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ECONOMIC POLICY IN CENTRAL EASTERN EUROPE: UNIT ROOT CONSEQUENCES

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Abstract. This article aims to provide an econometric justification for economic policy in the Central and Eastern European area by examining the stability of real GDP and industrial production in the Czech Republic, Slovakia, Poland, and Hungary. Stability of GDP and industrial production is examined by unit root tests. The Dickey-Fuller (1979) unit root test indicates unit root in case of all four outputs. In case of the industrial production, the results are mixed. Nonetheless, difference stationarity of the GDP implies that there is no deterministic time trend in GDP. Therefore, there is no short-run trend reversion. Deep and long recessions are not only possible but also even likely. Thus, actions of economic policy can be regarded as justified because they are desirable to boost economy in order to reverse these recessions. This study can also be regarded as an extension of unit root tests to the post communist countries.

Key words: Central Eastern Europe, Classical Economics, Keynesianism, Stability of output, Unit root

INTRODUCTION

The end of the Second World War in 1945 marked the beginning of more than forty years during which the European continent was divided by the 'Iron Curtain' and the two parts progressed along different paths. Politically, economically, socially, and culturally, there seemed to be little to unite the divided Europe. However, in one area at least there appeared to be a common development, namely the emergence of the state as the major economic decision-maker in society. In Central Europe, the role of the state was determined by socialist principles. Socialism required the state to own the means of production and this would enable the authorities to develop the system of central planning. Within a few years of the emergence of Soviet hegemony, the socialist states had appropriated the means of production. There were some exceptions such as the development of Polish agriculture outside the collectives and limited private enterprise was tolerated in Hungary after the 1960s.

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In the West, the state interventionism developed in reaction to the largely unsatisfactory socio-economic conditions of inter-war years. For instance, significant parts of the French economy were nationalized and this policy assisted the creation of the system of indicative planning utilized by the authorities. In Scandinavia, high levels of taxation became the norm as the state developed the social welfare model designed to promote social cohesion. In the United Kingdom, similar trends can be identified with the creation of universal national insurance and the National Health Service. However, the role of the state in Western Europe was conditioned also by the belief in Keynesian macroeconomics. J.M. Keynes had observed that the inter-war economy seemed mired in permanent recession with little evidence of the classical optimism of an essentially self-regulating economy. The belief in Say's Law meant that output is only limited by supply constraints and that any disparity between the supply and demand for labour would be closed by the invisible hand of the market or more precisely by a change in real wages. Persistent unemployment was explained by the emergence of trade unions restricting wage cuts. In contrast, the General Theory [1936] demonstrated that an unregulated market economy was unlikely to grow with a continuously high level of unemployment. Governments would have to intervene actively to promote full employment by forcing down interest rates to stimulate investment which was subject to expectations regarding future profits and the supply price of capital assets and thus subject to volatility. Additionally, there was a role for increases in public spending since Keynes rejected Say's Law in favour of the principle that output is demand constrained. Effective demand determines the trend of output and employment. In particular, the volatility of investment expenditure reflected the state of expectations and could create a level of demand in the economy, which leads to unemployment. The role of expectations together with a liquidity trap, which would set a floor for interest rates, could create the conditions for a persistent downturn with no guarantee that the trend rate of expansion in the economy would be resumed. Thus, a reformed or regulated capitalist system was desirable.

"For my part I think that capitalism, wisely managed, can probably be made more efficient for attaining economic ends than any alternative system yet in sight, but that in itself it is in many ways extremely objectionable" [Keynes 1926, p. 47–58].

Keynesian principles were adopted after 1945 albeit in a manner that bore limited resemblance to the analysis offered by the 'General Theory'. "Government after government accepted that it was not just the duty of government to maintain a high level of employment, it was also within its powers" [Corry 1983]. Governments took responsibility for demand – management, which was defined as a: "purposeful management of the overall level of demand in the economy to achieve macroeconomic aims such as full employment, growth, or avoidance of inflation" [Allsopp 1985].

