland are subject to special oversight by the state. Since the beginning of 2008, this supervision has been performed by the Financial Supervision Authority (FSA), which assesses the financial situation of banks, studies the quality of bank management, with a particular emphasis on risk management and the internal control system and compliance testing of activities with applicable laws and regulations. When it assesses a bank's financial situation, the Authority particularly scrutinizes earnings, asset quality, liquidity and solvency (Emerling, Wójcik-Jurkiewicz & Wszelaki 2011, p. 12). Great importance is thus assigned to banks' financial statements, which are the basis for the assessment of their financial condition.

3. Financial Reporting of Banks

3.1. Financial Reporting of Banks in Croatia

General Rules for Preparing Bank Financial Statements in Croatia

All banks in Croatia are required to apply IFRS according to the Accounting Act. This ensures that the data contained in bank financial statements is transparent.

Users of financial statements need relevant, confidential and comparable information they can use to estimate the financial position and performance of banks and to make economic decisions. They are also interested in bank liquidity, solvency and the risks that affect assets and liabilities recognised in balance-sheet and off-balance positions. Banks should apply accounting policies when preparing and presenting financial statements.

The Croatian National Bank (Hrvatska Narodna Banka) can bring regulatory legislation governing the following (according to art. 162 of the Act on Credit Institutions, *Zakon o kreditnim institucijama*… 2015):

1. The form and content of annual financial statements and consolidated annual financial statements credit institutions are required to deliver of financial agencies (Financijska Agencija – FINA) in order for them to be included in the Register of annual financial statements (*Registar godišnjih financijskih izvještaja*).

2. The form and content of financial and other statements of credit institutions for the purposes of the Croatian National Bank, how financial statements are to be delivered, and under what deadlines, to the Croatian National Bank,

3. The form and content of annual financial statements and consolidated annual financial statements and deadlines for their public disclosure and delivery to Croatian National Bank.

The CNB can bring legislation for a number of other purposes, including to regulate the coverage and content of statements and other data (*Odluka o strukturi*… 2008) from credit institutions from other EU member countries how financial statements and other data are to be delivered, and under what deadlines, to the Croatian National Bank. It can also legislate to regulate the coverage and content of credit institutions' financial statements and other data as well as how financial statements are to be delivered, and under what deadlines, to the CNB.

Credit institutions are required to deliver the following financial statements to the CNB from within 15 days of the day it has received the

auditor's report from the institution and four months after the business year has finished (according to art. 163 of the Act on Credit Institutions):

1) an auditor's report on its annual financial statement audit, and

2) an annual statement and consolidated annual statement done in accordance with regulations for those financial statements.

The credit institution is obliged to publish its revised unconsolidated annual financial statements together with the annual statement on its website no later than five months after the business year has finished.

The head credit institution is required to disclose its revised consolidated annual financial statements and consolidated annual report for a group according to the Accounting Act (*Zakon o računovodstvu*). A credit institution's branches from another member country are required to disclose on its website the revised annual financial statements and revised consolidated annual financial statements of the institution's as well as annual report of its founder, including an auditor's report in Croatian language, no later than 15 days from the file date statements in the country where the branch headquarter is located.

The Financial Reporting of Banks in Croatia

Banks are obliged to keep business books, other business documentation and evidence, evaluate assets and liabilities and prepare and disclose annual financial statements and produce an annual report in accordance with the regulations and standards established for the industry.

Pursuant to the Accounting Act (*Zakon o računovodstvu*… 2015), banks are large enterprises, and are thus required to prepare their statements in accordance with International Financial Reporting Standards (IFRS). The annual financial statements this act prescribes are the standard set of financial statements mentioned in the "General Rules for Preparing Bank Financial Statements in Croatia" section of this paper. Large, medium and publicly traded enterprises have their consolidated financial statements audited annually. Banks that prepare consolidated financial statements (*Odluka o strukturi*… 2008) disclose changes of minority interest per adequate positions separately.

Aside from obligatory reporting, which is defined by the Accounting Act and in detail by Odluka o strukturi i sadržaju godišnjih financijskih izvještaja banaka, as laid down by the Croatian National Bank, banks must prepare a variety of other oversight reports. The goal of bank supervision is to ensure the institutions follow risk management rules and other regulations as well as their own regulations and professional standards.

Credit institutions are required to publish revised unconsolidated annual financial statements together with an annual statement on their websites no later than five months after the business year has finished. Banks in Croatia must prepare the following statements (*Odluka o strukturi*… 2015):

1) a balance sheet statement,
2) an income statement,
3) a cash flow statement,
4) a report on equity alterations,
5) notes accompanying financial statements.

Financial statements for the CNB are prepared according to specific regulations, which lay down the required form and content of the balance-sheet and income statement.

Credit institutions are obliged to prepare financial statements on an individual basis and on a consolidated basis at the level of group of credit institutions or an entire group that is subject to consolidation (*Zakon o računovodstvu*… 2015).

3.2. Financial Reporting of Banks in Poland

General Rules Governing the Preparation of Bank Financial Statements in Poland

As elsewhere, banks in Poland are one of several units of public trust whose business is highly regulated and supervised by external institutions empowered to do so. Affiliation with these institutions should result in high-quality financial reporting.

The two primary sources of Poland's legal regulations concerning accounting are the Accounting Act and International Financial Reporting Standards (IFRS). The form of bank accounting is also affected by a number of different regulations, which describe issues including:

– specific accounting principles for banks,
– establishing a model chart of accounts for banks,
– the creation of risk reserves,
– detailed rules on financial instruments,
– preparing consolidated financial statements.

Since Poland's accession to the EU in 2004, all banks are now required to produce consolidated financial statements in accordance with IFRS, which can also be used in the preparation of individual financial statements. Practice shows that the Accounting Act as the basis for preparing financial

statements is used particularly by cooperative banks, but also smaller, commercial ones.

Financial statements produced by the National Bank of Poland is an issue this paper will not raise. It is worth noting, however, that the only operating state bank in Poland, Bank Gospodarstwa Krajowego, counts the implementation of IFRS among its currently ongoing strategic projects. This measure is intended to ensure a bank's financial statement is comparable with those of other banks operating on international markets (*Bank Gospodarstwa Krajowego. Raport…* 2015). It also underscores the importance of international standards in the global economy.

