

SEEJE

South-Eastern Europe Journal of Economics

THE OFFICIAL JOURNAL OF THE ASSOCIATION OF ECONOMIC UNIVERSITIES
OF SOUTH AND EASTERN EUROPE AND THE BLACK SEA REGION

Vol 10 | No 2 | FALL 2012

web site: <http://www.asecu.gr>
ISSN 1109-8597
ISSN On line: 1792-3115



FUNDING INSTITUTION
UNIVERSITY OF MACEDONIA
THESSALONIKI, GREECE

SEEJE

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ISSN 1109-8597

ISSN On line: 1792-3115

Thessaloniki, Fall 2012

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aim and scope of

ASECU was founded in 1996 as Association of South-Eastern Europe Economic Universities with the general aim of promoting the interests of those economic universities in South-Eastern Europe which are public, recognized or financed by the state of origin.

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WHAT IS THE IMPACT OF CURRENCY UNIONS ON FDI FLOWS? EVIDENCE FROM EUROZONE COUNTRIES

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Abstract

This paper investigates the effect of EMU on inward FDI flows to the Eurozone using panel data from 22 OECD countries for the period 1973-2006. The empirical findings suggest that the EMU led to a statistically significant overall increase in inward FDI flows to countries that adopted the euro as their national currency. They also show that the EMU effect on inward FDI flows differs substantially across member countries.

JEL Classification: F15, F21, F36

Keywords: Currency Unions, Euro, EMU, FDI

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Acknowledgements: We thank participants at the 27th International Symposium on Money, Banking and Finance (Bordeaux, 2010), the Eastern Economic Association meeting (New York, 2011), the European Economics and Finance Society annual conference (London, 2011) and seminar participants at the National University of Ireland, Galway for helpful comments. Financial assistance from a grant provided under the basic research scheme (Cycle D) and administered by the University of Macedonia Research Committee is gratefully acknowledged.

Introduction

The impact of the formation of currency unions on trade volume has been a topic of considerable interest following the seminal work of Rose (2000). This, primarily, empirical literature has grown significantly and has focused to some extent on the effect of the launch of the euro on intra-Eurozone trade. The main conclusion reached by this literature is that currency unions have a positive and quite large effect on trade among the countries that adopted a common currency (Rose, 2000, 2001, Glick and Rose, 2002, Micco *et al.* 2003). In particular, Rose and Glick (2002, p. 1126) find that “bilateral trade approximately doubles/halves as a pair of countries forms/dissolves a currency union, *ceteris paribus*”. Despite the growing interest in the effects of currency unions on trade volume, there has been, with some recent exceptions, a lack of attention to the effects of currency unions on FDI flows. This is despite the fact that FDI flows have grown recently at a much faster pace than trade flows. For instance, the growth rate of the FDI flows into the Eurozone from 1990-2006 was 469.6% whereas the growth rate of trade (exports plus imports) in the Eurozone for the same period was only 184.3%.

With that in mind, this paper attempts to contribute to the literature by examining the impact currency unions have on FDI flows in the context of the European Monetary Union (EMU). Specifically, it will investigate the effect of the introduction of the euro on inward FDI flows to the Eurozone, the group of countries that adopted it as their national currency.

Theoretical work on the effect of currency unions on FDI seems to be emerging slowly (Neary, 2007). Empirical work, on the other hand, has recently emerged and has mostly focused on the impact of the euro on FDI flows into the Eurozone¹. This literature (Aristotelous, 2005; de Sousa and Lochard, 2004, 2006, Petroulas, 2007, Schiavo, 2007, Brouwer *et al.*, 2008) points to a positive and significant effect. This seems to be a plausible result since a currency union may boost trade among its members via an increase in FDI flows. Indeed, the increase in inward FDI flows to the Eurozone may be behind the growth in intra-Eurozone trade flows documented in the empirical literature to date. Baldwin *et al.* (2008) provide a useful recent summary of the euro impact on trade and FDI in Europe.

The above-mentioned studies on the currency union-FDI nexus suffer from a number of weaknesses. First, they use a few years of data from the EMU period and hence cannot estimate accurately the effect of the EMU on FDI flows. Second, they investigate the overall effect of the EMU on FDI for the Eurozone and, hence, cannot determine whether this effect is widespread across Eurozone countries. This study

1. Wei and Choi (2002) focus on the effect of dollarization on bilateral FDI flows.

purports to fill these gaps in the literature using a number of econometric methodologies. The rest of the paper is structured as follows. Section 2 offers a review of the empirical literature. Section 3 outlines the estimated model. Section 4 discusses the methodology, the data and the results obtained from the empirical analysis. Finally, section 5 presents our conclusions.

Literature Review

Increasing monetary integration leading to a common currency may affect FDI positively via a number of channels. First, a monetary union that eliminates exchange rate risk and makes price comparisons more transparent may facilitate goods competition across countries, thus making cross-border mergers and acquisitions more profitable (Neary, 2007). Second, a common currency eliminates uncertainty regarding price variables and makes easier the pricing decisions and cost calculations of firms. Third, a single currency represents a credible commitment to an irrevocable fixing of exchange rates and hence reduces transactions costs associated with international investment flows. The reduction in transactions costs promotes investment flows across borders and hence FDI. A US company, for example, that is already operating in the Eurozone has an incentive to further expand its investment activity as it now anticipates higher trade activity in the Eurozone and hence more sales. Therefore, the positive impact of a common currency on FDI flows goes beyond the elimination of exchange rate uncertainty arising from the common currency.

Most of the empirical work focuses on the effects of currency unions on trade. However, currency union formation may affect trade via its effect on FDI. Empirical evidence on the effect of monetary integration on FDI has recently emerged. Wei and Choi (2002) examine the effect of a currency board or complete dollarization on US FDI. They find the positive effect on US FDI can be as high as 185%. De Sousa and Lochard (2006) estimate a gravity model to test for the impact of EMU on FDI flows and stocks. The estimated equation controls for market size, transactions and production costs, exchange rate volatility, exchange rates, skilled-labor endowments and merger and acquisition determinants. The authors use data on 22 OECD countries for the period 1982-2002. The major findings are the following. First, EMU leads to an increase in euro-members (and non-members) FDI inside the euro area. In particular, EMU is estimated to have increased FDI stocks in the EMU countries by about 29%. Second, there is no evidence that the EMU has led to a decrease in FDI originating from Eurozone countries into non-Eurozone EU-member countries (Denmark, Sweden, and UK).

Aristotelous (2005) tests for the effect of EMU on US FDI flows into the Eurozone using a panel of 15 EU countries and data for 1966-2003. Using a model that includes supply and demand-related locational determinants of FDI, the paper finds that EMU had a positive and statistically significant effect on US FDI flows into the Eurozone. In

addition, there was no FDI diversion - meaning that there is no evidence for a decline in US FDI into the three countries that opted out of the single currency (UK, Denmark, and Sweden). Petroulas (2007) also examines the effect of EMU on inward FDI flows to the Eurozone. The study focuses on both inward FDI flows originating from other Eurozone countries and from non-Eurozone countries. The estimated increase in the former case is 16% and in the latter 8%. In the analysis, the author uses annual data from 1992-2001 for 18 developed countries.

Schiavo (2007) uses data from 25 developed countries for the period 1980-2001 to investigate the effect of EMU on FDI flows. Despite using only three years of data from the euro regime, he finds that EMU had a positive and significant effect on FDI flows. More recently, Brouwer *et al.* (2008) examine the likely trade and FDI effects of the 2004 EU enlargement in each of the ten countries that joined the EU in that year. Using a panel of 29 countries for the period 1990-2004, the authors find the EMU effect on FDI to be positive and in the range of 18.5-30% where the minimum effect applies for Poland and the maximum for Hungary.

This paper contributes to the empirical literature that relates EMU and FDI flows in three ways. First, we use a number of econometric methodologies (that include dynamic panel estimation) to estimate the effects of EMU on FDI flows. Second, we include data up to 2006, thus allowing a longer time scale of EMU data that is expected to provide more accurate estimates of the EMU impact on FDI flows. Third, our methodology allows for the determination of country effects on FDI in order to examine whether the impact of the euro on FDI is symmetric across Eurozone countries.

The model

Numerous theories have been developed over the years to explain the determinants of FDI. These theories draw not only on different areas of economics such as industrial organization and economic geography, but also on corporate investment theory and strategic theory. UNCTAD, 1998, provides a good overview of these theories. In this paper we examine the impact of the euro on inward FDI to the Eurozone using a model of the determinants of FDI flows that is rooted in these theories. The estimated model is shown below:

$$\text{FDI}_{it} = \beta_0 + \beta_1 \text{GDP}_{it} + \beta_2 \text{GDPGR}_{it} + \beta_3 \text{RER}_{it} + \beta_4 \text{VOL}_{it} + \beta_5 \text{DIST}_i + \beta_6 \text{EU}_{it} + \beta_7 \text{EMU}_{it} + e_{it} \quad (1)$$

where i refers to 22 host countries, t to the time period 1973-2006 and e is the error term. The regression's dependent variable, FDI_{it} , is real total FDI inflows to host country i measured in US dollars. It is calculated by dividing inward FDI flows by the US GDP deflator.

GDP_{it} is host-country i 's real GDP measured in US dollars at constant 2000 prices and exchange rates and it captures the effect of market size on foreign investment.

$GDPGR_{it}$ is the growth rate of real GDP of country i . It accounts for the growth rate of market size in the host country that is expected, according to the acceleration principle, to affect positively FDI inflows. RER_{it} stands for the host country's real effective exchange rate against its trading partners. It is the trade weighted nominal exchange rate between the host country and its trading partners adjusted by the CPI of the host country and its trading partners. An increase in the real exchange rate implies a real depreciation of the host country currency and hence an increase of relative wealth of foreign firms (compared to domestic firms) leading to a rise in foreign FDI inflows into country i . VOL_{it} is the annualized month-to-month volatility of the trade-weighted real exchange rate measured in two different ways. We use the moving standard deviation of the logged real rate and the conditional variance of shocks to the exchange rate. In the second case, a GARCH model of the monthly real exchange rate is estimated and the estimated conditional variance is taken as a proxy of volatility. It is expected that the direction of the effect volatility would have on FDI is ambiguous. More volatility would expose firms involved in international trade to more uncertainty and hence would lead to substitution of FDI for trade flows; hence a positive effect of volatility on FDI (Harvey, 1989). In contrast, more volatility would expose firms to more uncertainty when investing abroad (for example, the size of profits in domestic currency terms would be more uncertain) and reduce FDI flows.

Another variable of interest is the distance in kilometers ($DIST_i$) between the capital of each host country and Frankfurt, considered in the literature as the industrial centre of the EU. The rationale for the incorporation of such a variable stems from the existence of locational externalities that arise from agglomeration economies in the EU. The closer a peripheral market is to the centre of industrial activity, the higher the positive externalities arising from this proximity and hence the more likely a foreign firm will wish to reap the benefits by investing in such a market. Hence, the sign of β_5 is expected to be negative. Equation (1) includes also two dummy variables. EU_{it} is the EU membership dummy that takes the value of one when the host country i was a member of the EU and zero otherwise. It is included in order to test whether being an EU member implies a positive effect on inward FDI. Finally, the last independent variable included in the regression is EMU_{it} , the dummy variable that captures the impact of the creation of the EMU on inward FDI flows. It takes the value of one starting in the year host country i joined the euro. Hence, it is equal to one starting in 1999 for Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain. For Greece, which joined the Eurozone in 2001, it takes the value of one from that year till 2006. Finally, for the rest of the countries that are part of the sample, including the three EU-members that have not joined the euro (Denmark, Sweden, UK), the dummy takes the value of zero throughout our sample.

As the objective of the paper is to test for the impact of the euro on inward FDI in the Eurozone, our primary focus in the above estimated regression is on the coefficient β_7 .

It is anticipated that this coefficient will be positive and statistically significant for the reasons outlined in the previous section. Recent evidence has concluded that currency unions tend to have a beneficial effect on trade volume (Rose, 2000, Glick and Rose, 2002, Micco *et al.*, 2003). Moreover, some evidence suggests that the effect of currency unions on trade may take place via their effect on FDI (de Sousa and Lochard, 2006). In other words, in anticipation of the positive effects on trade volume a currency union may bring to its members, a foreign company has a stronger incentive to expand its production activities (or set up new facilities to initiate a production activity) in the host country in order to reap the benefits of the boost in trade. Hence, the creation of a currency union tends to boost FDI flows into the Eurozone.