The tendency of an economy to move ahead in a cyclical pattern with the associated problems of boom and slump could be avoided by the manipulation of demand by timely discretionary policy. This viewpoint was reinforced by the development of the Phillips Curve, which predicted a stable trade-off between unemployment and inflation. The authorities could chose between stable outcomes for these variables and divergences from the optimum could be corrected by appropriate expenditure changing policies. The approach assumes that the workings of the economy were sufficiently well understood for reasonable assessments to be made as to the likely progress of critical variables such as

consumption and investment, and the impact of particular policy changes. Keynesianism did not accept neutrality of money hypothesis.

Until the end of the 1960s, demand-management seemed to have fulfilled the ambitions of the policy makers particularly on the employment goal. Fluctuations in output were fairly mild and in most "recessions" the growth in output merely slowed to an increase below the long term average. Thus in the UK, between 1950 and 1973, output only fell in one year. Nevertheless, there were still considerable fluctuations in the economy and during the 1970s the authorities seemed to be unable to overcome the cyclical instability. Some commentators observed that demand-management itself was destabilizing and that intervention removed the economy further from target than it would have been if no action had been taken. For example, Artis [1972] examined the stability of GDP in the UK around its trend. For the period 1958 to 1970, the dispersion of quarterly levels of GDP from the time-trend was larger than the dispersion of estimated "policy – off" GDP (i.e. after deducting the effects of all policy changes). However, as Artis [1972] admitted the course of target output to achieve a particular objective(s) may not always coincide with trend GDP. Other evidence supported the viewpoint that discretionary policies did not contribute towards stability included that presented by the OECD in 1969. For the UK, France and Italy the results of demand-management policies were actually destabilizing [OECD, Hensen 1969]. Such evidence can be refuted because the targets that the authorities sought to achieve were not constant over time. Thus while there is evidence that the annual targets for the GDP in the UK did not follow a steady trend, this is not sufficient to conclude that policy was destabilizing if the targets that the authorities chose to achieve changed over time. Nevertheless, the critique offered by commentators such as Artis and Hensen suggested that if the economy was left to market forces, disturbances would prove temporary and 'the invisible hand' will deliver an economy that in the long-run will exhibit stability around its prevailing rate of growth, whilst intervention would exacerbate instability in the economy.

These practical considerations as to the efficacy of demand-management were associated with growing difficulties in the western economies in 1970s and the emergence of new principles governing macro-economic behaviour. Under Keynesianism, policy was based on the requirement to manage demand because of the inherent instability of the economy. Left to its own devices, the economy would deviate from its long-run path and only intervention would restore stable expansion. While policy evolved over time, it remained interventionist in nature. From the mid 1970s the discretionary policy of varying instruments to achieve targets was replaced by the 'rules' approach. This opinion emphasized the idea that the economy was inherently stable. This reflects the greater importance of the long-run in determining crucial variables. For instance, where consumption depends on normal income (the permanent income hypothesis) as opposed to current disposable income (the Keynesian consumption function) one might expect that consumption and therefore aggregate demand to be slow to change following any disturbance. Also if there is a stable relationship between the disposable income of the private sector as a whole (i.e. the personal and company sector) and its expenditure this: "necessarily implies that no component of private expenditure exerts an independent (exogenous) net influence on the level of output or fluctuations in it" [Cripps et al. 1974].