Financial Reporting in Accordance with the Polish Accounting Act

The Accounting Act is the legal act used by most of the entities in Poland, but in some articles it relates directly to the activities of banks and their accounts. For example, the Accounting Act (i.e. in art. 2, 3, 41, 43, 50 55, 64, 65, 83, Annex No. 2) directly defines a bank for the purposes of the Act and, further, regulates and obliges banks to apply the Accounting Act, prepare financial statements and consolidated financial statements in accordance with IFRS, entitle the Minister of Finance to determine the model chart of accounts for banks and determine the structure of their net financial results (Hońko 2014). In art. 3 para. 1, pt. 2, the Accounting Act defines a bank as that "understood to mean undertaking operations on the basis of the provisions of the Banking Act".

The Act does not refer specifically to particular types of banks, but treats them in a uniform manner. Therefore, all banks in Poland which apply the Accounting Act, regardless of whether they are operating as a cooperative or a joint-stock company, shall apply the same rules, and their financial statements should have the same form.

Pursuant to the Accounting Act, financial statements of banks consist of (Annex No. 2):

1) an introduction to financial statements,
2) a balance sheet,
3) a profit and loss account,
4) a statement of changes in equity,
5) a cash flow statement,
6) notes.

The appearance, scope and level of detail of bank financial statements are regulated in a strict manner by Annex No. 2 to the Accounting Act.

The specificity of banking activities is reflected particularly in the structure of the balance sheet. The order of a bank's balance sheet is opposite that of a company. The first item of assets is cash and balances with the central bank, and among the last are intangible assets and tangible fixed assets. Bank liabilities are arranged starting with liabilities towards the central bank and ending with the net profit or loss.

The annual financial statement is accompanied by a report on the activities of the bank. However, it does not constitute a part of the financial statement, but is relevant to understanding the bank's financial position. The statement should include information about important areas of bank activity, its financial condition and risk assessment (Emerling, Wójcik-Jurkiewicz & Wszelaki 2011, p. 125). Legal regulations require banks to prepare all elements of financial statements, which are necessary for a fair assessment of the financial condition of a bank.

A bank's financial statement prepared in accordance with the Polish Accounting Act ensures the transparency of the financial data included therein. The figures in the balance sheet and the profit and loss account are much more detailed than in the financial statements prepared in accordance with IFRS. The introduction to a financial statement is also an important element of the report, which introduces the user to the basic principles that were used in preparing the entire financial statement.

Constructed differently than IFRS, national GAAP (Generally Accepted Accounting Principles) and the resulting construction of the statement limit its use on a global scale.

Financial Statements of Banks in Poland in Accordance with IFRS

The Accounting Act imposes an obligation to use international accounting standards by banks preparing consolidated financial statements and by banks that are issuers of securities. The Accounting Act permits the use of IFRS in the preparation of separate financial statements of banks which are part of a capital group in which the parent company prepares financial statements in accordance with IFRS. The possibility of using IFRS applies to consolidated financial statements of issuers of securities intending to apply, or applying for admission to trade on one of the regulated markets of the European Economic Area countries. Consistent with IFRS, they may also be used in preparing the financial statements of branches of foreign banks, if the headquarters of the bank prepares statements in accordance with IFRS.

Banks in Poland apply national rules in cases not regulated by IFRS, including bookkeeping reflecting:

– the use of a standard chart of accounts,
– conducting inventory,
– data storage.

The content and layout of financial statements drawn up in accordance with IFRS, regardless of the type of unit, are decided based on Conceptual Framework for Financial Reporting, IAS 1 "Presentation of Financial Statement", as well as all other standards detailing the various balance sheet items. International regulations do not impose a template to be used for bank financial statements (Wszelaki 2014, pp. 160–161).

Guidelines on the scope and principles of preparing financial statements in accordance with IFRS are the same for all banks, regardless of the country in which the entity operates. The same IFRS and elements of financial statements resulting from these standards apply in both Poland and Croatia. When considering just Poland, differences resulting from the different approach of banks to financial statements drawn up in accordance with IFRS and those done in accordance with the Accounting Act are significant.

In contrast to the Accounting Act, after the transition to IFRS, each bank independently develops a model of the financial statement. IFRS does not provide any suggestions for such a template. Therefore, the preparation of financial statements in accordance with IFRS is a challenge which the accounting division must face. As part of this work, banks create their own names for each balance sheet item. This is a task not to be underestimated, especially in ensuring the comparability of financial data of particular banks (Wszelaki 2014, p. 162).

Polish banks' practice of preparing financial statements (especially the digit sections) in accordance with IFRS makes their statements much less complex, and thus much less detailed than those prepared in accordance with the Accounting Act.

In contrast to the Accounting Act, a bank's financial statement prepared in accordance with IFRS has another element, a statement of comprehensive income. It consists of a profit or loss statement and other total income. International regulations do not prohibit recording these two parts as separate.

Despite certain principles in favor of greater transparency of financial statements prepared in accordance with the Polish Accounting Act, it is not possible to apply the same patterns in entities as important to the

financial system and to international markets as large banks in Poland. The harmonisation and standardisation of accounting is a phenomenon not to be overestimated in the global economy.

4. The Differences in Financial Reporting of Banks in Croatia and Poland: A Synthetic View and Suggested Solutions

Each country has its own accounting system, shaped by cultural, religious and historical factors. Under globalisation, the existence of national accounting systems hinders communication in business (Krasodomska 2010). While creating an international accounting system based on one set of concepts, principles, procedures and regulations is virtually impossible, international standards are designed to facilitate comparability and – consequently – the assessment of the financial condition of entities operating in different countries (e.g. Yip & Young 2012, Brochet, Jagolinzer & Riedl 2013, Kubíčková & Jindřichovská 2014). EU regulations do not, however, eliminate the use of national legislation in the Member States, nor guarantee their application in the same way in all Member States. Research has shown that differences resulting from national legislation may even have an impact on the financial statements of units of public trust, such as banks.

As regards Poland and Croatia, the same IFRS and elements of financial statements resulting from these standards apply to both. Banks in Poland apply national rules in cases not regulated by IFRS. All banks in Croatia have to apply IFRS according to Croatian accounting law.

In both countries, banks are obliged to prepare balance sheet, profit and loss account, statements of changes in equity, statements of cash flows and notes. The difference in content of financial statements is that in Poland there is an Introduction to financial statements. However, this Introduction to financial statements is required only for those banks which prepare financial statements in accordance with the Polish Accounting Act. Those which use IFRS as the basis for preparing financial statements may forego the requirement.