Methodology, Data and empirical results

(i) Methodology

Regression models that use pooled data have been traditionally estimated in three different ways: Pooled Least Squares (PLS), Fixed Effects (FE), and Random Effects (RE). PLS is the simplest estimation model. It assumes that the intercept and slope coefficients are the same for the different cross-sectional entities. It is commonly estimated to provide 'base-line' or 'benchmark' results. The FE estimation model allows for different intercepts for each cross-sectional entity and should be used when differences between the intercepts for the cross-sectional entities are considered constant over time, not random. The RE estimation model incorporates differences between cross-sectional entities by allowing the intercept to change, as in FE, but the amount of the change is random. It should be used when each entity in the cross-section data is chosen at random to represent a larger population. Because the cross-sectional entities in this paper were not chosen at random (they are all OECD member countries), the FE, and not the RE, is the appropriate technique to estimate equation (1).

In addition to the frequently used procedures discussed above, a Generalized Method of Moments (GMM) estimator along the lines suggested by Arellano and Bond (1991) and Arellano and Bover (1995) can also be used to estimate a panel equation such as equation (1). Arellano and Bond (1991) suggest an estimation procedure that uses first differenced data, whereas Arellano and Bover (1995) suggest removing individual effects from a panel equation using orthogonal deviations. These types of estimation procedures are commonly used in the literature to estimate dynamic panel data models. For a more detailed survey of the literature of GMM estimation and dynamic panel estimators, see Wooldridge (2002).

2. The 22 OECD countries included in the study are the 15 European countries that were members of the EU when the euro was launched plus Australia, Canada, Japan, Korea, New Zealand, Norway, Switzerland, and USA. Please note that in the past FDI figures for Belgium and Luxemburg were combined into a single total; rather than lose valuable observations, this study treats Belgium and Luxemburg as if they were a single country.

(ii) Data

We use panel data for 22 OECD countries² that cover the period 1973-2006. The start of the sample period is dictated by the collapse of the Bretton Woods system and the beginning of the exchange rate float. The FDI data are taken from the World Investment Report (UNCTAD, 2007). The rest of the data are from the OECD (Main Economic Indicators) and International Financial Statistics CD-ROM. Monthly-frequency data are used in order to construct the proxies for exchange rate volatility.

(iii) Results

We estimate equation (1) for three sample periods: the full sample period 1973-2006 and two sub-sample periods (1979-2006 and 1990-2006). We do so in order to determine whether our findings are sensitive to the time period under consideration. The first sub-sample is motivated by the creation of the European Monetary System (EMS) in 1979. The second sub-sample is chosen on the basis that EMU, the name basically given to the process of harmonizing the economic and monetary policies of the EU members with a view to the introduction of euro on Jan. 1, 1999, began in July 1990.

To establish the robustness of our results, we also estimate equation (1) using a number of panel data estimation techniques. Table 1 reports the results of the baseline panel least squares estimation procedure. The baseline estimates obtain under the assumption that the intercept and slope coefficients are identical for the different cross-sectional entities. Table 2 reports the results of the fixed effects panel estimation. In this case, the estimated intercepts for the various cross-sectional entities are allowed to differ but the differences among them are taken to be constant and not random. Finally, Table 3 provides the estimates of two dynamic panel models.

According to the results reported in Tables 1-3, we derive the following conclusions. First, real GDP and the real GDP growth rate have a positive and very statistically significant impact on inward FDI in almost all cases, a result consistent with our expectations. Second, the effect of the real effective exchange rate on inward FDI is positive and significant in most cases. Hence, as expected, a real depreciation of the domestic currency leads to an increase in inward FDI flows. Third, exchange rate volatility measured by the moving standard deviation seems to have an ambiguous effect on inward FDI flows. The direction of the effect appears to be sensitive to the estimation technique used. When the 5% level of significance is reached, the effect of exchange rate volatility on FDI inflows is estimated to be positive (see Table 3). When volatility is measured using the conditional variance of shocks to the real effective exchange rate, however, its effect on FDI flows is positive in all cases and significant in most cases (see Table 4). Fourth, distance from the centre of activity had a negative and statistically significant effect on inward FDI flows as expected. Fifth, the positive effect of EU membership seems to be rather weak as it obtains only in the baseline estimates.

Table 1. Panel Least Squares Estimates of EMU impact on FDI inflows into the Eurozone

	Dependent Variable: FDI Inflows		
	Sample period: 1973-2006	Sample period: 1979-2006	Sample period: 1990-2006
Real GDP	10.24* (1.51)	10.70* (1.57)	11.67* (1.94)
Real GDP growth rate	440 (296)	736*** (427)	1293** (674)
Real Effective Exchange Rate	18450* (3220)	19888* (4386)	27700* (10774)
Exchange Rate Volatility	-123108*** (65723)	-137384*** (79906)	-174526 (133839)
Distance	-0.27* (0.088)	-0.30* (0.12)	-0.55* (0.20)
EU Membership	4685* (850)	5153* (931)	6325* (1535)
EMU	11442* (3701)	13201* (3682)	8748** (3981)
Adjusted R-squared	0.40	0.40	0.38
F-statistic	69.2 (0.00)	59.2 (0.00)	34.0 (0.00)
Number of observations	738	612	374

Source: Authors' calculations.

Notes: White-type robust standard errors are given in parenthesis. * denotes statistical significance at the one percent level, ** at the five percent level, and *** at the ten percent level.

Table 2. Fixed Effects Estimates of EMU impact on FDI inflows into the Eurozone

	Dependent Variable: FDI Inflows		
	Sample period: 1973-2006	Sample period: 1979-2006	Sample period: 1990-2006
Real GDP	21.89* (4.32)	23.10* (5.34)	29.51* (9.02)
Real GDP growth rate	574** (273)	929** (405)	1402** (641)
Real Effective Exchange Rate	17467* (4433)	14473** (5525)	1102 (10006)
Exchange Rate Volatility	3198 (43981)	71205 (76511)	186541 (164229)
EU Membership	1840 (1985)	2014 (2010)	2405 (3162)
EMU	17053* (3267)	16673* (3202)	14632* (3199)
Adjusted R-squared	0.56	0.56	0.55
F-statistic	35.1 (0.00)	30.2 (0.00)	18.2 (0.00)
Number of observations	738	612	374

Source: Authors' calculations.

Notes: White-type robust standard errors are given in parenthesis. * denotes statistical significance at the one percent level, ** at the five percent level, and *** at the ten percent level.

Table 3. Dynamic Estimates of EMU impact on FDI inflows into the Eurozone

	Dependent Variable: FDI Inflows			
	Sample period: 1973-2006		Sample period: 1979-2006	
	GMM/Dynamic Estimates Transformation: First Differences	GMM/Dynamic Estimates Transformation: Orthogonal	GMM/Dynamic Estimates Transformation: First Differences ⁽³⁾	GMM/Dynamic Estimates Transformation: Orthogonal ⁽⁴⁾
FDI Inflows (-1)	0.54* (0.09)	0.54* (0.09)	0.54* (0.09)	0.54* (0.09)
Real GDP	11.99* (2.59)	11.98* (2.58)	11.77* (2.60)	11.77* (2.60)
Real GDP growth rate	1100* (432)	1106* (431)	1227** (525)	1227** (525)
Real Effective Exchange Rate	2,182 (3,833)	2045 (3908)	2389 (4678)	2389 (4678)
Exchange Rate Volatility	120669** (57135)	120,214** (57079)	136349** (66609)	136349** (66609)
EU Membership	788 (2778)	800 (2785)	876 (2859)	876 (2859)
EMU	8702** (3690)	8698** (3691)	8779** (3751)	8779** (3752)
Number of observations	734	734	610	610

Source: Authors' calculations.

Notes: (1) White-type robust standard errors are given in parenthesis. * denotes statistical significance at the one percent level, ** at the five percent level, and *** at the ten percent level.

(2) Dynamic estimation could not be performed using EViews for the sample period 1990-2006 because the number of instruments is greater than the number of observations.

(3) The estimation procedure uses differenced data as in Arellano and Bond (1991).

(4) The estimation procedure uses orthogonal deviations as in Arellano and Bond (1995).

The results reported in Tables 1-3 also show that the estimated coefficient for the EMU dummy is positive and statistically significant in all cases. In other words, the results demonstrate that, no matter what estimation technique is used or what sample period is used to estimate equation (1), the impact of the euro on inward FDI flows to the Eurozone is positive and statistically significant. This result is consistent with the finding of the earlier literature on the topic (see Schiavo, 2007, among others) that the euro boosted FDI flows into the Eurozone after its introduction on January 1, 1999. Also notice that the EMU dummy is always significant but the same is not true for the exchange rate volatility variable (Table 2). This finding squares with the fact that the EMU dummy captures not just the elimination of exchange rate uncertainty but also the additional benefits of a single currency outlined earlier.

As our dependent variable is measured in millions of US dollars, the coefficient estimates for the EMU dummy reported in Tables 1-3 capture the average annual change in FDI flows into the Eurozone in millions of US dollars. For instance, the coefficient 11442 in Table 1 suggests that the formation of the EMU led to an average annual increase in FDI flows into the Eurozone of approximately \$11.5 billion.

These coefficient estimates range from a low of \$8.7 billion to a high of \$17.0 billion, representing an average annual increase in inward FDI flows to the Eurozone that is between 11.7 and 22.9 percent of the average annual FDI flows into the Eurozone from the 1990-98 period.

In order to establish whether the results are sensitive to how exchange rate volatility is measured, we also proxied volatility by the conditional variance of shocks to the real effective exchange rate. Table 4 reports the sign and level of significance (when the respective coefficient is statistically significant) of the volatility and EMU dummy coefficients. The EMU coefficient is positive and statistically significant (at 5% or better) in all cases, a result which, in turn, suggests that the EMU effect on FDI flows into the Eurozone is not sensitive to how exchange rate volatility is measured.

Table 4. Empirical Estimates of EMU impact on FDI inflows into the Eurozone using an ARCH measure of exchange rate volatility

	Dependent Variable: FDI Inflows									
	Sample Period: 1973-2006				Sample Period: 1979-2006				Sample Period: 1990-2006	
	PLS Estimates	Fixed Effects	Dynamic Estimates ⁽²⁾	Dynamic Estimates ⁽³⁾	PLS Estimates	Fixed Effects	Dynamic Estimates ⁽²⁾	Dynamic Estimates ⁽³⁾	PLS Estimates	Fixed Effects
Exchange Rate Volatility (ARCH)	+	+	+	+	+	+	+	+	+	+
	NS	NS	S(1%)	S(1%)	NS	NS	S(5%)	S(5%)	NS	S(5%)
EMU dummy	+	+	+	+	+	+	+	+	+	+
	S(1%)	S(1%)	S(5%)	S(5%)	S(1%)	S(1%)	S(5%)	S(5%)	S(5%)	S(1%)

Source: Authors' calculations.

Notes: (1) NS = not significant; S = Significant

(2) The estimation procedure uses differenced data as in Arellano and Bond (1991).

(3) The estimation procedure uses orthogonal deviations as in Arellano and Bond (1995).

Another issue of great importance is whether the positive and statistically significant effect of EMU on inward FDI flows to the Eurozone are symmetrical across the countries that adopted the euro. In order to be able to do so, equation (1) was re-estimated by incorporating in it EMU country specific dummies. The corresponding results are reported in Table 5. These results suggest that the EMU effect on FDI inflows differs across Eurozone countries. EMU has had a positive and statistically significant effect (in all or most cases) on FDI inflows to Belgium/Luxembourg, France, Germany, Italy, Netherlands, and Spain. In the case of Ireland the EMU effect is positive but not statistically significant. In the case of Austria and Finland, the EMU effect is negative and statistically significant in some cases. In the case of Greece and Portugal, the EMU effect on inward FDI flows is mixed. An interesting observation that can be drawn from these results is that the EMU had a positive and significant effect mostly on inward FDI flows to Eurozone countries that are in the centre of the monetary union and negative or mixed effect on countries that are in the periphery of it.