The most important of the 'schools of thought' associated with the rules approach was the Monetarist. The monetarists rejected the idea that there was a stable and predictable choice between unemployment and inflation. At best, only a short-run trade-off existed and governments attempting to pursue employment targets would fail in the long-run, and only boost the level of inflation. Thus, the effects of discretionary demand management were reduced to impotency in the long-run and macro-policy should be properly confined to ensuring low inflation by control of the money supply. The adaptive expectations model meant that there was a possibility of demand-management policies in the short-run, but in the long-run the resulting inflation would necessitate higher levels of unemployment and lower output. In terms of economic stability, government intervention would prove to have the opposite outcomes from those intended. The New Classical version of monetarism went even further by denying that real variables such as output and employment could be influenced by systematic demand-management policies in either the short-run or long-run. There is no trade-off between unemployment and inflation. The only Phillips curve is a vertical relationship at the natural rate of unemployment. This notion is based on 'rational expectations' whereby economic agents acting in their self-interest will modify their behaviour in line with expectations based on the most up-to date information available. Economic agents (workers) do not suffer from money illusion, because if government attempt to expand demand in order to stimulate output and employment this is fully anticipated by decision makers. Behaviour is modified to offset the intervention of the authorities and there will be no effect on the real variables in the economy even in the short-run. If price expectations no longer lag behind inflation, which is crucial to understanding the Phillips Curve trade-off, there is no possibility of moving variables from their natural levels. Rational expectations theory was originally developed by J.F. Muth in 1961, but its application to macroeconomics was made by Lucas in 1972. Expectations which economic agents form about the variables in which they are interested such as the rate of inflation will reflect the efficient use of publicly available information such as the rate of monetary expansion. Agents will form expectations, which will not be systematically wrong over time. One average, expectations will be correct. Such expectations will be rational because the best use is made of the available information. It is not claimed that economic decision-makers all have direct information about the causation process of inflation, but it is argued that it will be possible to utilise such information and that market pressures and information indirectly acquired, such as through the media, with lead economic agents to rational decision-making.

Rational theory implies that unemployment cannot depart from the natural level in any persisting fashion. Employment will deviate from the natural rate as the result of random and unpredictable shocks to aggregate demand and supply. However, subsequent changes in behaviour will restore equilibrium and there is certainly no available short-run Phillips curve available to the authorities. Indeed the actions of the policy makers to influence output and employment will cause shocks to the system. As Artis and others argued, the prescription for stability in the economy is not to manipulate demand as the post-war Keynesians had claimed, but rather to adopt a rule (growth of the money supply) and stick to it without deviation. Fiscal policy became associated with supply-side policies to raise the trend rate of growth. Thus, the role of markets would be enhanced because it is private enterprise that creates growth and employment.

When the 'Iron Curtain' fell at the end of the 1980s, the nearby emergent Central European economies underwent economic liberalization stabilization, and privatization. By moving as quickly as possible towards the market economy, these societies would establish the necessary framework for economic growth. Like their western counterparts, economic growth had not been as stable as might have been expected during the era of socialist planning – as for instance evidenced by the gluts of investments and unfinished capital projects that periodically occurred.

However, questions can be raised as to the validity of the rationality approach. In other words: Does the evidence suggest that the outcomes for the Central European Economies post 1989 have been as the classicals predicted in their rational world, or is 'capitalism wisely managed' the appropriate path for the authorities? The aim then of this study is to provide a justification for certain economic policies with reference to Czech Republic, Slovakia, Poland, and Hungary (CEE 4). By investigating the GDPs and industrial production indices for the CEE 4 economies, it can be determined whether these variables are stable around their trends as the classicals proclaimed and thus state intervention is unnecessary. Any deviations will lead to appropriate changes in behaviour, which will restore equilibrium. Alternatively, if GDP is unstable or stochastic, then the authorities must take action to avoid permanent recessions.

This study can be also regarded as an extension of unit root tests to the post communist countries. It is worth to pointing out that these economies have some specific features such as the specific structure of GDP, socio-economic environment, institutional and legal framework amongst others.

Laissez – Faire: stable trending GDP

The classical economics presumes that the economy follows a trend determined by Solow's neoclassical model [Solow 1956]. It assumes that the long-run component of the GDP is a deterministic trend with short-run fluctuations caused by external shocks. Therefore, Classical economics decomposes real GDP into a long-run trend and a short run stationary cyclical component. The slope of the trend is considered to be determined by long-run factors such as technological growth, fertility, and educational attainment levels. Cyclical deviations from the trend are regarded as demand and supply shocks. These deviations are temporary, which means that their fluctuations are eliminated through reversion to a long-run trend. The Classical economists state that over the long run, macroeconomic variables grow at a constant trend and that any deviations from the trend are only temporary and eventually eliminated by the invisible hand of market. Since these deviations are temporary, recessions do not have any permanent negative effects on GDP and there is no need for activist stabilization policy. The economy will converge to equilibrium represented by trend in long run.