Furthermore, annual financial statements in Poland are accompanied by a report on the activities of the bank. This is not a feature of bank financial statements in Croatia.

All banks in Poland are required to prepare consolidated financial statements in accordance with IFRS which can also be used in the preparation of individual financial statements. Practice shows that the Polish Accounting Act as the basis for preparing financial statements is used

particularly by cooperative banks, but also by smaller, commercial banks. On the other hand, there are no cooperative banks in Croatia, i.e. the most similar to cooperative banks in Poland are credit unions in Croatia which keep business books and prepare financial statements according to the Croatian Accounting Act and are regulated by Zakon o kreditnim unijama (2011).

The differences in the financial statements of banks in Croatia and in Poland concern only smaller banks focused on the domestic market, which means their financial statements need not be comparable on an international scale. Polish cooperative banks, which the differences mainly refer to, have much smaller assets than commercial banks, and thus simpler and cheaper accounting solutions than IFRS are best for them.

For Polish accountants, the structure of a bank's financial statements that accord with the Accounting Act is made easier by the specific form provided in Annex No. 2 of the Act (Wszelaki 2014). As practice shows, IFRS is problematic for Polish accountants and statutory auditors, and nor does it guarantee that all information necessary for users will be clearly presented in the financial statements (Wędzki 2009). Given this, it is advisable to keep the legal solutions for bank financial reporting which are currently in use.

A different issue is the desire to increase the comparability of the financial statements of banks whose operations are broader than the local market. Banking activities are intrinsically linked to risk, so the users of financial statements expect information about that risk.

Particularly relevant in this regard is the information contained in the notes and the activity report. In addition to explaining individual balance sheet items and profit and loss account, they also include information on risk management related to the bank's activities (Krasodomska 2008, p. 69). It is therefore desirable to standardise, on an international scale, the rules for drawing up these elements of financial information.

In recent years, growing interest and regulatory changes in the transparency of disclosures have been observed. We also agree with J. Krasodomska and others that there is a lack of recognition in a separate international accounting standard of any regulations specific to banks.

While it seems unlikely that the difference in national accounting systems will be eliminated, striving to harmonise and standardise the financial reporting of entities as important to the financial system as are international banks should be a priority for both individual countries and organisations which make international legislation.

5. Conclusion and Further Research

Legal regulations require the preparation of all elements of financial statements, which are necessary for a fair assessment of a bank's financial condition to be made. This paper has discussed the similarities and differences of the financial reporting done by banks in Croatia and Poland. It has focused on the legal regulations governing bank financial reporting in these countries in order to understand the main differences. As Member States, Croatia (2013) and Poland (2004) are obviously affected by the EU's legal regulations, including as pertains to financial reporting. However, Member States have some freedom, which has led to differences in the financial reporting framework for banks in the two countries.

The main difference was that the financial statements are prepared by some banks in Poland in accordance with national accounting law, but it has relatively little importance. This applies to numerous, though small, regional cooperative banks. Particularly noteworthy is the separation of additional notes to the introduction into financial statements in all banks in Poland. Because of its descriptive nature and the extent of disclosures it contains, this part of the financial statement may be important in terms of the transparency of information concerning the risks of bank operations. The issue of disclosure in the notes section in Croatian legislation compared to the introduction into financial statements and notes in Polish legislation should be subject to further detailed research.

The research leads us to recommend that national accounting regulations not be applied at regional banks. However, it would be advisable to further standardise and harmonise accounting for those banks whose activity and risk may be of interest to users from different countries. Moreover, the development of international standards should lead to the development and implementation of a separate standard for banks within the European Union.

The research has also revealed the need for further analysis of the practice of financial reporting by banks in Croatia and Poland. That analysis could consider the functioning of banks in the information age, the scientific role of virtualising the circulation of an entity's accounting information (emphasised in the research of Liu & Vasarhelyi 2014, Bauer & Baran 2015, Baran & Bauer 2016), changes in the storage and retrieval of banks' accounting information (e.g. Bátiz-Lazo & Wood 2002) and the limited access to financial reporting of cooperative banks in Poland (Bauer 2015). All of these issues point to the need for research related to access to the financial information of banks as institutions of public trust.

As globalisation widens and the capital resulting from it moves freely, while at the same time banks go bankrupt in different countries, research on their financial reporting is of crucial importance.

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Abstract

Regulacje prawne dotyczące sporządzania sprawozdań finansowych przez banki w Chorwacji i Polsce

Celem artykułu jest określenie podobieństw i różnic w sprawozdawczości finansowej banków w Chorwacji i w Polsce. W badaniach skupiono się na analizie regulacji prawnych w tych krajach. Wyniki badań świadczą o tym, że pomimo iż obydwa kraje są członkami Unii Europejskiej, dzięki istnieniu krajowych regulacji prawnych w krajach tych występują pewne różnice w sprawozdawczości finansowej banków. Zarówno w Polsce, jak i w Chorwacji stosuje się MSSF i sporządza – wynikające z nich – te same elementy sprawozdania finansowego. Banki w Polsce stosują ponadto krajowe regulacje prawne w sprawach, które nie zostały uregulowane w MSSF. Wszystkie banki w Chorwacji stosują MSSF zgodnie z prawem rachunkowości. W Polsce do rocznego sprawozdania finansowego dołączone jest sprawozdanie z działalności banku, które nie jest sporządzane w Chorwacji. Istnieją również pewne różnice dotyczące rodzajów banków między obserwowanymi krajami, tj. w Chorwacji nie ma banków spółdzielczych, które funkcjonują w Polsce.

Słowa kluczowe: sprawozdawczość finansowa, regulacje bankowe, bank, Chorwacja, Polska.

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Wojciech Piontek

THE PROBLEM OF WASTE INTENSITY IN ENTREPRENEURIAL BUSINESS MODELS*

Abstract

A key feature of the market economy and the mechanism of its growth, as defined by J. A. Schumpeter, is an incessantly expanding avalanche of consumer goods which eventually transforms into an expanding waste stream. In fact, waste is a permanent feature of capitalist economy. Securing sustainable development requires that the realization of capitalist economic goals be accompanied by practical actions to solve the problems and threats arising from this fact. One of the key areas of this type of activity is directly correlated with entrepreneurial business models. A different understanding of the notions of growth and sustainability allows for a distinction between two separate models of waste management: the market model, which entails the intervention of public authorities, and the environmental model. Both are oriented at stimulating economic growth, increasing welfare and employment. Both also respect the requirements of the environment and focus on solving the problems of waste and waste intensity. Development is perceived differently in each of the respective models. The market model refers to neoclassical economics and a dialectical understanding of economic growth, while the environmental model is based on the foundations of classical economics. The entrepreneurs' approach to the problem of waste intensity remains closely correlated to the waste management model within which they operate. In the market model, the entrepreneur concentrates his actions on salvage and recycling of the waste already produced, whereas the entrepreneur seeks to limit waste in the environmental model by putting the "earn more selling less" rule into practice.