Table 5. Empirical Estimates of EMU effect on FDI inflows for individual Eurozone countries

	Dependent Variable: FDI Inflows									
	Sample Period: 1973-2006				Sample Period: 1979-2006				Sample Period: 1990-2006	
	PLS Estimates	Fixed Effects	Dynamic Estimates ⁽²⁾	Dynamic Estimates ⁽³⁾	PLS Estimates	Fixed Effects	Dynamic Estimates ⁽²⁾	Dynamic Estimates ⁽³⁾	PLS Estimates	Fixed Effects
Austria	-1179 (1,679)	-1322 (1,810)	-1019 (1,028)	-1019 (1,026)	-1949 (1,839)	-1479 (2,059)	-972 (1,096)	-972 (1,097)	-5169** (2,487)	-904 (2,937)
Belgium/ Luxembourg	57,805* (11436)	55,456* (11334)	30,817* (5254)	30,798* (5237)	56,652* (11144)	54,471* (11172)	30,712* (5565)	30,712* (5565)	52,421* (10725)	48,953* (11155)
France	32236* (4958)	30761* (5428)	17925* (3576)	17925* (3566)	30932* (5011)	30121* (5569)	17801* (3512)	17801* (3512)	26404* (5298)	24185* (6055)
Finland	-485 (1409)	-3989** (1651)	-3169*** (1835)	-3145*** (1839)	-1542 (1599)	-3528*** (2056)	-3016 (1898)	-3016 (1898)	-5281** (2405)	-1534 (3192)
Germany	30802 (19740)	35910*** (19493)	19210* (3546)	19174* (3583)	29551 (19756)	37874** (19686)	20168* (3790)	20168* (3790)	25095 (19798)	41996** (21446)
Greece	-4121* (1420)	-729 (1648)	3751 (5958)	3728 (5960)	-5428* (1683)	-626 (1777)	3621 (6006)	3621 (6006)	-9865* (2571)	-2912 (2174)
Ireland	1666 (6936)	6924 (6178)	2706 (1745)	2703 (1746)	-657 (7053)	6038 (6142)	2827 (1784)	2827 (1784)	7480 (7845)	6,290 (6775)
Italy	1681 (3073)	7755** (3099)	8146* (2380)	8151* (2374)	745 (3127)	8431* (3115)	8348* (1946)	8348* (1945)	3075 (3557)	10029* (3357)
Netherlands	21892* (7534)	20594* (7007)	5778** (2951)	5721** (2953)	20896* (7543)	19703* (7057)	5712*** (3092)	5712*** (3092)	16685* (7815)	15870** (8077)
Portugal	-554 (1651)	2708 (1942)	1963*** (1125)	1957*** (1127)	-1231 (1984)	3432 (2235)	2223** (1069)	2223** (1069)	-4287 (2904)	2703 (2582)
Spain	15379* (3623)	12683* (3423)	4450** (2014)	4445** (2016)	13931* (3851)	11540* (3495)	4589** (1982)	4589** (1982)	9130** (4743)	9175* (3357)

Source: Authors' calculations.

Notes: (1) White-type robust standard errors are given in parenthesis. * denotes statistical significance at the one percent level, ** at the five percent level, and *** at the ten percent level.

(2) The estimation procedure uses differenced data as in Arellano and Bond (1991).

(3) The estimation procedure uses orthogonal deviations as in Arellano and Bond (1995).

Finally, we proceed to investigate whether EMU led to diversion of FDI activity from the three countries that opted out from adopting the euro as their national currency. In Table 6 we include results on country specific dummies for Denmark, Sweden, and the UK. These results show that there is no evidence for diversion. On the contrary, we find a positive and significant effect of EMU on inward FDI flows to Denmark and the UK and no significant effect for Sweden. The lack of evidence for diversion for Denmark and the UK squares well with the findings of Schiavo (2007).

Table 6. Empirical Estimates of EMU effect on FDI inflows for non-Eurozone EU countries

	Dependent Variable: FDI Inflows									
	Sample Period: 1973-2006				Sample Period: 1979-2006				Sample Period: 1990-2006	
	PLS Estimates	Fixed Effects	Dynamic Estimates ⁽²⁾	Dynamic Estimates ⁽³⁾	PLS Estimates	Fixed Effects	Dynamic Estimates ⁽²⁾	Dynamic Estimates ⁽³⁾	PLS Estimates	Fixed Effects
Denmark	1818 (3928)	8257** (4025)	4337** (2104)	4331** (2103)	944 (3909)	7908** (4034)	4294** (1982)	4294** (1982)	-2035 (3868)	6154 (4145)
Sweden	13649** (6532)	6816 (6863)	2386 (2364)	2402 (2377)	13080*** (6721)	7880 (7404)	2558 (1996)	2558 (1996)	11606 (7630)	8216 (8509)
UK	61064* (17565)	51221* (18053)	23991* (3476)	23952* (3490)	59768 (17590)	48821* (18259)	23534* (3530)	23534* (3530)	56640* (17658)	41964** (19352)

Source: Authors' calculations.

Notes: (1) White-type robust standard errors are given in parenthesis. * denotes statistical significance at the one percent level, ** at the five percent level, and *** at the ten percent level.

(2) The estimation procedure uses differenced data as in Arellano and Bond (1991).

(3) The estimation procedure uses orthogonal deviations as in Arellano and Bond (1995).

Conclusions

This paper examines the EMU effect on inward FDI flows to the twelve countries that adopted the euro as their national currency. In the analysis, we use panel data for 22 OECD countries that cover the period 1973-2006. Our basic model of the determinants of inward FDI flows was estimated using a number of different estimation techniques including dynamic panel estimation.

The empirical results suggest the following: First, the overall EMU effect on FDI flows into the Eurozone is positive and statistically significant. This result is robust to different estimation techniques and sample periods. According to our estimates, the adoption of the euro resulted in an average annual increase in inward FDI flows to the Eurozone that is between 11.7 and 22.9 percent of the average annual inward FDI flows to the Eurozone from the 1990-98 period. Second, our results indicate that there is no diversion of FDI activity from the three countries that opted out from adopting the euro as their national currency. Finally, our results suggest that the EMU effect on FDI inflows differs across Eurozone countries. Specifically, they show that the EMU had (a) a positive and significant effect mostly on inward FDI flows to Eurozone countries that are in the centre of the monetary union and (b) a negative or mixed effect on countries that are in the periphery of it.

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GREEN WAY-OUT FROM DEPRESSION: INSIGHTS FROM THE EU

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Abstract

Global economic crisis, along with domestic structural inefficiencies, weakens growth perspectives for the less developed and/or the financially weaker economies of Europe. On the other hand, the relevant literature claims that technological innovations, especially with respect to the ecological aspects of products and processes, could be an effective way-out. The present paper contributes to this discussion in two ways: first, we discuss relevant case studies of certain multinationals. Second, we proceed with a panel data analysis of recent intra-EU data, estimating the effect of environmental expenditures and investments on exporting activity, considering also “gravity”- explanatory variables. We conclude that “green”- investments seem to have a positive effect, both, in the micro- as well as macro-dimension, while expenditures could affect extroversion and competitiveness adversely.

JEL Classification: Q56, F14

Keywords: green economy, southern Europe, competitiveness

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The paper was presented at the plenary session of the 2012 annual ASECU Conference in Rzeszow. The initial title was: “Green Entrepreneurship & Green Economy as a Way-Out: Insights from the EU”.

1. Introduction

The entrance of the US economy into recession in late 2007 interrupted the twenty-year period of stability and prosperity of “Great Moderation” (Castree, 2009; Dagum, 2010; Kurth, 2010). The US credit crisis spread rapidly in many developed countries (butterfly effect) and the subsequent recession has become so deep and prolonged as to be considered a new major crisis similar to the Great Depression of 1930 (Castree, 2009; Kurth, 2010). Indicative of the inability of current theoretical approaches to provide a suitable policy, was the possibility of payments suspension that the United States faced in July 2011 as well as the risk of a domino debt effect in many member states that the eurozone still has to deal with. The problem becomes more complicated when we take into consideration that it has coincided with severe environmental and social problems (Castree, 2009).

In the following paragraphs we explore whether a green economy (via a new green technological revolution) could be sufficient to overcome the downswing phase of the current Kondratieff wave and to put the global economy on a growth trajectory. More specifically, could it help the European economies that have been hardest hit?

The rest of the paper is structured as follows: the next section provides a short theoretical and empirical literature review. Section 3 provides empirical investigation in the micro-dimension through specific case studies of certain multinational companies. Section 4 implements a cross-section test using a gravity model to provide a macro-dimension empirical investigation. Section 5 offers our conclusions.

2. Literature review

The present global economic crisis is systemic as well as multidimensional, for a series of reasons that will be presented below.

There are opposing views in the academic community regarding the nature of the current crisis, which has led to declining profits, growth and employment on a world-wide scale, exacerbating socio-economic inequalities at the same time (Gills, 2010). Heterodox tradition argues that the capitalist economy has inherent imbalance trends tending to no equilibrium. Hence, crises are generated by the system itself and economic fluctuations are structural and long-term (thus accepting the existence of long waves), in contrast to the neoclassical view of normal recession incidents of the business cycle (Zarotiadis and Michalena, 2010; Gills, 2010). According to Gills (2010) the causes of the current problems must be searched for in the footsteps of neo-liberalism. Adopted in 1970, it temporarily led the way out of the Great Inflation but apparently created a chain reaction within capitalism leading to the present systemic crisis. Otherwise problems would be solved through existing policy tools, confirming that neoliberal capitalism has a relatively smooth operation (which is not observed) demonstrating the failure of the orthodox school, who believed that the recipe for the control of business cycles had been found (Kotz, 2009). Moreover, the current crisis differs from previous ones in to its multidimensional nature. Not only do we have financial issues but also serious environmental and social ones that have emerged since the beginning of 21st century.

The gradual rise of crude oil prices (that reached nearly \$150 per barrel in July 2008) was due to the reduction of oil production during 2002-2003 (because of the war in Iraq), increasing demand for fossil fuels from emerging countries and the absence of reliable data regarding reserves' adequacy (Kesicki, 2010; Maugeri, 2009). It is obvious that developed countries, which entirely depend on oil, were -and will continue to be- more sensitive to any energy crisis. There was a direct effect on the prices of staple food through increased fertilizer prices, the cost of agricultural machinery and transport costs (Chand, 2008). Furthermore, we should include the conversion of arable production to biofuels since 2007, the change of dietary preferences of emerging countries and climate change in areas that were the main producers of staple foods - leading to the 2007 food crisis (prolonged drought in Russia and floods in Australia) (Biggs et al., 2011; Chand, 2008; Hanjra and Qureshi, 2010). At the same time there is a common consensus that global warming is a phenomenon that is evolving at dramatic speed owing to a rapid increase in energy requirements and harmful emissions (Schumacher, 2007). In addition, according to a WHO survey of 2004, 1.2 billion people had no access to cheap and clean water – exacerbating sanitation and hygiene problems as a result of water scarcity (Moe and Rheingans, 2006). All the above disproportionately affected the lower strata of the global population and intensified the problem of famine. Bearing in mind the relevant literature, each of the earlier long waves seems to have been launched by the adoption of a new technological revolution which according to Zarotiadis (2012:41) “...is the most fair and efficient solution to any crisis” (Ayres, 2006; Eklund, 1980; Gore, 2010; Maddison, 2007). Combined with the obvious need for an alternative form of development that will not be at the expense of the environment, it is not surprising that the green economy has come to the fore. The question is whether we are on the threshold of a new, fifth Kondratieff wave that will be stimulated by environmental technology and will be able to rescue the fragile global economy (Palmberg and Nikulainen, 2010).

UNEP (2011:16) defined the green economy as the economic system that aims at improving the welfare of individuals and social justice, and is combined with the simultaneous reduction of both environmental risks and ecological inadequacies. Nevertheless, the concept does not enjoy wide acceptance by economists and environmentalists, probably owing to the complexity of the term. It is frequently confused with sustainable development, which is a broader term that includes the three pillars of (sustainable) development: economic, social and environmental (Fulai, 2011; Khor, 2011). In practice, it is the economic strategy that will help to reach sustainable development (UNEP, 2011:16-19). However, there will not be a simultaneous transition process towards a green economy for all countries. There will be variations among them, taking into account the specificities of their natural environment and environmental problems, human resources and level of development (McLauchlan and Mehrubeoglu, 2010; OECD, 2010:22).