This belief in a deterministic trend is reflected in the common practice of detrending macroeconomic variables using a regression equation. In mathematical terms, classical economics presumes that GDP is a trend stationary variable, which means that it is a sum of a deterministic trend and a stationary process. The GDP is a function of the time and some stationary cyclical component. This fact implies that GDP can be stationarized by estimating and deducting of a trend only. The equation describing GDP can be written as follows

$$GDP_t = GDP_0 + a_1 t + \varepsilon_t \quad [1]$$

where t denotes time and ε_t is a stationary cyclical component, which is a difference between the estimated or expected GDP and the real observed GDP. The direct consequence of trend stationarity is a temporary character of the cyclical component, which vanishes over time. Since this cyclical component always reverts to its mean, it has no permanent influence on the trending variable. In other words, under the assumption of output as a trending variable the recessions have only temporary effects on output that vanish over time as the classical authorities supposed.

INTERVENTIONISM: UNSTABLE STOCHASTIC GDP

The New Keynesian economics regards real GDP as a sum of independent random shocks that do not vanish over time but have permanent influence on the level of the GDP. Cyclical deviations from the trend occur because of the productivity shocks due to technological change. If these real factors cause aggregate fluctuations, then business cycles cannot be viewed as temporary. There is no invisible hand that draws economy back to its long-run trend and long deep recessions are highly likely. Thus from this point of view, the New Keynesian economics provides justification for state interventionism.

The New Keynesian economics in fact assumes that output is a difference stationary variable, which means that it contains a unit root or random walk process. If GDP contains a unit root, it means that GDP is a function of time and the cumulative sum of random disturbances, or error terms. More precisely

$$GDP_t = GDP_0 + a_1 t + \sum_{i=1}^{t} \varepsilon_i \quad [2]$$

where the term a_1 refers to the drift of output. It is evident from the equation 2 that the first difference of the GDP is a sum of constant growth rate and error term or cyclical stochastic component ε_t. Since the error term has variance σ and not one, it is possible that $|\varepsilon_t| > a_1$ which means that this stochastic component completely overtakes the influence of constant growth rate a_1 and GDP deviates from this constant trend in long run [Enders 2004]. In this case, error terms do not have temporary effects. These cyclical random shocks have a permanent effect, because they are not stationary. Output in period t2 is determined by the output in the period t1. This change in output persists in every future period, which means that recessions have permanent effects on output. Therefore, the only possible way of stationarisation is differencing. In other words, there is no trend in GDP, there is only increasing tendency caused by the drift term.

Unit root has also important consequences in terms of theoretical economics. Snowdon and Vane [2005] state that: "If shocks to productivity growth due to technological change are frequent and random, then the path of output following a random walk will exhibit features that resemble a business cycle" [Snowdon and Vane 2005, p. 303]. However, in this case the observed fluctuations in GDP are not deviations from a deterministic time trend. These deviations are fluctuations in the "natural (trend) rate of output"

[Snowdon and Vane 2005, p. 303] caused by a series of permanent shocks. Thus, each productivity shock is permanent and determines a new growth path.

Now, if the issue concerns the justification or legitimacy of economic policy interventions than the question is whether output is trend stationary or difference stationary. Snowdon and Vane [2005] state:

"If business cycles are temporary events, then recessions create no long-run adverse effects on GDP. However, whereas Keynesians feel that such deviations could be severe and prolonged and therefore justify the need for corrective action, monetarists, and especially new classical economists, reject the need for activist stabilization policy, having greater faith in the equilibrating power of market forces and rules-based monetary policy" [Snowdon and Vane 2005, p. 300].