Keywords: economic development, sustainable business model, waste intensity, waste management model.
JEL Classification: E21, Q530.

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1. Introduction

Some of the most important features of the capitalist economy and its growth, as seen from the perspective of waste intensity, are addressed by J. A. Schumpeter in *Capitalism, Socialism and Democracy.* He discusses revolutions taking place in the economy, which "periodically reshape the existing structure of industry by introducing new methods of production (…). Now these results each time consist in an avalanche of consumers' goods that permanently deepens and widens the stream of real income, although in the first instance they spell disturbance, losses and unemployment. And if we look at those avalanches of consumers' goods we again find that each of them consists in articles of mass consumption and increases the purchasing power of the wage dollar more than that of any other dollar – in other words, that the capitalist process, not by coincidence but by virtue of its mechanism, progressively raises the standard of life of the masses" (Schumpeter 1950, p. 68).

The ever-expanding avalanche of consumer goods transforms into an expanding stream of waste. As such, waste is an intransigent feature of the capitalist economy. As D. L. Sayers notes, "a society in which consumption has to be artificially stimulated in order to keep production going is a society founded on trash and waste, and such a society is a house built upon sand" (Packard 1960, p. 15). She thereby points out how fragile economic growth is when achieved by violating the relations between man and the environment. She urges us to look for solutions to allow for the achievement of capitalist economic goals while avoiding the negative repercussions of waste.

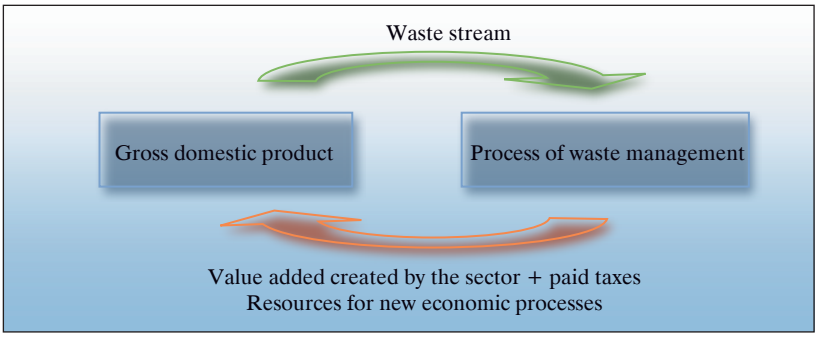

Fig. 1. The Bilateral Relationship between GDP and the Waste Management Process

Source: the author's own elaboration.

The relationship between economic growth and the process of waste management is bilateral (Figure 1). Economic growth intensifies the waste stream, the latter being a subject of waste management. The development of a waste management system increases GDP because:

– subjects forming the waste management system generate value added and pay taxes,

– waste management closes the resource cycle in the economy, empowering economic growth despite limited resources.

One of the key elements shaping the waste intensity of the production process is the type of business model the company uses. How entrepreneurs approach the problem of waste intensity is a result of the waste management model they use, their hierarchy of values and goals for their economic activity, and their understanding of sustainability. Despite the common use of the term, its characterisation fundamentally differs across varying social groups.

2. The Notion of Sustainability and Its Evolution in Economics

Initially, the primary objective of the capitalist economy, within the framework of both economic theory and practice, was expressed by the notion of economic growth. Consequently, business models aimed at maximising financial profits – at all costs and by all means. Numerous negative phenomena accompanying economic growth, occurring on economic, social and ecological fronts, were (and still are) treated as unavoidable costs, ones that need to be covered in the name of acting rationally (Sadowski 2007, p. IX). However, they were and are a consequence of violating the basic conditions which capitalist societies need to meet. In particular, they violated the golden rule, "do unto others as you would have them do unto you," and violated the unwritten principle that any given capitalist society and system must be moral and meet certain moral criteria (Anderson 1992, p. 81).

A scarcity of resources and negative consequences of constantly pursuing economic growth lead to the evolution of new paradigms as well notions for conceptualising and distinguishing development and sustainability. However, economists perceived these new paradigms as something imposed from the outside. The prevailing concept is homo economicus, guided by egoism and greed. Bearing in mind T. S. Kuhn's remarks on scientific revolutions, we should expect that achieving universal approval for a new understanding of growth and sustainability would require a paradigm shift or full generational

change (Kuhn 1996). Nevertheless, the dominance of the concept of homo economicus in the field of economics has resulted in unjustified uses of the term "sustainability," in which the concept was applied to all possible socio-economic activities. It is also visible in major differences between how development and sustainability are defined.

Contemporary economic thought distinguishes two main approaches in interpreting development and sustainability. The first approach treats economic growth and development as synonymous, using them interchangeably. The second approach treats them as two separate categories, economic development being the broader category and subsuming economic growth.

Development is defined across a number of socially and politically-oriented documents as well as in the broader literature. The approach that is crucial to the analysis in this paper conceptualises development as consistent with an accepted system of values, describing it as "a process of positively assessed changes according to a particular value system (that is, a set of rules describing that system)" (Borys 2003, my translation). It therefore remains relative. The evolution of a system of values changes how development is understood. A representative feature of development repeatedly highlighted in the literature is sustainability, which is expressed in an integrated order: it encompasses social, institutional, political, economic, environmental and spatial orders (Borys 2011, pp. 76–77). Accordingly, a sustainable business model can be defined as a combination of a company's strategy and technology used in its practical implementation, contributing to building sustainable order.

Within the aforementioned, criteria-based understanding of development one can distinguish two types of definitions. The first are definitions marginalising economic values and operating primarily in reference to values beyond economics (e.g. anthropocentric, biocentric). The second type includes definitions closely bound to the values and goals of mainstream economics and refers primarily to economic criteria.

Within the first type, an excellent example would be Principle 1 of Sustainable Development provided in the Rio Declaration on Environment and Development, which states that "human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature" (*Rio Declaration…* 1992). So the Declaration stresses the superiority of human beings, with the primary measure being the interest of human beings.