Environmental issues have attracted worldwide attention since the 1970s energy crisis, and many countries have adopted environmental practices relating to the characteristics of products and production processes (Esty and Geradin, 1998). Despite research progress on both theoretical and empirical levels since 1990, the empirical literature in the micro- and macro-dimension is currently inconclusive as to whether 'it pays to be green' (Horváthová, 2010; López-Gamero et al., 2009).

The traditional view is that environmental legislation (which has been promoted to deal with environmental problems and has become stricter over the years) is intended to correct the negative externalities caused by pollution (Testa et al., 2011). However, businesses face additional costs that lead to reduced competitiveness and decreased market shares (Costantini and Mazzanti 2012; Esty and Geradin, 1998; Iraldo et al., 2011; Horváthová, 2010; Testa et al., 2011). Palmer et al. (1995) in their neoclassical model showed that stricter environmental legislation is an additional cost that weakens companies' financial operations (Eiadat et al., 2008; Testa et al., 2011). On the other hand, it has been argued that improved environmental activity (through legislation) is able to promote competitive business advantage by more efficient processes, improved productivity and opportunities in new emerging markets (Iraldo et al., 2011; Testa et al., 2011). According to Porter and van der Linde (1995), more flexible but rigorous environmental legislation will increase the incentive to adopt innovations in two directions: firstly, towards product innovation (as a finished product or as an input) in order to differentiate it from others. Eco-labeling, which first appeared in the late 1970s allows businesses to acquaint consumers with their environmentally friendly products (D'Souza et al., 2006). Meanwhile, process innovation regulates the manner in which goods are manufactured. Thus businesses adopt environmental management systems and communicate them through international certification standards such as ISO 14001 and EMAS (Sinding, 2001). Hitherto the empirical literature has been divided (Iraldo et al., 2011). Half of the studies display a positive relationship while the rest of them a negative or no relationship between environmental practices and business economic performance (Eiadat et al., 2008).

At the macro level an indicative measure of competitiveness is the size of exports, assuming that an open economy strengthens its competitiveness when its share of exports (imports) is increasing (decreasing) (Kemp and Horbach, 2008; Taner et al., 2000). Among several econometric studies, gravity models are more often used to check the effect that stricter environmental legislation (as a new variable in the classical gravity model) may have on bilateral trade between countries. Xu (2000) could not confirm that stricter environmental legislation reduces total bilateral exports of environmentally sensitive goods among 34 countries. Jug and Mirza (2005) unlike the majority of previous models, decided to express the stringent environmental variable through the new Eurostat indicator of current environmental protection expenditure. Through a gravity model among 12 importing and 19 exporting European countries

for the period 1996-1999, they concluded that the environmental costs entailed negative trade flows. Cagatay and Mihci (2006) constructed an index that indicates the level of diversification of environmental stringency between 23 developed and 9 developing countries for 2000 and concluded that environmental rigor discourages exports. Caporale et al., (2010) also used current environmental expenditure data from Eurostat. Their gravity model for multilateral trade relations between Romania and 20 European trading partners suggested that in most cases the environmental stringency variable had a positive and statistically significant effect on trade. Finally, Costantini and Mazzanti (2012) in a sample of 14 exporting and 145 importing countries for the period 1996-2007, examined each country's environmental policies (such as environmental taxation and Environmental Certification Standards) to find that they did not burden exports while in some cases promoted them.

3. Micro-investigations

The following empirical investigation will be carried out by the method of case studies. Environmental policy reporting is quite a recent aspect of corporate strategy, thus there is difficulty in finding available data from businesses¹. Meanwhile, there is controversy in the existing literature owing to a long list of practices that have been used and variables that have been examined, which leads to different results (Horváthová, 2010). In order to avoid these problems we will adopt this method in examining four multinationals: Fujitsu, IBM, Sharp and Toyota. Our primary goal is to identify the reasons that initially motivated them to adopt environmentally friendly practices in processes and/ or products. Moreover, since they apply environmental accounting we can have a comparative evaluation between environmental costs and benefits in order to examine which view in the existing literature prevails.

Fujitsu, Sharp and Toyota are Japanese companies whereas IBM is an American multinational. They were all founded in the beginning of the 20th century and are successful in their respective fields of operation. Through their environmental reports it has been observed that in general their interest in environmental protection started in the 1990s. As stated, their common objective was the fulfillment of their 'corporate social responsibility'. At the same time, they admit their desire to strengthen their competitive advantage, enhance their market share and promote their economic prosperity. According to them, all the above can be achieved through their preoccupation with environmental practices.

1. Data were collected from multinationals' sustainable and environmental reports respectively, from the following websites:
<http://www.fujitsu.com/global/about/environment/communication/report/> (last accessed 23 Nov 2011);
<http://www.ibm.com/ibm/environment/annual/> (last accessed 12 Nov 2011); http://sharp-world.com/corporate/eco/csr_report/backnumber.html (last accessed 19 Nov 2011);
<http://www.toyota-global.com/sustainability/report/archive/> (last accessed 14 Nov 2011);
http://sharp-world.com/corporate/eco/csr_report/backnumber.html (last accessed 19 Nov 2011);
<http://www.toyota-global.com/sustainability/report/archive/> (last accessed 14 Nov 2011).

Thus they have restructured their production processes as a means to use resources efficiently (since nowadays there is constant increase in the prices of raw materials) and to alleviate as much as they can their impact on the environment. Otherwise they would be dealing with more fines because of stricter environmental legislation, which seems to confirm the 'Porter Hypothesis'. Thus, all multinationals have adopted the global ISO 14001 environmental management system to harmonize with various environmental laws of foreign markets and gain easier access to them. At the same time, they are interested in environmentally friendly products and their certification (e.g. ENERGY STAR) in order to inform consumers as well as to sell them in any market where certification is needed.

Concerning the environmental accounting of the multinationals in question, they appear to have relatively uniform positive effects. Environmental costs are quite similarly assessed while there is diversity in the calculation of benefits, mostly in the indirect ones (whose importance has been realized). As far as the economic impact of the specific multinationals is concerned, we can deduce that the environmental costs do not seem to significantly burden them as an additional cost, in contrast to the traditional view. Accordingly, the resulting benefits (direct and indirect) are difficult to estimate and do not appear to make a particular contribution because in times of crisis businesses were unable to maintain their momentum. Instead they produced more environmentally sensitive products, probably as a way to boost their profile and gain the 'first mover advantage'. This is clearly demonstrated in the case of Toyota (by the production of the hybrid Prius) and of Sharp (by the production of photovoltaic panels). Their involvement with innovative green products provided them with the required expertise that made them leaders in the new emerging markets.

Nevertheless, the orientation of business to green innovation in both products and production processes is relatively recent, thus medium and long term results are not yet available. Therefore, we cannot draw definitive conclusions because of the limited amount of information, since the data are mostly ten years old. Future, further research through an appropriate econometric investigation would be required, taking into account a wider range of data.

4. Macro-empirical analysis

In the following part, we will try to examine, through inductive reasoning, whether the transition to a green economy can have positive effects on nations' competitiveness. Thus we have focused on the European Union, which has been the leader - to a degree - in the design and adoption of stringent environmental policies (Costantini and Mazzanti, 2012). Since the southern member-states have been worst hit by the current debt crisis, we thought it would be of greatest interest to focus on them. The issue of 'environment and international trade' is relatively recent, thus specializing in the core of the European Union, the Eurozone, is even rarer. For this reason, we will use the current environmental expenditure and investment data both for public and private sectors from Eurostat, which do not seem to have been widely used before.

We will adopt the method of gravity models because they are eminently applicable to the empirical investigation of international trade and are thought to be the most successful econometric tools, without losing the geographic dimension (Cagatay and Mihci, 2006; Caporale et al., 2010; Costantini and Mazzanti, 2012). Applied initially by Tinbergen, Pöyhönen and Linneman, who pioneered the idea of analyzing international trade flows by adopting the concept of Newton's law of gravity (science of physics), they were further developed by Bergstrand as well as Helpman and Krugman (Cagatay and Mihci, 2006; Caporale et al., 2010; Eita, 2008; Xu, 2000). Gravity models are also used to test the relationship between environmental regulation and trade flows and the equation has the following form:

$$(1) \quad T_{ijt} = \beta_0 + \beta_1 \text{GDP}_{it} + \beta_2 \text{GDP}_{jt} + \beta_3 N_{it} + \beta_4 N_{jt} + \beta_5 d_{ij} + \beta_6 S_{ijt} + \beta_7 X' + u_{ijt}$$

where T_{ijt} is the dependent variable that represents trade flows between countries i and j in time t (they can be bilateral, exports or imports), while the explanatory variables are GDP_{it} and GDP_{jt} (GDP for countries i and j respectively at time t), respective populations N_{it} and N_{jt} for countries i and j at time t , d_{ij} is distance between countries i and j and is independent of time, X' is a vector that represents other control variables which may differ between countries and influence trade flows, β_0 is the constant variable, u_{ijt} is the error term and $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ are the coefficients of the model (Caporale et al., 2010; Jug and Mizra, 2005).

4.1. Models and the dataset

Our main goal is to examine the consequences of environmental policies on trade flows, by analyzing bilateral trade relations among five northern (Germany, France, Netherlands, Finland, Belgium) - henceforth N - and six southern (Greece, Italy, Spain, Portugal) and eastern (Bulgaria, Romania) European countries - henceforth S - for the period 1997 to 2007. Their selection was based on data availability and their economies' size depending on European GDP ranking.

Before proceeding, it must be noted that there will be two different dependent variables: net exports (henceforth NX) between N and S and exports (henceforth X) between N and S. Considering that NX, in general show the country's position in bilateral trade flows while X reveal the openness of domestic firms, it is likely that the trade balance will remain unchanged although firms become more competitive.

The two econometric regression equations are:

$$(2) \quad \left(\frac{NX_{S,N}}{GDP_S} \right)_t = a_0 + a_1 (Y_S - Y_N)_t + a_2 \left(\frac{\frac{ECE_S^{Pu}}{GDP_S}}{\frac{ECE_N^{Pu}}{GDP_N}} \right)_t + a_3 \left(\frac{\frac{ECE_S^{Pr}}{GDP_S}}{\frac{ECE_N^{Pr}}{GDP_N}} \right)_t + a_4 \left(\frac{\frac{EI_S^{Pu}}{GDP_S}}{\frac{EI_N^{Pu}}{GDP_N}} \right)_t + a_5 (ISO_S - ISO_N)_t + u_{SNT}$$

$$\begin{aligned}
(3) \left(\frac{X_{S,N}}{GDP_S} \right)_t &= a_0 + a_1 (y_S - y_N)_t + a_2 DIST_{SN} + a_3 \left(\frac{EI_S^{Pu}}{GDP_S} \right)_t + a_4 \left(\frac{EI_S^{Pu}}{GDP_S} \right)_{t-1} + \\
& a_5 \left(\frac{ECE_S^{Pu}}{GDP_S} \right)_{t-1} + a_6 \left(\frac{ECE_S^{Pr}}{GDP_S} \right)_{t-1} + a_7 (ISO_S - ISO_N)_t + a_8 (ISO_S - ISO_N)_{t-1} + \\
& a_9 D_{IT} + a_{10} D_{SP} + a_{11} D_P + a_{12} D_{BU} + a_{13} D_{RO} + a_{14} D_{FR} + a_{15} D_{NL} + \\
& a_{16} D_{FI} + a_{17} D_{AU} + u_{Snt}
\end{aligned}$$

where $\left(\frac{NX_{S,N}}{GDP_S} \right)_t$ denotes net exports from country S towards country N in year t, expressed as a percentage of GDP while $\left(\frac{X_{S,N}}{GDP_S} \right)_t$ shows exports from S towards N in year t, expressed as a percentage of GDP (database: COMTRADE²; World Bank³). Since GDP per capita is a more objective indicator that takes into account the country's population, we used $(y_S - y_N)_t$ which is the difference of GDP per capita between S and N in year t (database: Eurostat⁴). Because there are no available data for private environmental investment, we tried to include them indirectly through the variable $(ISO_S - ISO_N)_t$, which shows the difference in change ratios of international environmental management systems between S and N in year t. (database: ISO surveys⁵). We also included it lagged by one year, assuming that their impact takes time to occur. The next independent variable $DIST_{SN}$, shows the geographical distance in kilometers between the capitals of N and S (database: Google Maps).