In order to determine whether economies need corrective actions, a distinction must be made as to whether outputs are difference stationary or trend stationary. In other words, do outputs fluctuate around deterministic trend or are they purely stochastic without any clear trend? More precisely, in order to answer the question we need to prove if the equation 3 contains a unit root.

$$GDP_t = GDP_0 + a_2 t + a_1 GDP_{t-1} + \varepsilon_t \qquad [3]$$

Nelson and Plosser's groundbreaking study [1982] indicates that the U.S. GDP is purely stochastic without any stable trends. On base of the Dickey-Fuller test [Dickey and Fuller 1979], they were not able to reject the null hypothesis of unit root in the case of real GNP, nominal GNP, industrial production, and unemployment rate of the United States. In particular, non-rejection of unit root in the case of real GNP had very strong influence on theoretical macroeconomics as well as on practical macroeconomic policy.

"The most important implication of the unit root revolution, is that under this hypothesis random shocks have a permanent effect on the system. Fluctuations are not transitory. This implication, as forcefully argued by Nelson and Plosser, has profound consequences for business cycle theories. It runs counter to the prevailing view that business cycles are transitory fluctuations around a more or less stable trend path" [Perron 1989, p. 1362].

Many other studies dealt with the unit root testing by using U.S. data, as for instance, Rudenbusch [1992], Simkins [2001] or Andreou and Spanos [2003]. Furthermore, Fleissig and Strauss [1999] applied panel unit root tests to examine if real per capita GDP for OECD economies are trend or difference stationary. They conclude that the results fail to reject the null hypothesis of unit root. Similarly, Narayan [2006] explored per capita income of G7 countries in the period 1870–2001. He was able to reject the unit root hypothesis in case of five countries of G7. Smyth and Inder [2003] used real GDP per capita in 25 of China's provinces to test the unit root. They concluded that the evidence supports the unit root hypothesis if they allowed no structural breaks or one structural break. In case of more than one break and in case of breaks in intercept and slope the results were mixed. Li [2000] examines China's output data and concludes that the data are "flexible trend stationary rather than difference stationary" [Li 2000, p. 825]. However, these studies have not examined economies the Central and Eastern Europe and the aim of this paper is to provide an extension of previous studies to the CEE4.

THE TIME SERIES OF DATA

The time series of the GDPs and indices of industrial production were collected form OECD database. The GDP series consist of quarterly values and the series of index of industrial production accounts for monthly values. The longest possible data ranges were deployed. The Table 1 provides data ranges. In case of all time series, logarithms have been taken so that they were used in logarithmic form during all computations. All computations have been conducted by using MATLAB programming environment.

Table 1. Data ranges
Tabela 1. Zakres danych

Country	GDP	Number of Observations	Index of Industrial Production	Number of Observations
Czech Republic	Q1 1996 – Q3 2007	47	January 1989 – November 2007	215
Slovakia	Q1 1995 – Q4 2007	52	January 1990 – December 2007	228
Poland	Q1 1995 – Q4 2007	52	January 1985 – December 2007	277
Hungary	Q1 1995 – Q4 2007	52	January 1985 – January 2008	276

Source: OECD Stats Extracts.
Źródło: OECD Stats Extracts.

AUGMENTED DICKEY-FULLER TEST

When estimating a polynomial trend in logarithms of GDP and index of industrial production series, the autocorrelation functions of regression residuals have a slowly decaying pattern and oscillate around zero. This pattern suggests unit root [Enders 2004]. However, a more exact methodology is applied to the series. The Dickey-Fuller [1979] developed a test to investigate the presence of the unit root. This test is applied to four countries of the former Soviet bloc; Czech Republic, Slovakia, Poland and Hungary. The intention is to demonstrate whether their outputs and indices of industrial production confirm laissez faire policy or active economic interventions. As testing statistics, it has been decided to use the Augmented Dickey-Fuller test [Dickey and Fuller 1979].

It will be tested if the parameter a_1 is greater than one in absolute value in the equation 4.

$$y_t = a_0 + a_1 \cdot y_{t-1} + a_2 \cdot t + b_1 \cdot \Delta y_{t-1} + b_2 \cdot \Delta y_{t-2} + ... + b_n \cdot \Delta y_{t-k} + \varepsilon_t \quad [4]$$

The term $b_1 \cdot \Delta y_{t-1} + b_2 \cdot \Delta y_{t-2} + ... + b_n \cdot \Delta y_{t-k}$ refers to the lags for corrections of residual autocorrelation. It is worth pointing out that too many lags lead to a loss of degrees of freedom and reduce the power of the test to reject the null of the unit root.