Other examples of marginalising economic criteria can be found in the works of A. Sen, who understands development as a process of broadening the range of freedoms humanity can enjoy. It requires eliminating subjugating factors such as poverty, limited entrepreneurial opportunity, systematic social repression, a lack of social insurance, intolerance, or the interference of totalitarian or authoritarian states in social processes. Sen's concept of development serves as an axiological basis for the idea of sustainable development. The second type of the non-economic approach, utilising biocentric criteria in defining development, can be found in the encyclical *Laudato si'* which, due to its environmental dimension, was enthusiastically received throughout the world. Pope Francis condemns the anthropocentric perspective with roots in the Book of Genesis. What matters is life as such, including all of its forms. "Each creature possesses its own particular goodness and perfection" (*Encyclical Letter…* 2015, p. 55). Therefore, development means that "human beings, endowed with intelligence, must respect the laws of nature and the delicate equilibria existing between the creatures of this world" (*Encyclical Letter…* 2015, p. 54).

A much bigger and better-established group of definitions are those based on the goals and values typical of mainstream economics. The World Commission on Environment and Development defines sustainable development as "a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations" (*Report of the World Commission…* 1987). Similarly, the definition provided in the Europe 2020 strategy states: "Sustainable growth means building a resource-efficient, sustainable and competitive economy, exploiting Europe's leadership in the race to develop new processes and technologies, including green technologies, accelerating the roll out of smart grids using ICTs, exploiting EU-scale networks, and reinforcing the competitive advantages of our businesses (…)" (Communication from the Commission… 2010). Many scientists and researchers define development in an approximate manner.

Another important issue arising in the analysis of the notion of development is the conflict between growth and the values of mainstream economics. This contradiction is particularly visible in terms of waste intensity. In definitions relating to economic values, development cannot negatively influence economic growth nor any of its elements. Development makes it possible to maximise the net benefits from economic growth while preserving the utility and quality of natural resources in the long run. This

results in rising income per capita and the improvement of other factors contributing to social welfare. At the same time, however, growth requires limiting the consumption of material goods and services to an ecologically acceptable level in order to preserve the environment for future generations. As is relatively obvious, this condition contradicts economic development. Therefore, limiting consumption must be followed by changes in the vector of socio-economic goals, along with other welfare measures.

3. Models of Waste Management

Different understandings of development and sustainability allow one to construct two models of waste management: a market model with the intervention of the public authority (hereafter referred to simply as the market model) and an environmental model (Piontek 2015). Both models are oriented toward stimulating economic growth, increasing welfare and employment. Also, both respect the requirements of the environment and focus on solving the problem of waste and waste intensity. Development is perceived differently in each of the models. The market model refers to neoclassical economics and a dialectical understanding of economic growth, whereas the environmental model is based on the foundations of classical economics.

In the market model, ecological aspects of material and resource management are superseded by strictly economic priorities. A rising amount of waste is a highly desirable phenomenon from the macroeconomic point of view. Therefore, preventing waste production, although recommended and desirable from the ecological point of view, contradicts neoclassical economics and is highly unlikely to be put into action. The incessantly expanding waste stream is a phenomenon desired by producers of goods, consumers, waste processing businesses and the public sector. In the area of waste management, sustainability is expressed through actions aimed at utilising the expanding waste stream. This is why the development of innovative technologies plays a crucial role in allowing for the utilisation of waste that is increasingly difficult to process.

The market model of waste management is represented in Figure 2, which depicts the basic components of the system, their goals, movement of resources, products and waste between the components.

The most important factors influencing the expanding waste stream are production and consumption. Persistent innovation leads to more efficient of production processes and thus higher production, the introduction of

completely new products and services to the market as well as new models of already existing ones. Production can be increased thanks to the use of an increasing stream of natural resources. In the long term, the economy seeks to utilise all of the available resources in the process of growth. Consequently, production growth translates into an expanding waste stream. The pace of economic growth is dependent on the amount of resources introduced into the economic mechanism and the speed of their circulation in the economy. The more resources that are utilised, the more goods rapidly turned into waste and waste again turned into resources, the faster the pace of economic growth becomes.

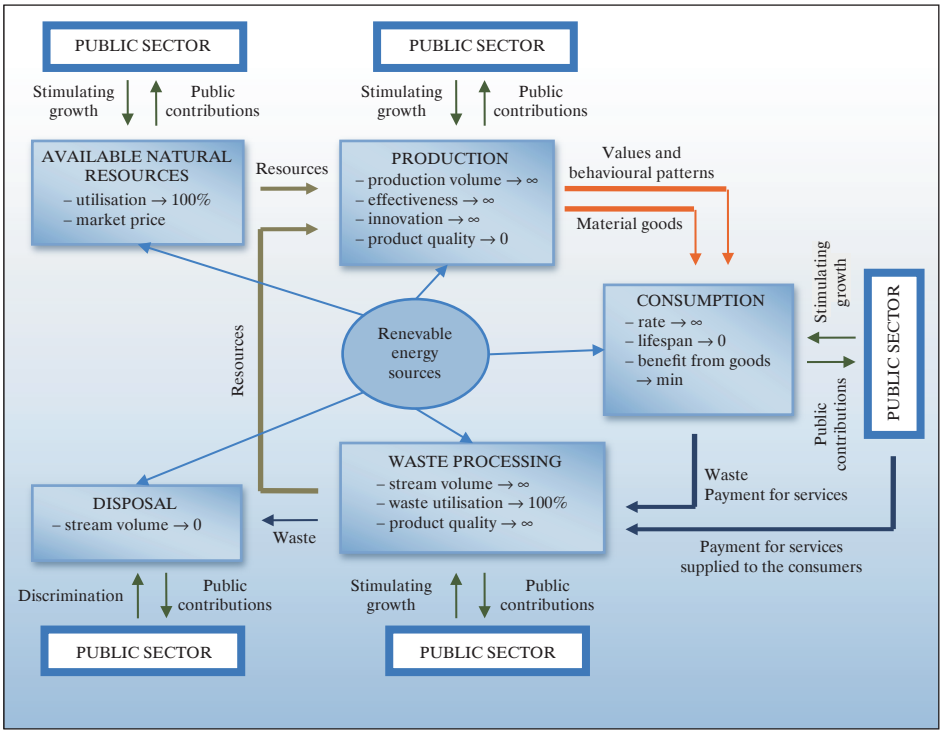

Fig. 2. Mechanism of Economic Growth Using the Market Model of Waste Management

Source: the author's own elaboration.