To denote environmental stringency we used $\left(\frac{ECE_S^{Pu}}{GDP_S} \right)_t$, $\left(\frac{ECE_S^{Pr}}{GDP_S} \right)_t$, which are the ratios of current environmental expenditures of public and private sector respectively (as a percentage of GDP) in S to N in year t (database: Eurostat⁶).

2. <http://comtrade.un.org/db/mr/daYearsResults.aspx?y=all> (last accessed 12 Dec 2011).
3. <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD?page=3> (last accessed 13 Dec 2011); <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD?page=2> (last accessed 13 Dec 2011); <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD?page=1> (last accessed 13 Dec 2011); <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD> (last accessed 13 Dec 2011).
4. http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database (last accessed 14 Dec 2011).
5. ISO survey, 2000, http://www.tc207.org/PDF/News_Articles/2000/2000_7.pdf (last accessed 28 Dec 2011); ISO survey, 2004, <http://www.iso.org/iso/survey2004.pdf> (last accessed 28 Dec 2011); ISO survey, 2006, <http://www.environment.gov.au/soe/2006/publications/drs/pubs/590/set/hs59iso-survey12thcycle.pdf> (last accessed 28 Dec 2011); ISO survey, 2008, http://www.accredia.it/UploadDocs/488_survey2008.pdf (last accessed 28 Dec 2011).
6. Current expenditure for environmental protection includes both internal current expenditure and fees/purchases. Internal (in-house) current expenditure includes the use of energy, material, maintenance and own personnel for measures taken by a sector to protect the environment. http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database (last accessed 14 Dec 2011).

Moreover, $\left(\frac{EI_S^{Pu}}{GDP_S} \frac{EI_N^{Pu}}{GDP_N}\right)_t$ is the ratio of environmental investment as a percentage of

GDP of the public sector in S to N in year t (database: Eurostat⁷). For the same reason (as mentioned above), environmental variables entered in our model lagged by one year. Finally, in order to take into account countries' general characteristics, we included which are dummies for each country respectively and not every combination of countries.

4.2. Empirical results

In order to estimate the gravity model (2), we implemented the fixed effects (according to the Hausman test). On the other hand, we could not use this technique in its typical form to estimate equation (3) because we included the distance variable that remains unchanged for each pair of countries. Thus, we chose to use dummies. We estimated both regression models with the weighted Generalized Least Squares method in order to deal with the problem of heteroskedasticity. Table 1 summarizes the results for two different regressions and includes the estimated coefficients and their calculated t-statistics (in parentheses).

In both equations, the difference in GDP per capita has a positive and statistically significant effect, confirming similar findings in modern empirical theory (contrary to the neoclassical theory of trade). That supports that the intensity of trade flows is sometimes larger among countries which have a similar level of prosperity. Moreover, distance has the expected (by the gravity model theory) negative and statistically significant effect on exports.

Next, we focus on environmental variables. In equation (2), current environmental expenditures both in private and public sectors are not statistically significant. On the contrary, in equation (3) the same variables lagged by one year, have a negative and statistically significant effect on X. This may be justified, because high environmental costs are incurred to correct damage resulting from lack of appropriate environmental policy. As a result there is a need for additional environmental costs that obviously further burden state budgets and firms. This should not intimidate us. Conversely, one might say that it demonstrates the need for a proper environmental policy that will lead to reduction in expenditure.

Likewise, we do not have distinct results as far as environmental investments of the public sector are concerned. In spite of having a positive and statistically significant impact on NX, the same is not confirmed for X. There is a rather negative impact when the one year-time lag of the variable is included. Since the shift to environmental issues (with strict policies and more investments) is relatively recent, there may be short-term results that cannot be easily identified within our models. For example, it would be useful perhaps to use more time lags, which is difficult because of the limited time horizon of our data

7. Investment expenditure includes all outlays in a given year (purchases and own-account production) for machinery, equipment and land used for environmental protection purposes. http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database (last accessed 14 Dec 2011).

Finally, the results from the implementation of environmental management systems (ISO) and the lagged ISO seem to vindicate us since they have a statistically significant effect both in NX and X.

Table 1. Estimation results

Variables	Regression (2)	Regression (3)
a_0	-0.003082 (-2.933548) ***	0.037032 (48.34934) ***
$(y_S - y_N)_t$	2.23E-07 (3.353034) ***	2.51E-07 (9.354016) ***
$DIST_{SN}$		-4.56E-06 (-24.74868) ***
$\left(\frac{ECE_S^{Pu}}{GDP_S}\right)$ $\left(\frac{ECE_N^{Pu}}{GDP_N}\right)_t$	-0.000259 (-1.509549)	
$\left(\frac{ECE_S^{Pu}}{GDP_S}\right)$ $\left(\frac{ECE_N^{Pu}}{GDP_N}\right)_{t-1}$		-0.000427 (-2.368970) **
$\left(\frac{ECE_S^{Pr}}{GDP_S}\right)$ $\left(\frac{ECE_N^{Pr}}{GDP_N}\right)_t$	-7.72E-07 (-0.005008)	
$\left(\frac{ECE_S^{Pr}}{GDP_S}\right)$ $\left(\frac{ECE_N^{Pr}}{GDP_N}\right)_{t-1}$		-0.000363 (-2.285744) **
$\left(\frac{EI_S^{Pu}}{GDP_S}\right)$ $\left(\frac{EI_N^{Pu}}{GDP_N}\right)_t$	3.61E-05 (2.237814) **	-2.65E-05 (-2.778902)
$\left(\frac{EI_S^{Pu}}{GDP_S}\right)$ $\left(\frac{EI_N^{Pu}}{GDP_N}\right)_{t-1}$		-1.14E-05 (-1.628592) ***
$(ISO_S - ISO_N)_t$	0.000168 (4.233916) ***	0.000345 (2.877118) ***
$(ISO_S - ISO_N)_{t-1}$		0.000205 (7.977332) ***
R-squared	0.940658	0.957916

5. Conclusions

The aim of this paper was to empirically contribute to the discussion whether the transformation to a green economy will have a positive impact in promoting firms' profitability and countries' competitiveness in the current era of the new imbalance in the capitalist system.

Firstly, the investigation of four multinationals through the method of case studies, has not reached clear conclusions. It is not confirmed that the adoption of green products (both in production process and products) either promotes and boosts multinationals' profitability in time of crises or burdens them as an additional cost (as claimed by neoclassical theory). Of course, enterprises' occupation with environmental issues is relatively recent, thus medium- and long-term results do not exist yet. However, multinationals seem to increasingly declare their interest in becoming "green". Because of their new environmental profile they will gain larger market shares and "the first mover advantage", which will give them the leading position in newly-created markets as well. Therefore, we could say that the four multinationals care for indirect benefits, though they cannot fully calculate them.

The empirical testing of the two econometric models that followed yielded a number of interesting observations which certainly deserve further investigation and confirmation. However, there are indications that the adoption of environmental practices can contribute to the openness of a country's economy, contrary to the traditional view. In future research, a microeconomic econometric investigation would be quite useful. At the same time, it would be beneficial to broaden the sample both of countries and control variables.

In conclusion, a comprehensive evaluation of the results suggests positive consequences from the shift to green economies, although the results are not fully confirmed. Building a green economy will require strong political commitment and proper policy coordination. In any case, it is obvious that the era of neoliberal capitalism seems to be coming to an end and there will need to be a new development model, more environmentally friendly.

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EVALUATING ‘VARIETIES OF CAPITALISM’
BY THE EXTENT AND NATURE OF THE INFORMAL ECONOMY:
THE CASE OF SOUTH-EASTERN EUROPE

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Abstract

‘Varieties of capitalism’ have been conventionally delineated by the varying types of formal economy that exist. Given that the vast majority of employment globally is in the informal economy, this paper offers a new analytical framework which delineates varieties of capitalism by their degree of informalization and the character of the informal economy. Examining South East Europe through this lens using evidence from a 2007 Eurobarometer survey, the finding is that this region is a ‘quasi-formal market economy’ and its informal economy composed largely of quasi-formal employment relations, albeit with significant variations in the degree and nature of the informal economy across different countries, sectors and population groups.

JEL Classification: E26, O17

Keywords: Informal Economy, Varieties of Capitalism, Employment Relations, South-East Europe

Introduction

Until now, varieties of capitalism (VoC) have been largely delineated by the type of formal economy that exists, such as the Liberal Market Economies (LMEs) model often typified by the United Kingdom and the United States, the Coordinated Market Economies (CMEs) model typified by Scandinavian countries and Japan (Hall and Soskice, 2001) as well as other variants such as Mediterranean capitalism (Whitley, 1999) or South European capitalism (Amable, 2003). The starting point of this paper is that such analyses of the varieties of capitalism fail to recognise that on a global level the vast majority of employment continues to be in the informal economy. Indeed, the OECD reports that of a global work force of three billion, some 1.8 billion (nearly two-thirds) work in the informal economy (Jütting and Laiglesia, 2009). Given this, the argument of this paper is that varieties of capitalism can no longer be classified purely by the type of formal economy that exists, since only a minority of global employment is in this realm. The aim of this paper, therefore, is to propose an analytical framework for understanding varieties of capitalism that focuses more upon the informal economy and delineates economies by the degree of informalization and type of informal economy that prevails. This will then be applied to understanding the varieties of capitalism in South East Europe.

To commence, therefore, this paper will first briefly review the literature on varieties of capitalism followed by the literature on the informal economy and then propose an analytical framework for understanding varieties of capitalism based on the extent of informalization and type of informal economy that exists. In the second section of the paper, we then apply this to South East Europe so as to begin to map the variety of capitalism in this region as well as how it differs across countries, sectors and socio-demographic groups. The outcome in the concluding section will be to summarise the variety of capitalism in South-East Europe as a 'quasi-formal market economy' and the type of informality as characterised by 'quasi-formal employment', and to call for the broader application of this analytical framework to a wider range of countries and regions so as to begin mapping the different varieties of capitalism in other spaces of the global economy.

Before commencing however, the informal economy needs to be clearly defined. Reviewing the voluminous literature on what is variously called the 'underground', 'cash-in-hand', 'undeclared', 'black', 'hidden' or 'shadow' economy/sector/work, it is common to define the informal economy in terms of what is absent from or insufficient about it relative to the formal economy, and there exists a strong consensus over what is absent or missing. The informal economy is widely defined as paid work that is not declared to the state for tax, social security and labour force purposes when it should be declared, but which is legal in all other respects (European Commission, 1998, 2007; Renooy *et al.*, 2004; Sepulveda and Syrett, 2007; Williams 2006; Williams and Windebank, 1998). If additional absences (i.e., differences) exist, then the activity is

not defined as the informal economy. For example, if the good and/or service is also illegal (e.g., drug-trafficking), it is ‘criminal’ activity, while if it is unpaid, it is part of the unpaid informal sphere.

Varieties of capitalism and the informal sector

It is now widely assumed that capitalism is hegemonic. A process of commodification, whereby ‘goods and services ... are produced by capitalist firms for a profit under conditions of market exchange’ (Scott, 2001: 12), is widely assumed to have occurred across all spheres of everyday life and to be inevitable and irreversible (Comelieau, 2002; Castree *et al.*, 2004; De Soto, 2001; Fulcher, 2004; Gudeman, 2001; Harvey, 2000; Rifkin, 2000; Ruskola, 2005). On the one hand, this is argued by those of a neo-liberal persuasion such as De Soto (2001: 1) who asserts that ‘Capitalism stands alone as the only feasible way rationally to organize a modern economy’. On the other hand, it is also argued by those opposed to capitalism’s continuing encroachment, owing to its negative impacts, but who nevertheless believe that its on-going permeation is irreversible. As Fulcher (2004: 127) asserts, ‘The search for an alternative to capitalism is fruitless in a world where capitalism has become utterly dominant’. Similarly, Castree *et al.* (2004: 16-17) contend, ‘that this is a predominantly capitalist world seems to us indisputable... this system of production arguably now has few, if any, serious economic rivals’.