The lag length k is selected using the t-statistics, which is in line with Perron [1994] who argues that the methods based on information criteria are less appropriate. This method sets the number of lagged variables so that the lagged variables are included up to the last statistically significant lagged variable.

In line with Dickey and Fuller [1979], the equations have been transformed by subtracting *yt*–1 from each side so that the model has the following final form:

$$y_t - y_{t-1} = a_0 + \gamma \cdot y_{t-1} + a_2 \cdot t + b_1 \cdot \Delta y_{t-1} + \varepsilon_t \quad [5]$$

where $\gamma = a_1 - 1$. The t-statistic labelled as τ has been used to test the null hypothesis $\gamma = 0$ against the alternative $-2 < \gamma < 0$ by comparing to Dickey-Fuller critical values.

The tables 2 and 3 provide the results of the estimated equations with trend. The equations have the following final forms

$$\Delta GDP_t = a_0 + \gamma \cdot GDP_{t-1} + a_2 \cdot t + b_1 \cdot \Delta GDP_{t-1} + \varepsilon_t \quad [6]$$

for GDP and

$$\Delta IIP_t = a_0 + \gamma \cdot IIP_{t-1} + a_2 \cdot t + b_1 \cdot \Delta IIP_{t-1} + \varepsilon_t \quad [7]$$

for the index of industrial production.

From the tables 2 and 3 it is apparent that the parameter γ is close to zero in all cases, which indicates the unit root. The Dickey-Fuller critical values of τ statistic for 50 observations are –3.5 at the 5% significance level and –4.15 at the 1% significance level [Enders 2004, p. 439]. Therefore, we cannot reject the null hypothesis of unit root in all of the four GDPs at either the 5% or 1% significance level. Since the Dickey-Fuller critical values of τ statistic for 250 observations are –3.43 at the 5% significance level and –3.99 at the 1% significance level [Enders 2004, p. 439], we cannot reject the unit root hypothesis at either the 5% or 1% significance level in any of the four indices of industrial production. The table 4 summarizes these results.

Table 2. Estimated equations of GDP with deterministic trend
Tabela 2. Oszacowane modele PKB z trendem deterministycznym

GDP	a0	γ	a2	b1	τ	R2	Q
Czech Republic	–0.0027	–0.0228	0.0003	0.7734	–3.1450	0.9390	21.4384
Slovakia	0.0017	0.0169	–0.00002	0.5814	0.6140	0.5267	10.5297
Poland	0.0191	–0.1637	0.0016	---	–2.0992	0.0896	7.7864
Hungary	0.0027	–0.0555	0.0006	0.5697	–1.0635	0.3355	18.3708

Source Authors' calculations.
Źródło: Obliczenia własne.

Table 3. Estimated equations Indices of Industrial Production with deterministic trend
Tabela 3. Oszacowane modele indeksów produkcji przemysłowej z trendem deterministycznym

IIP	a0	γ	a2	b1	b2	τ	R2	Q
Czech Republic	0.2287	–0.0545	0.0003	0.5080	0.1754	–2.693	0.2533	35.5816
Slovakia	0.2835	–0.0672	0.0003	–0.4328	–0.3160	–2.3770	0.2167	69.4373
Poland	0.0264	–0.0073	0.0001	–0.3194	---	–0.7971	0.1153	25.3550
Hungary	0.0199	–0.0063	0.0001	–0.4317	---	–0.9031	0.2043	30.0155

Source: Authors' calculations.
Źródło: Obliczenia własne.

Table 4. Acceptance of the null hypothesis at the 1% significance level
Tabela 4. Przyjęcie hipotezy zerowej na poziomie istotności 1%

	GDP		Index of Industrial Production	
	5%	1%	5%	1%
The Czech Republic	Accepted	Accepted	Accepted	Accepted
Slovakia	Accepted	Accepted	Accepted	Accepted
Poland	Accepted	Accepted	Accepted	Accepted
Hungary	Accepted	Accepted	Accepted	Accepted

Source: Authors' calculations.
Źródło: Obliczenia własne.