In the market model, expanding the waste stream is possible as a consequence of either defective pricing of natural resources or assuming

the possibility of full recovery of resources from waste and unlimited provision of energy from renewables to the economy. The prices of resources are market prices. This means that they do not reflect the actual value of resources determined by their limited quantities. Unlimited world trade doctrine plays a dominant role in shaping the prices of resources, leading to continued price reductions and maximising the short-term profits of producers. Prices are also shaped by normal cyclical fluctuations, political phenomena and speculation.

Key features of the environmental waste management model differ from those presented above. The environmental model is based on classical economics. In defining the notions of development and sustainability, it refers to non-economic values. It also assumes that the state should not intervene in the creation of waste management processes, but instead leave it to free market mechanisms and their self-governing regulators. The state's functions, according to this model, should be redefined and limited to shaping the basic features of the economic environment. The waste managing process remains ecological. Waste is treated as a collection of resources to be utilized in the most effective way possible. Waste creation is an unwanted phenomenon and should be minimised. The environmental waste management model consists of the same components as the market model. However, the subjects are governed by different values and goals (Figure 3).

Production, consumption and waste processing require that the prices of raw materials and resources to be shaped according to their actual value as determined by their limited quantities (as suggested by von Waizsacker, Lovins and Lovins (1998) in the first principle of natural capitalism, stating that prices should tell the ecological truth.

Using the actual prices leads to a re-evaluation of the goals of economic activity, processes of production and consumption as well as waste management. Business philosophy is reflected by the rule "earn more selling less". Businesses achieve profits by saving resources and limiting waste production. Profit is generated as a result of selling high-quality products to an increasing number of clients, instead of maximising the number of transactions with a very limited group of consumers. This strategy leads to standards of living and wealth being aligned among citizens throughout the world. At the same time, it eliminates excessive wealth and consumption in "highly developed countries." From the entrepreneurial point of view, the global market is sufficiently receptive and does not constitute a barrier to the functioning of enterprises. An entrepreneur following the rule "earn

more selling less" shows less interest in increasing production capacity in favour of improving the quality of goods and introducing new ones, designed to fit the real consumer needs.

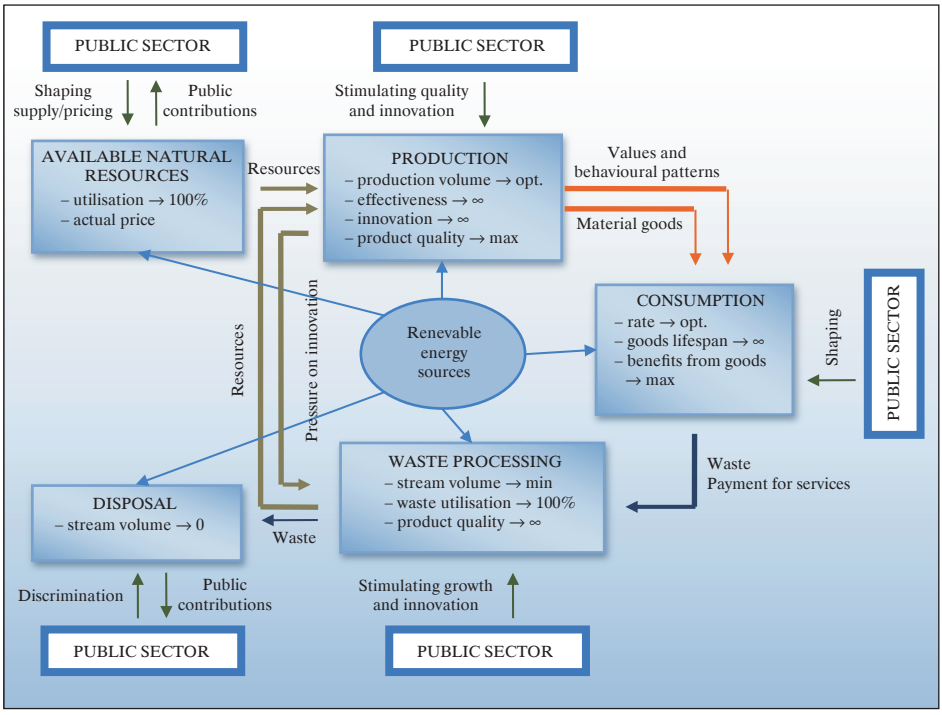

Fig. 3. Mechanism of Economic Growth Using the Environmental Model of Waste Management

Source: the author's own elaboration.

Desired behaviours can be also shaped by protecting ownership. In this case, waste production and everything that contributes to it is treated as a violation of private or public property. According to M. N. Rothbard, this in turn stimulates the interaction and action (particularly legal action) that promote the protection of ownership. The convicted party is forced to pay damage claims, which effectively prevents these kinds of violations. Sustainability in the environmental waste management model leads to an actual reduction in waste production.

4. Balancing Business Models in Terms of Waste Management

Functioning within the two waste management models forces entrepreneurs to shape their business models in relation to waste intensity. Entrepreneurs functioning within the market model cannot remain passive in the process of shaping demand for the goods they offer. The natural process of a product wearing out takes too long in relation to the needs of the market. Product wear, as with demand for new products, needs to be consciously and intentionally shaped, taking into account the process of product obsolescence. Therefore, business models are organised in relation to a primary objective: transform a product into waste in the shortest possible time. This can be achieved by following the 3Cs principle (as opposed to the 3R principle of reduce, reuse, recycle):

– create the need for increasing consumption,
– create the urge for increasing consumption,
– create the opportunity for increasing consumption.

The need to increase consumption is created as a consequence of well-established marketing techniques and current fashions. Producers aim to challenge and eventually destroy the value consumers ascribe to products they own. As P. Mazur points out, "style can destroy completely the value of possessions even when their utility remains unimpaired" (Packard 1960, p. 68). As a consequence of marketing influence, consumers perceive goods as worthless and in need of immediate replacement only because they do not present the features currently promoted in the mass-media. Simultaneously, they become convinced that the new goods being sold are more functional, which fully justifies purchasing them. Consequently, enterprise value is enhanced when the value of consumers' private property is destroyed.

The two most important decisions in the process of creating the need to increase consumption are those regarding the quality of products introduced to the market and their predicted lifespan. Producers facing those decisions need to choose between the following product quality strategies:

– the high-quality strategy,
– the frequent-purchase strategy.