Based on this assumption about capitalist hegemony, which is itself open to question (Gibson-Graham, 2006; Williams, 2003; Williams and Windebank, 2003), there has emerged a ‘varieties of capitalism’ (VoC) approach that demonstrates how it takes on different forms in different places. To delineate the varieties of capitalism that exist, the focus has been upon delineating the different varieties of formal economy. The outcome has been the emergence of different varieties of capitalism, such as the Liberal Market Economies (LMEs) model often typified by the United Kingdom and the United States, the Coordinated Market Economies (CMEs) model typified by Scandinavian countries and Japan (Hall and Soskice, 2001) and other variants such as Mediterranean capitalism (Whitley, 1999) or South European capitalism (Amable, 2003). Little, if any, attention has been paid to the informal economy, not least because the assumption is that it represents a minor residue which is steadily disappearing from view. There are, however, a few notable exceptions (Amable, 2003; Dibben and Williams, 2012; Frynas and Wood, 2006; Whitley, 1999). Whitley (1999) examines ‘emergent capitalisms’ from the perspective of economic transition within Eastern Europe, and Frynas and Wood (2006) refer to ‘segmented systems’ within East Africa, explaining how institutional relationships can be characterised by two systems: one that is capitalized and export orientated, and a diverse non-export orientated sector comprised of smaller enterprises and the informal sector. Dibben and Williams (2012) in a case study of Mozambique, meanwhile, introduce the idea of a new variety of capitalism,

which they term ‘Informally Dominated Market Economies’ that more fully takes into account that in some markets the informal economy is dominant.

Until now, however, little thought has been given to how to more fully take into account the informal sector in market economies where it is not the dominant work arrangement but is nevertheless a prominent aspect. Nor has much thought been given to how one can capture the diverse array of types of informal economic activity. To understand how this might be achieved, it is necessary to turn to the burgeoning literature on the informal economy.

For much of the previous century, the widespread belief was that the formal market economy was stretching out its tentacles to colonise every nook and cranny of the modern world. In this modernisation perspective, or what has been variously termed a “dual economies” or “formalization” view (Chen 2006; Fernandez-Kelly 2006; Williams 2006, 2010), the formal and informal markets are viewed as separate discrete realms, with the informal sphere viewed as a residue that is steadily disappearing from view (Boeke 1942; Geertz 1963; Lewis 1959); as ‘the mere vestige of a disappearing past [or as] transitory or provisional’ (Latouche, 1993: 49). Seen in this manner, therefore, there is little reason to take into account the informal economy when discussing varieties of capitalism. It is merely a residue or remnant of the past that is disappearing. Never is the informal economy portrayed as resilient, ubiquitous, capable of generative growth, or as driving economic change. Nor is it even represented as a component part of a multitude of employment relations existing in the contemporary world.

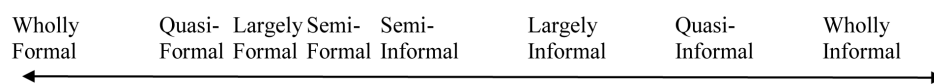
Over the past few decades, however, it has been recognised that the informal economy is not only relatively widespread but also growing relative to the formal economy in many global regions (OECD, 2002; ILO, 2002 a,b; Schneider and Enste, 2002; Schneider, 2008; Jütting and Laiglesia, 2009; Rodgers and Williams, 2009). Indeed, given that a recent OECD report estimates that out of a global working population of some 3 billion, around two-thirds (1.8 billion) work in the informal sector (Jütting and Laiglesia, 2009), the informal sector is far from being a small residual realm. It is the informal economy which is the dominant employment relations system in the contemporary global economy and the formal economy which is a minority practice that is ‘small, dispersed and fragmented’ (Chowdhury, 2007: 49).

Given this, it seems no longer feasible to classify the varieties of capitalism by the type of formal economy since only a minority of global employment is in this sphere. Instead, what is perhaps required is an analytical framework for understanding varieties of capitalism that focuses upon the informal economy, where the vast majority of work in the global economy is located, and delineates economies by their degree of informalization and the character of the informal economy that exists.

To begin moving in this direction, Figure 1 provides an analytical framework for depicting varieties of capitalism by their degree of informalization. This recognises a spectrum of economies from wholly formalized to wholly informalized, with many

varieties in-between. By constructing this as a continuum, the implicit recognition is that one cannot simply temporally sequence economies in some historical queue in which some countries are positioned behind others according to their degree of formalization, as if there is a singular one-dimensional trajectory of economic development throughout the world (Massey, 2005). Instead, there is recognition of difference in trajectories and that countries might move in either direction along this spectrum.

Figure 1. Typology of Economies by their Level of Informalization

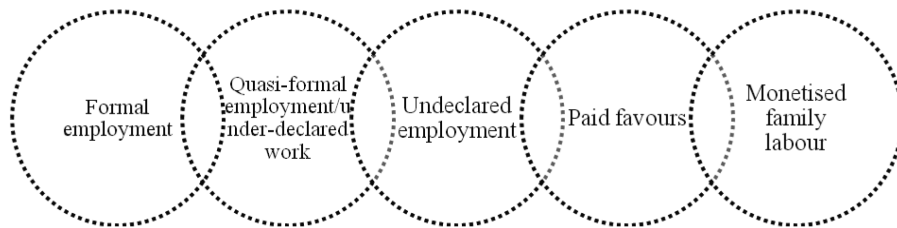


It is not just the degree of informalization, however, that needs to be analysed if the varieties of capitalism are to be more fully understood. It is also the character of the informal sector that needs to be unpacked, just as the conventional models of varieties of capitalism unpack the character of the formal economy in different places.

The problem confronted when seeking to analyse the character of the informal economy, however, is that the informal and formal economies are not always separate and discrete. On the one hand, employment cannot be always neatly allocated to either the formal or informal economy and on the other hand, the formal and informal economies are not always grounded in wholly different economic relations, values and motives (Chowdhury 2007; Escobar 2001; Gibson-Graham 2006; Gupta 1998; Pollard *et al.* 2009; Samers, 2005; Williams and Zelizer 2005; Zelizer, 2011). The result is that the informal economy cannot be analysed in a vacuum as a separate and discrete entity from the formal economy. Instead, the boundaries between the formal and informal economies are often blurred. Indeed, the informal economy is often so inextricably interwoven and entwined with the formal economy that their distinctiveness is hardly sustainable (Williams *et al.*, 2007).

It is therefore insufficient and mistaken to adopt a ‘dual’ economies approach which treats the formal economy as separate from the informal economy. Instead, there is a need to recognise a spectrum of employment relations ranging from purely formal employment relations at one end to purely informal relations at the other with a range of varieties in-between (Williams, 2010). Figure 2 provides a graphic portrayal of such a spectrum from wholly formal to wholly informal employment relations with many hybrid varieties in-between. Overlapping circles with hatched lines are deliberately used to represent each type in order to display how there is a borderless continuum of, rather than separate sets of, employment relationships which overlap and merge into one another. The outcome is a vivid representation of the seamless fluidity of a diverse repertoire of employment relations that exist in economies and of how they are not discrete but seamlessly entwined together (Williams, 2010a; Williams *et al.*, 2011).

Figure 2. A Typology of the Repertoire of Employment Relations in Contemporary Societies



These five broad overlapping sets of employment relations each possess within them a multiplicity of varieties and merge at their borders with other sets of employment relations. Firstly, there is ‘formal employment’, which is paid work that is registered by the state for tax, social security and labour law purposes. This has conventionally been seen as separate from the informal sector. However, it has recently been recognised that ‘quasi-formal employment’ (or what is sometimes called ‘under-declared’ employment) exists whereby formal employees employed by formal employers are often paid two wages, an official declared wage and an additional unofficial undeclared (‘envelope’) wage, thus demonstrating that jobs are not either formal or informal, but can be concurrently both (Karpuskiene, 2007; Sedlenieks, 2003; Williams, 2007; Woolfson, 2007; Žabko and Rajevska, 2007). Indeed, one in 20 formal employees in the EU-27 receive both a declared and undeclared (envelope) wage (Williams, 2009). Different varieties of ‘quasi-formal employment’ exist, ranging from instances where envelope wages are paid as part of the employee’s salary for their regular employment through to envelope wages paid for extra work or overtime (Williams, 2007, 2010b).

Similar diversity exists when one examines undeclared employment, which is defined as paid work that is unregistered by or hidden from, the state for tax, social security and labour law purposes (Williams, 2009). There is firstly a spectrum from wholly undeclared waged employment to undeclared own-account work and within the latter, a further continuum ranging from profit-motivated self-employment conducted either by wholly off-the-books enterprises or formal businesses conducting a portion of their trade off-the-books (thus calling into question the notion that formal and informal enterprises are discrete and further blurring the formal/informal divide), through to own-account work conducted for and by kin living outside the household, friends, neighbours and acquaintances for redistributive and social rationales (here termed ‘paid favours’), with many combinations and overlaps in-between. Finally, there is monetised family labour where paid work takes place within the household that is not declared to the state for tax, social security and labour law purposes when it should be declared. Again, this often blurs into paid favours and other forms of undeclared and under-declared work (e.g., in family businesses).

To differentiate the character of the informal sector in different places, however, it is insufficient to simply analyse the different types of employment relations. It is also necessary to understand the contrasting motives of those engaged in such work. In some contexts, the participation in the informal sector will be due to 'exclusion' from the formal economy. Viewing the informal economy as a direct by-product of a de-regulated open world economy (Castells and Portes 1989; Davis 2006), informal employment relations can be seen to have emerged as part of the shift toward flexible production, used by capital to reduce costs and increase profits in the context of international competition, high levels of state regulation, and organised labour. As such, informal workers are unwilling and unfortunate pawns who engage in such work out of economic necessity as a last resort, owing to their exclusion from the formal sector and in the absence of other opportunities (Castells and Portes, 1989; Gallin, 2001; Portes, 1994; Portes and Roberts, 2005; Sassen, 1997). Often, such work is highly insecure and unstable, involving long hours, poor conditions, no legal or social protection, limited access to credit and very limited bargaining power (ILO, 2002a; Kapoor, 2007).

In other contexts, however, informal workers might be working in the informal economy more out of choice as an 'exit' strategy from the formal economy because of the greater autonomy, flexibility and freedom found in the informal economy (Cross, 2000; Hart, 1973; de Soto, 1989, 2001; Gerxhani 2004, Maloney, 2004; Snyder, 2004). Some of these voluntary informal workers, therefore, can be seen to make a rational economic decision to voluntarily exit the formal economy to avoid the costs, time and effort of formal registration (Cross and Morales, 2007; de Soto, 1989, 2001; Perry and Maloney, 2007; Small Business Council, 2004). Others do so more as social actors and as a lifestyle choice, as portrayed in studies which reveal informality to be a chosen activity which is: conducted largely for closer social relations such as kin, neighbours, friends and acquaintances (Williams, 2006); undertaken more for social and redistributive reasons rather than purely financial gain (Persson and Malmer, 2006; Round and Williams, 2008; Williams, 2004); a resistance practice pursued in response to the corruption and bribes that can be part and parcel of operating in the formal economy (Kudva, 2009; Whitson, 2007), or an alternative realm in which people transform their work identity and/or display their authentic identities such as by establishing 'lifestyle' business ventures (Snyder, 2004). For the character of the informal sector to be understood, therefore, it is not just the different types of informal work that exist in any place that need to be understood but also the reasons for participating in such work.

In sum, the literature on varieties of capitalism has so far largely adopted a narrow focus that distinguishes the different kinds of formal economy found across countries. Here, however, it has been recognised that the vast majority of global employment is in the informal sector. As such, a call has been made to understand the varieties of capitalism more in terms of the level and nature of informalization. To show how this can be achieved, attention now turns towards a case study of South East Europe.