In order to test residual autocorrelation Enders [2004, p. 188] used the Durin-Watson statistic [Durbin and Watson 1951]. However, Nerlove and Wallis [1966] points out that if lagged dependent variables are included in an equation estimated by ordinary least squares method "the value of Durbin-Watson statistic is asymptotically biased towards 2", which means towards indicating no autocorrelation. Durbin [1970] confirms these findings. Greene [2002] suggests using the Ljung-Box Q test [Ljung and Box 1978] in case of regression equation with lagged dependent variables. Thus, the Durbin-Watson statistic [Durbin and Watson 1951] can be used in case of Polish GDP only, where it has value of 2.157, which indicates no residual autocorrelation.

The column labelled as Q in tables 2 and 3 provides the values of the Ljung-Box statistic at lag 10. The critical value of the $\chi^2_{1-0.05}$ distribution based on the corresponding degrees of freedom is 30.5779 at the 1% significance level. It is apparent that there is no significant residual autocorrelation in six of eight cases; only in the case of Czech and Slovak industrial production does the Ljung-Box statistic indicate residual autocorrelation.

It can be concluded that the outputs and industrial productions of the Central European Countries contain a unit root. These economic variables should be regarded as difference stationary rather than trend stationary. Further investigation is required to test the validity of these findings before conclusive confirmation of the validity of the Keynesian approach to economic management can be made. Such an investigation will be the subject of further research.

CONCLUSIONS

The GDP statistics and indices of industrial production of four Central European countries have been examined in order to find out if their outputs are stable around a deterministic trend or if they are stochastic.

The Dickey-Fuller test indicates unit root in case of all four countries for both the GDP and the index of industrial production. Difference stationarity means that there is no deterministic long-run time trend in either GDP series or index of industrial production series. These series have a growing tendency, which can be completely overtaken by the influence of cyclical fluctuations because these fluctuations have a unit root. Since unit root implies permanent character, long lasting deviations from this growing tendency are

likely. These deviations in fact represent long and deep recessions and confirm Keynes' 'inherent instability of the economy'. In other words, permanent recessions are not only possible but also even very likely. Thus, state interventions in Central Eastern Europe to boost economy during these recessions can be regarded as justified. The results are in line with the Nelson and Posser's study from 1982. The Dickey-Fuller test also indicates unit root in case of industrial productions of all four countries.

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POLITYKA GOSPODARCZA W EUROPIE ŚRODKOWO-WSCHODNIEJ: KONSEKWENCJE PIERWIASTKÓW JEDNOSTKOWYCH

Streszczenie. Celem artykułu jest przedstawienie ekonometrycznego uzasadnienia dla polityki gospodarczej w Europie Środkowej i Wschodniej, w oparciu o badania stabilności realnego PKB i produkcji przemysłowej w Czechach, na Słowacji, w Polsce i na Węgrzech. Stabilność produkcji przemysłowej i PKB badana jest za pomocą testów pierwiastków jednostkowych. Test Dickey-Fullera (1979) wskazuje pierwiastek jednostkowy w przypadku wszystkich czterech państw. W przypadku produkcji przemysłowej rezultaty są różne. Niemniej jednak, stacjonarność różnic PKB oznacza brak trendu deterministycznego PKB, w związku z czym w krótkim okresie nie następuje zwrot trendu. Głęboka i długa recesja są nie tylko możliwe, ale nawet prawdopodobne. Tak więc działania polityki gospodarczej mogą być uznane za uzasadnione, ponieważ mają za zadanie pobudzenie gospodarki w celu odwrócenia recesji. Przedstawione opracowanie stanowi także rozszerzenie testów pierwiastków jednostkowych w krajach postkomunistycznych.

Słowa kluczowe: Europa Środkowo-Wschodnia, ekonomia klasyczna, keynesizm, stabilność produkcji, pierwiastek jednostkowy

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