The frequent-purchase strategy, used in the market model, forces the consumer to subsequently purchase the same goods to satisfy the same needs (see Slade 2007). This strategy ensures constant demand, which, when combined with unlimited world trade doctrine, maximises welfare and enhances GDP. Putting the strategy into practice, producers launch goods that either have precisely calculated wearable periods or meet the criteria

typical of waste. Fulfilling this strategy became possible as a consequence of devaluating the notion of quality. In its initial meaning, quality referred to degree of excellence. Contemporary textbooks distinguish different types of quality (e.g. technical quality, market quality), each of them described by an array of features. Thus, applying the market quality criteria, we can assess products as highly valuable, based on their exclusiveness, aesthetics or presentation, even if their lifespan is short and they require immediate replacement.

Juxtaposing the two strategies in terms of entrepreneurs' competitiveness and impact on economic growth, we should state that under current economic conditions the high-quality strategy poses a threat to businesses and is not desirable in terms of achieving growth in GDP. A "high--quality" producer releasing a long-lasting product results in a product being purchased relatively rarely. What is more, a durable product is more expensive than those offered by "frequent-purchase" entrepreneurs (the entrepreneur receives a deferred benefit from profits he would have achieved if he were repeatedly selling the same product to the same consumer). In consequence, long product lifespan discourages potential buyers guided by the principle: "More! Cheaper! More often!".

These product quality strategies are supplemented by the service policies companies apply in the warranty and post-warranty periods. In the market model, service in the warranty period often comes down to replacing products with new ones, instead of trying to fix them. This changes when the warranty period expires: customers are usually informed that reparation costs exceed the price of a new product, thereby being encouraged to purchase a new device. In addition, the lack of complete spare part catalogues and the practice of designing devices assembled from integrated modules contribute to forcing new purchases. In the second case, if a module fails, it needs to be replaced with an entire new one, instead of just exchanging a single part. For industries offering supposedly reliable and durable products (such as the automotive industry), "designing defects" became a common element of financial strategies, aimed at securing economic effectiveness both for the producers and the dealer-service networks.

Product planned obsolescence is not a new phenomenon – it was introduced by B. London at the time of the Great Depression (London 1932). He stated: "Factories, warehouses, and fields are still intact and are ready to produce in unlimited quantities, but the urge to go ahead has been paralysed by a decline in buying power (…). In a word, people generally, in a frightened and hysterical mood, are using everything that they own

longer than was their custom before the depression. In the earlier period of prosperity, the American people did not wait until the last possible bit of use had been extracted from every commodity. They replaced old articles with new for reasons of fashion and up-to-dateness. They gave up old homes and old automobiles long before they were worn out, merely because they were obsolete" (London 1932, pp. 1–2). London attributes the grounds of crisis to consumer behaviour. Guided by rationality, consumers fully utilise the goods they own, not responding to marketing and fashion. "People everywhere are today disobeying the law of obsolescence. They are using their old cars, their old tires, their old radios and their old clothing much longer than statisticians had expected on the basis of earlier experience" (London 1932, p. 2). As a consequence of his analysis, London proposed that the government should be able to arbitrarily set the lifespan of each product. After that period had passed, a product would be recognised as legally "dead" and collected for disposal by a government agency. As a consequence, consumers would be forced to regularly purchase new goods of certain kinds, which would ensure the continuity of production and employment.

London's concept was not utilised during the Great Depression, but has been in effect since World War II as a consequence of the rapid growth in productivity. It applies to all types of products introduced to the market. Planned obsolescence became a primary factor influencing economic growth in the capitalist economies of the 20th and 21st centuries. It constitutes a basis for supply-side economics, a theory represented by A. Laffer, R. Mundell and J. Wanniski. Supply-side economics was developed in response to the US economic crisis in the 1970s, which sealed the failure – it was then thought – of Keynesian economic policy. It was also a part of *Reaganomics*, a set of strategies meant to prevent economic recession during Ronald Reagan's presidency (1980–1988). The quality of goods produced in supply-side economics is subordinated to the companies' development strategies and the objective of achieving GDP growth. One characteristic of products should be their "waste quality", necessitating constant re-purchasing. Shaping their business models according to supply-side economics, entrepreneurs started providing consumers around the world with high quantities of cheap, low--quality goods which did and still do require frequent replacement.

Product planned obsolescence was recognised as an issue as early as in 1950s. In 1958, *Time* magazine quoted C. Briggs, vice-president of Chrysler, commenting on the progress taking place in the car industry: "auto service is bad, and the quality of cars is not as good as 10 years ago. The auto industry (…) has treated the public badly, to say it mildly" (Packard 1960,

p. 92). An official of the Automotive Finance Association quoted a similar approach of one of the Association's members when testifying at a US Senate subcommittee hearing: "The quality of today's automobile does not compare favourably with past years… The price of the product continues to go up and the quality continues to go down. Improvement in automobiles in the past few years has strictly been tinsmith work" (Packard 1960, p. 93). Eventually, G. Lippincott (industrial designer) provided the following telling assessment of the quality of household devices: "My mother had the same washing machine for twenty years. She has the same refrigerator now she had when I went to high school thirty years ago… We [my own family] built a 'leisure house' five years ago… We're on our second washing machine and our second drier… We threw out the disposal… We're on our third vacuum cleaner" (Packard 1960, p. 102). Among numerous examples of product ageing, it is worth noting that since 2005 the average lifespan of computers has fallen from 5 to 2 years (*2012 Annual Report…*). The average life-cycle of mobile phones fluctuates between 12 and 18 months and is subject to constant shortening.

In Poland, as in other Eastern Bloc countries, product planned obsolescence became common practice with the socio-economic transformations of the 1990s, the introduction of a market economy and the entrance of international corporations to the markets. In socialist economies, which are not subordinated to economic efficiency in a narrow sense and characterised by a significant scarcity of goods, shortening a product's lifespan couldn't be rationalised. During the transformation period, the societies of Eastern Bloc countries remained unaware of new consumption mechanisms and uncritically accepted them. Hence, socio-economic transformations were followed by both qualitative and quantitative growth of the waste stream. The only form of waste management was disposal.

The mechanism of product planned obsolescence also indirectly contributed to the collapse of domestic enterprises. Enterprises of the Eastern Bloc countries were not sufficiently efficient, but they offered long--lasting products. Suddenly, they had to compete with global companies offering cheaper, good-looking products that – consumers were not told – needed to be frequently replaced with new ones. The result of the free market competition was a foregone conclusion for the domestic enterprises. The now-freed demand needed to be managed. Social consciousness and consumer choices in Eastern Bloc countries, including Poland, are a separate issue.