Evaluating varieties of capitalism in South East Europe

Methodology

Until now, most studies of the level and nature of informalization in South East Europe have been small-scale studies of particular nations, particular population groups and/or places, such as studies in Bulgaria (Centre for the Study of Democracy, 2008; Chavdarova, 2002; Loukanova and Bezlov, 2007), Cyprus (Christofides, 2007), Greece (Danopoulos and Znidaric, 2007; Karanitos, 2007; OECD, 2005; Lazaridis and Koumandraki, 2003; Liaropoulos *et al.*, 2008; Lyberaki and Maroukis, 2005; Tatsos, 2001), Romania (Ghinararu, 2007; Kim, 2005; Neef, 2002; Stanculescu, 2002), Serbia and Montenegro (Benovska-Sabkova, 2002) and Slovenia (Ignjatović, 2007).

To evaluate the varieties of capitalism in South-East Europe by the degree of informalization and character of the informal sector, therefore, we here report evidence from one of the few extensive cross-national surveys currently available, namely the 2007 Eurobarometer survey of undeclared work. Here, the focus will be upon its findings in relation to South-East Europe where 4,544 face-to-face interviews were conducted in five South-East European nations, namely Bulgaria, Cyprus, Greece, Romania and Slovenia.

Using the same basic sampling method as Eurobarometer surveys in general, in all countries, a multi-stage random (probability) sampling method was applied. Within each, a number of sampling points were drawn with probability proportional to population size (for total coverage of the country) and to population density according to the Eurostat NUTS II (or equivalent) and the distribution of the resident population in terms of metropolitan, urban and rural areas. In each of the selected sampling units, a starting address was then drawn at random. Further addresses (every *n*th address) were subsequently selected by standard 'random route' procedures from the initial address. In each household, meanwhile, the respondent was drawn at random (following the 'closest birthday rule'). All interviews were conducted face-to-face in people's homes and in the appropriate national language with adults aged 15 years and over. So far as the data collation is concerned, CAPI (Computer assisted personal interview) was used in those countries where this was available.

In all countries, furthermore, a national weighting procedure was employed for data analysis purposes that used marginal and intercellular weighting by comparing the sample with the universe description taken from Eurostat population data and national statistical offices. All results in this paper are based on this weighting procedure. In each country, this weighting process ensures that the gender, age, region and size of locality of the sample were proportionate to the universe.

The face-to-face interview schedule covered a wide array of questions on the extent and nature of the informal sector. Its structure, adopting a gradual approach to discussing more sensitive issues, firstly asked respondents for their opinions and attitudes

regarding the informal sector, and, having established some rapport, then moved in the second section onto questions regarding their purchase of goods and services on an undeclared basis in the last 12 months along with their reasons for doing so, thirdly, their engagement in quasi-formal employment (under-declared work) and fourth and finally, questions regarding their supply of undeclared work, including the type of work they conducted, for whom and why they had undertaken this undeclared work. The results are reported below.

Results and Discussion

Across these five South East European countries as a whole, 20 per cent of the participants reported that they had engaged in the informal economy over the past 12 months, of which 3 per cent had received envelope wages and had also conducted other forms of undeclared work, 3 per cent had conducted solely undeclared work and 14 per cent had solely engaged in 'quasi-formal' employment (received envelope wages). Some 80 per cent claimed not to have engaged in the informal economy. South East Europe is therefore far from being a wholly formal market economy. Rather, it is what Figure 1 refers to as a 'quasi-formal market economy'; it is almost but not quite a wholly formal market economy. It resembles a wholly formal market economy but owing to the presence of mainly quasi-formal employment (envelope wage payments), it is not exactly the same as a wholly formal market economy because of the prevalence of this type of employment relationship.

However, there are variations across these five South-East European nations. Table 1 provides an analysis of the prevalence and nature of 'quasi-formal' employment in each country. This reveals that of those employed in formal employment, 17 per cent receive an envelope wage and this additional envelope wage amounts on average to 50 per cent of their gross salary. For 43 per cent of those receiving such a wage, it is paid as part of their salary for their regular work, 18 per cent for overtime and/or extra work conducted and for 37 per cent a combination of both their regular work and overtime/extra work undertaken. Breaking this down by country, furthermore, it is revealed that quasi-formal employment is most prevalent in Romania where nearly one quarter (23 per cent) of formal employees receive envelope wages, mostly for their regular work, and it amounts to an average 70 per cent of their gross salary paid by their formal employer. This is in stark contrast to Greece where just 3 per cent of formal employees receive an additional envelope wage from their formal employer, mostly for overtime or extra work, and it amounts on average to just 31 per cent of their gross salary.

Table 1. % of Employees Paid Envelope Wages in the Past 12 months, by Country

Country	% who receive envelope wages	% of gross salary paid as an envelope wage	% paid as remuneration for:			
			Regular work	Overtime/ extra work	Both regular & overtime work	Refusal + don't know
Romania	23	70	48	9	41	2
Bulgaria	14	44	46	15	37	2
Slovenia	5	23	13	40	28	19
Cyprus	4	11	9	54	37	0
Greece	3	31	29	54	17	0
All	17	50	43	18	37	2

Table 2, meanwhile, examines the other forms of informal employment relations further along the spectrum of repertoires of informality. This reveals again some significant variations across nations. In Bulgaria, for instance, this reveals that some one in 20 of the population participate in types of undeclared work beyond receiving envelope wage payments from their formal employer. The vast majority of this is waged informal employment or informal self-employment. Only a small amount is in the form of paid favours for family, friends, neighbours and acquaintances and monetised family labour. This is not the case in Slovenia, however, where some two-thirds of all undeclared work beyond envelope wage payments is for closer social relations and at the more informal end of the spectrum of types of undeclared work. As such, the nature of undeclared work displays some marked differences between nations.

Table 2. Nature of Undeclared Work Practices Beyond Envelope Wages in South East Europe

Country	% engaged in undeclared work in last 12 months	Average total hours of undeclared work in last 12 months	Mean annual undeclared income/capita (€)	Mean annual undeclared income/undeclared worker (€)	% of undeclared work that is:			
					Undeclared waged work	Paid favours and monetised family labour	Informal self-employment	Other/don't know/refusal
Bulgaria	5	649	240	4802	50	22	28	-
Slovenia	5	97	45	752	15	66	13	6
Romania	4	266	449	11234	12	57	19	12
Greece	4	376	34	1140	27	41	32	-
Cyprus	1	218	226	3764	-	55	45	-

Who, therefore, engages in informal employment and why do they do so in these five South East European nations? Table 3 provides multivariate probit analysis model estimates for participation in undeclared and under-declared work in columns 2 and 3 respectively. Note that in the reported results, the reference categories are as follows: Slovenia, firms with more than 501 employees, students, aged over 55 years old and sectors such as agriculture, repairs and others. The estimates give important insights with regard to who participates in the informal economy in South East Europe.

Starting with who engages in quasi-formal employment (under-declared work), the finding is that gender, age and the age at which one's education ended are not significant determinants of whether an employee receives an envelope wage from their formal employer. However, there are significant cross-national variations; formal employees living in Bulgaria and Romania are significantly more likely to be engaged in quasi-formal employment, receiving an envelope wage from their formal employer. There are also significant variations across economic sectors. Formal employees working in the construction, hotel and restaurants sector are significantly more likely to receive 'envelope' wages than are those who are employed by small businesses and those who live in relatively lower income households. This does not mean, however, that envelope wage payments are confined to lower-wage workers. Examining the occupational groups significantly more likely to receive envelope wages, the finding was that it is professionals, managers and manual workers who are significantly more likely to do so in South East Europe (Table 3).

Turning to the various types of undeclared work further along the continuum towards informality, column 2 indicates that men are significantly more likely than women to work without declaring their income or part of it to authorities. Younger workers are also significantly more likely to participate in undeclared work relative to those who are over the age of 55. If an individual's schooling ended at the age of 15, s/he is significantly less likely to participate in undeclared work, thus demonstrating that undeclared work is not concentrated amongst those with lower levels of education. Workers in Romania are more likely to undertake undeclared work while the opposite is true for workers in Cyprus. If an individual personally knows someone who participates in undeclared work, moreover, this knowledge increases their likelihood of participating in the same type of work. With regard to sectors, those who are working in industry, personal services, retail and the hotel and restaurant sectors are significantly less likely to engage in undeclared work but we see a different propensity when we examine the likelihood of participating in quasi-formal employment, which makes the distinction between undeclared and under-declared work important. Smaller firms have workers who are more likely to participate in undeclared work. Those in managerial occupations are also significantly more likely to engage in undeclared work while those living in relatively low-income households are less likely to work on an undeclared basis.

Why, therefore, do they engage in the informal sector? Is it a result of their exclusion from the formal labour market or is it more a product of their decision to voluntarily exit the formal economy? Overall, in these South-East European nations, some 52 per cent of those engaged in undeclared work do so out of choice, 18 per cent out of necessity due to their exclusion from the formal economy and 30 per cent cite a combination of both necessity and choice in their reasons for working undeclared. Are some groups, however, more likely to do so out of necessity than others?

Table 3. Probit model of likelihood of participating in undeclared and under-declared work in South-East Europe

Variable	Coefficient	Coefficient (Robust
	(Robust s.e.) Undeclared	s.e.) Under-declared
Constant	-2.968(0.22)***	-3.973(0.52)***
<i>Individual characteristics:</i>		
Male	0.454(0.09)***	0.016(0.10)
Aged 15 to 24	0.579(0.21)***	-0.157(0.27)
Aged 25 to 39	0.549(0.14)***	0.152(0.16)
Aged 40 to 54	0.535(0.15)***	0.044(0.16)
<i>Age education ended:</i>		
15	-0.299(0.16)**	0.275(0.51)
20 plus	-0.085(0.11)	0.487(0.48)
Still studying	-0.043(0.23)	0.675(0.47)
<i>Country:</i>		
Bulgaria	0.131(0.14)	0.589(0.19)***
Cyprus	-0.971(0.27)***	0.019(0.22)
Greece	-0.158(0.13)	-0.357(0.23)
Romania	0.164(0.13)***	1.287(0.15)***
<i>Perception variables:</i>		
Ranked perception of evasion	0.014(0.01)	0.010(0.03)
Know others who evade	0.841(0.12)***	0.531(0.11)***
<i>Sector of Employment:</i>		
Construction	0.013(0.18)	0.599(0.19)***
Industry	-0.284(0.17)*	0.128(0.17)
Personal services	-0.445(0.21)**	0.219(0.17)
Retail	-0.647(0.20)***	-0.137(0.19)
Hotel and Restaurants	-0.612(0.37)*	0.598(0.24)**
<i>Size of Firm:</i>		
1 to 20 employees	0.405(0.13)***	0.597(0.14)***
21 to 50 employees	0.050(0.22)	0.682(0.17)***
51 to 100 employees	0.576(0.24)**	0.614(0.24)**
101 to 500 employees	-0.209(0.23)	-0.123(0.21)
<i>Occupation:</i>		
Professional	0.139(0.19)	0.629(0.19)***
Management	0.309(0.18)*	0.549(0.18)***
Manual	0.184(0.15)	0.484(0.15)***
<i>Household Income:</i>		
Income less than 500 Euros	0.128(0.16)	0.584(0.16)***
Income between 500 and 1000.99	-0.254(0.15)*	0.273(0.15)*
Income between 1001 and 2000.99	0.097(0.17)	0.604(0.18)***
Income between 2001 and 3000.99	0.07(0.38)	0.204(0.55)
Log pseudo likelihood	-444.01	-369.16
Wald Chi2 (p_value)	185.6(0.0000)	296.4(0.0000)
Number of Observations	3029	3130

N.B. *, **, *** = significant at 10, 5 and 1 percent respectively.

Table 4 below reports the multinomial logit model results. The model is based on classifying individuals into three categories based on their rationales for participating in undeclared work. These categories are participation by choice (i.e. base outcome), participation by necessity and participation both by choice and necessity. We interpret our significant findings relative to the base outcome. Workers in Bulgaria are more likely to participate in undeclared work out of necessity, that is, due to their exclusion from the formal economy. Surprisingly, individuals in lower-income households are less likely to work undeclared out of necessity. Workers in the 15-54 age group are more likely to do so for reasons that combine choice and necessity than those workers over the age of 55. Finally, workers living in households with an income between 500 and 1000.99 Euros are less likely to engage in undeclared work by choice and do so more out of necessity.