A third element of the 3Cs principle is creating opportunities for increasing consumption. This includes building necessary infrastructure and providing potential buyers with financial means necessary for incessant consumption. All-night shops, enabling shopping 24/7, online stores, and personalized e-commerce are just a few examples of the unlimited shopping infrastructure. Securing financial means for consumption is achieved by developing payment and debt instruments.

Entrepreneurs' actions with regard to sustainability in waste management are shaped by legal instruments defined by public authorities. Contrary to official statements (expressed, for instance, in the European waste hierarchy), public authorities do little to nothing to prevent waste production. The instruments not being used include:

– regulations defining the minimal shelf and use life of products,

– requirements regarding the design of goods so they can be repeatedly repaired together, and forcing producers to provide service and complete spare parts catalogues throughout the entire use life of a product,

– obligatory customer information regarding product lifespan and the producer's financial responsibility for its utility during the lifespan,

– restrictions on the maximum weight of products and packaging,

– goods designed in compliance with the requirements governing their eventual recycling and salvage and eliminating solutions which impede this process.

The official argument against using the listed instruments is that they violate entrepreneurial freedom. In fact, the actual counteracting of waste production requires neoclassical economics and a dialectical understanding of economic growth to be abandoned for a return to classical economics. This approach, however, does not currently have a sufficient number of supporters.

Legal instruments used by the state focus on managing waste already produced. In business models, entrepreneurs are obliged to respect the following:

– recommendations (of unspecified and imperative need) on designing goods in compliance with the requirements of their future recycling and salvage,

– the obligation/possibility to label products released on the market,

– the obligation to eliminate harmful substances and those impeding the process of salvage and recycling,

– the obligation to meet the rates for recovery and recycling,

– the obligation to participate in the waste management system financing,

– the obligation to create collection systems for separated fractions of waste,

– the obligation to use recyclables in production processes.

The process of designing waste management strategies in the environmental model differs from the ones presented above. When shaping business models, producers prefer a high-quality strategy. They want to introduce durable, reliable products bringing the highest possible benefits to customers during their long period of utility. Planned product obsolescence is rejected. Consumption is meant to improve the quality of a consumer's life instead of simply accelerating economic growth. Enterprises serve to meet consumer needs, instead of merely profiting from them and enhancing GDP. Products are replaced with new ones as a result of consumers' conscious decisions based on real premises, when they are actually used or when the new models offer significant improvements. When poised to make purchases, consumers acquire information about a product's lifespan and thereby make rational decisions. That, in turn, leads to limiting unnecessary waste. Customers are not encouraged to constantly and mindlessly exchange goods, and the value of goods is reflected by their utility instead of current fashion and trends (Piontek 2015).

Fig. 4. The Oldest Light Bulb. The Bulb Has Shone since 1901. Fire Station in Livermore, California, USA

Source: Centennial Bulb, http://www.centennialbulb.org. Accessed: 15 December 2015.

Producing high-quality and long-lasting goods is not (and never was) problematic from a technological point of view. The only reason for such goods to not be produced lies in the contradiction between producing high-quality products and maximizing profits: the latter, realized in the circumstances of considerably narrow targeting, excludes high quality. Before the era of cost-effectiveness, numerous products made to serve for decades were manufactured, even as early as the turn of the 20th century. For example, the same light bulb has illuminated the Livermore fire station since 1901 (Figure 4).

5. Conclusions

It is not possible to fully eliminate waste intensity in a capitalist free--market economy. Waste production marks one of the necessary conditions for economic growth. A definite "no" to waste intensity would equal rejecting a capitalist economy. All actions limiting consumption – including those preventing waste production – slow down economic growth and are therefore rejected by entrepreneurs, societies and public authorities.

Securing sustainable development requires that the realisation of capitalist economic goals be accompanied by practical measures to solve the problems and threats that arise. One of the key areas for these preventative measures lies with entrepreneurial business models. Entrepreneurs' approach to the problem of waste intensity remains closely correlated to the waste management model within which they operate. In the market model, the entrepreneur concentrates his actions on salvaging and recycling the waste already produced, whereas in the environmental one, the entrepreneur seeks to limit waste by putting the "earn more selling less" rule into practice.

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Abstract

Problem odpadogenności w modelach biznesowych przedsiębiorstw

Istotą gospodarki kapitalistycznej i mechanizmu jej wzrostu wyrażaną przez J.A. Schumpetera jest nieustannie powiększająca się lawina dóbr konsumpcyjnych. Z natury rzeczy ulega ona przekształceniu w powiększający się strumień odpadów. Zjawisko odpadów jest zatem immanentną cechą gospodarki kapitalistycznej. Zapewnienie rozwoju zrównoważonego wymaga, aby realizacji celów gospodarki kapitalistycznej towarzyszyły realne działania na rzecz rozwiązywania pojawiających się problemów i zagrożeń. Jednym z kluczowych obszarów działań są modele biznesowe przedsiębiorstw. Odmienne rozumienie pojęć rozwoju i zrównoważenia pozwala zbudować dwa modele gospodarowania odpadami: rynkowy z interwencją władzy publicznej oraz środowiskowy. Modele zorientowane są na pobudzanie wzrostu gospodarczego, powiększanie bogactwa oraz zatrudnienia przy zachowaniu wymogów środowiska i rozwiązywaniu problemu odpadów i odpadogenności. Rozwój w proponowanych modelach jest odmiennie postrzegany: w modelu rynkowym zgodnie z ekonomią neoklasyczną i dialektycznym postrzeganiem rozwoju gospodarczego, w modelu środowiskowym zgodnie

z założeniami ekonomii klasycznej. Podejście przedsiębiorców do problemu odpadogenności pozostaje ściśle skorelowane z modelem systemu gospodarowania odpadami, w ramach którego funkcjonują. W modelu rynkowym przedsiębiorca koncentruje swoje działania na procesach odzysku i recyklingu odpadów już wytworzonych, a w modelu środowiskowym na zapobieganiu powstawaniu odpadów, kierując się zasadą „zarabiam więcej, sprzedając mniej".

Słowa kluczowe: rozwój gospodarczy, zrównoważony model biznesowy, odpadogenność, model gospodarowania odpadami.