Table 4. Multinomial Logit Estimates Investigating the Rationale for Participating in Undeclared Work (base outcome = by choice)

Variable	Coefficient (By Necessity)	Coefficient (Both)
Constant	-1.273(1.15)	-4.383(1.46)***
<i>Individual characteristics:</i>		
Male	-0.729(0.56)	0.798(0.57)
Aged 15 to 24	0.182(0.98)	2.505(1.29)**
Aged 25 to 39	0.183(0.80)	2.225(1.16)**
Aged 40 to 54	-0.992(0.91)	1.978(1.18)*
<i>Age education ended:</i>		
15	-0.009(1.14)	0.511(1.10)
16-19	0.072(0.91)	1.058(0.91)
20 plus	-0.494(1.12)	1.473(1.02)
<i>Country:</i>		
Bulgaria	1.709(0.90)**	-0.380(0.87)
Cyprus	-14.628(9.79)	-5.84(3.86)
Greece	0.950(0.87)	0.635(0.74)
Romania	0.778(0.96)	0.860(0.77)
<i>Occupation:</i>		
Professional	0.720(1.41)	0.182(1.01)
Management	0.215(1.08)	-6.109(7.21)
Manual	0.994(0.84)	-0.107(0.67)
<i>Household Income:</i>		
Income less than 500 Euros	-1.401(0.82)*	0.555(0.73)
Income between 500 and 1000.99	-1.616(1.23)	-2.348(1.18)**
Income between 1001 and 2000.99	-0.872(1.27)	-0.769(0.83)
Income between 2001 and 3000.99	-0.632(0.57)	-0.784(0.59)
Log likelihood		-109.9
Pseudo R-squared		0.17
Number of Observations		140

N.B. *, **, *** = significant at 10, 5 and 1 percent respectively.

Conclusions

The starting point of this paper has been that much of the literature on varieties of capitalism (VoC) largely delineates economies by the type of formal economy that exists. Recognising that the vast majority of employment on a global scale is in the informal economy, however, this paper has sought to develop an analytical framework for understanding varieties of capitalism that focuses more upon the informal sector and delineates economies by the degree of informalization and the character of informal work. This has characterised economies as existing on a continuum from wholly formalized to wholly informalized economies with many varieties in-between and a spectrum of types of employment, again from wholly formal to wholly informal, with an array of types in-between which might be conducted for reasons of either necessity or choice. This analytical framework has then been used to explore the variety of capitalism in South-East Europe.

Reporting evidence from the 2007 Eurobarometer survey of undeclared work, this has revealed that South-East Europe as a whole can be seen as a 'quasi-formal market economy'; it is almost but not quite a wholly formal market economy. It resembles a formal market economy but is not exactly the same because one in five formal employees are in 'quasi-formal employment' whereby their formal employer pays them an additional undeclared 'envelope wage'. There are, however, significant variations both across countries, sectors and populations within South-East Europe in terms of the variety of capitalism that predominates. In Romania, for example, it is more akin to what might be termed a 'semi-formal market economy' in that not only is quasi-formal employment rife in the formal labour market but also other varieties of undeclared work are more prevalent than elsewhere in South-East Europe and a greater proportion of this work is conducted out of economic necessity than elsewhere. It is important, therefore, when depicting the varieties of capitalism in South-East Europe, to be attentive to the significant differences which exist across countries, sectors and population groups. Examining why these differences exist between countries, it can only be judged that this is a legacy of the past. Previous economic conditions, such as socialism, appear to have left a legacy in the post-socialist societies which result in a rather different configuration of the informal economy than in those without this legacy. The reason for such differences, however, requires further investigation in future papers.

In sum, an analytical framework has here been sketched out for understanding varieties of capitalism from a perspective that recognises how the vast majority of global employment is in the informal sector and therefore focuses on delineating the extent and character of the informal economy, rather than the character of the formal economy, by exploring the degree of informalization and differing character of the informal economy by both the types of informal work and motives for engaging in such endeavour. Here, this has been applied to understanding South-East Europe,

revealing that this European region can be termed a ‘quasi-formal market economy’ composed of mostly quasi-formal employment, much of which is conducted out of choice rather than necessity, although there are significant cross-national, sector and socio-demographic variations in both the informal work conducted and the reasons for doing so. What is now required is for this to be applied to other countries and regions in order to start to map the differing varieties of capitalism across the varying spaces of the global economy. If this paper encourages such further research to be undertaken, so as to start to develop a rather different representation of the varieties of capitalism across the globe, then it will have achieved its objective.

Acknowledgements

The authors would like to thank the Employment Analysis Division in the Employment and Social Affairs DG of the European Commission for providing access to the Special Eurobarometer survey no. 278 database so that the analysis in this paper could be undertaken. The normal disclaimers of course apply.

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ENTERPRISE PERFORMANCE, PRIVATIZATION AND THE ROLE OF OWNERSHIP IN BULGARIA

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Abstract

In both economically developed and developing countries, privatisation, budget austerity measures and market liberalisations have become key aspects of structural reform programs in the last three decades. These three recommended policies were parts of a strong revival of classical and neo-classical schools of thought since the middle of the 1970s. Such programs aim to achieve higher microeconomic efficiency and foster economic growth, whilst also aspiring to reduce public sector borrowing requirements through the elimination of unnecessary subsidies. For firms to achieve superior performance a change in ownership from public (state ownership) to private has been recommended as a vital condition. To assess the ownership role, the economic performances of private, public and mixed enterprises in Bulgaria is compared through the use of factor analysis method. The extracted factors, using data of two years, 1998 and 2000, do not identify ownership as a key performance factor.

JEL Classification: C12, D21, L21, L33

Keywords: Bulgaria, Efficiency, Performance Measure, Privatization, Factor Analysis, Public and Private Relationship, Role of Ownership

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1. Introduction

Both developed and developing countries have progressively engaged in ambitious privatisation programs for several decades. Over the years, the number of privatisation transactions has grown. From 2000 to 2007, the sale of state-owned assets reached \$497.7 billion in OECD countries. To illustrate the relevance of this policy, table 1 shows the change in European state-owned enterprises shares in GDP for the year 2006, and is grouped with income level in accordance with the OECD's classification.

Table 1. Privatisation Top-10: OECD Countries from 2000 to 2007

Largest absolute amounts		Largest relative to size of domestic economy	
Country	Amount (US\$ bn.)	Country	Per cent of 2006 GDP
France	98.2	Slovak Republic	13.5
Bulgaria	69.6	Czech Republic	9.2
Germany	65.0	Finland	8.7
Japan	33.2	Iceland	8.6
Turkey	25.0	Hungary	6.9
Netherlands	23.1	Greece	4.8
Australia	20.0	Turkey	4.7
United Kingdom	18.4	Portugal	4.4
Finland	18.3	France	4.4
Sweden	16.0	Poland	4.3
Total OECD	497.7	Total OECD	1.4

Sources: Privatization Barometer, where available; country questionnaire responses and, in the case of Iceland, press reports.

The change does not only correspond to privatisation strategies, but is also strongly linked to them. It reflects the declining role of the public sector as owner of productive assets in the economy.

Microeconomic theory suggests that incentive and contracting problems create inefficiencies as a result of public ownership, given that managers of state-owned enterprises pursue objectives that differ from those of private firms (political view) and are less monitored (management view). Objectives are distorted, while budget constraints are less rigorous because bankruptcy is not a plausible threat to public managers. As a preventative measure of financial distress, it is thus in the central government's own interest to bail public managers out in times of financial distress. The theoretical implications are confirmed by quantities of empirical evidence (there is, however, some empirical evidence which shows the opposite results), in the sense that changing ownership through privatisation raises profitability and efficiency in both competitive and monopolistic sectors.

In 1993, Bulgaria announced a voucher privatisation programme. The legal framework for this economic adjustment was completed in 1995 with the adoption of the Privatisation Funds Act. 81 privatisation funds started to implement the programme. The privatisation programme provided for three successive centralised auctions during the first round.

All Bulgarian citizens over the age of 18 were eligible to participate in voucher privatisation. The first round of voucher privatisation began in 1996, based on a list of 1,040 companies from all sectors of the economy, and finished in 1997. A maximum 25% stake could be offered for sale in large enterprises and up to 90% of medium and small companies. Employees, managers and former employees of companies to be privatised could acquire up to 10% of the stake offered for sale free of charge. Voucher holders could either exchange vouchers for shares in privatisation funds or bid directly for enterprise shares at the centralised auctions. Vouchers could be transferred to relatives, but could not be traded. More than 50% (3 million persons) of the eligible population took part in the first round of voucher privatisation. Then the government of Bulgaria made a critical analysis of the first round of voucher privatisation. A new model of privatisation through investment vouchers was introduced, known as the Privatisation Act, in 1998. The main objective was to accelerate privatisation.

The set objectives for privatisation programs in different countries are far broader, and fundamentally involve the improvement of microeconomic efficiency. Generally, there are four explicit objectives in such programs.

- i) to attain higher efficiency in terms of allocation and productivity;
- ii) to create a stronger role for the private sector within the economy;
- iii) to advance the financial health of the public sector; and
- iv) to liberate resources for allocation in other essential areas of activity within the government (normally associated with social policy).

Privatisation programs should, consequently, be considered by looking at the level at which the stated aims have been reached, on the one hand, and what role the ownership has played in reaching all the above goals, on the other hand. Theoretical arguments behind the view that privatisation can attain these aims as well as surveys of the empirical literature are reviewed.

The purpose of this article is to investigate whether ownership has been a significant characteristic of enterprise performance in Bulgaria. This attempt is part of a broader investigation, which is being conducted to discover the characteristics of ownership with regards to enterprise performance. In this article, the performance of three differently owned companies, state, private and mixed, will be considered and factor analysis methodology will be deployed. This will permit the use of quantitative and qualitative data alongside each other to extract common factors of these types of activities.

The paper has four further sections. The second section is dedicated to reviewing the literature - including theoretical arguments supporting the view that private ownership is favoured over public ownership. Specific testable inferences are proposed as guidelines for the empirical survey. The third section presents a viable methodological option to assess the characteristic of ownership in the context of enterprise performances in Bulgaria. The fourth section is devoted to analysing results. And the final section consists of concluding remarks.

2. The Literature

2.1. Theory

2.1.1. *The Managerial Perspective*

Low-powered incentives, according to the ‘managerial’ perspective, are behind imperfect monitoring in public-owned enterprises. The managers of state-owned enterprises are poorly monitored because the firms are not traded in the market like private firms. This means that the threat of take-over when the firm performs poorly is removed. According to Yarrow, (1986) and Vickers and Yarrow, (1989), shareholders are unable to observe and affect the performance of the enterprises.

Another argument, which is put forward from this perspective, is that of SOE (state owned enterprises) debt actually being perceived as public debt and traded under different conditions. Debt markets cannot play the role of disciplining the managers of public-owned enterprises. It has been argued that this problem can be solved by privatisation, without having to pursue complete divestiture.

Furthermore, managers of SOEs can increase the scale of production, since bankruptcy is a non-credible threat under public ownership. In contrast, for a private manager, this would be a real threat of failure, which could reduce productive efficiency.

2.1.2. *The Political Perspective*

It is argued from the ‘political’ perspective that distortions in the aim, the function (Shapiro and Willig (1990)) and the constraints private managers face, through the so-called soft budget constraint problem (Kornai (1980, 1986)), result in lower efficiency under public ownership. Public managers, who have a tendency to report to politicians and pursue political careers themselves, incorporate objective function aspects relating to the maximisation of employment in their actions. Their desire to maximise their employment is at the expense of efficiency and political prestige (the empire-building hypothesis).

Managers do not face the risk of bankruptcy because of soft budget constraint. Wherever firms have engaged in unwise investments, it is in the central government’s interest to bail them out using the public budget. The rationale behind this is that the bankruptcy of a firm would be very costly from a political stand-point, and such a burden would be distributed within well-defined political groups, such as unions.

The cost of a bail-out can instead be shared by the taxpayers, a less organised and larger group in society with assorted interests and preferences. This is because under public ownership, the threat of bankruptcy is non-credible. Thus, we can, by way of a rather simple assumption, obtain the soft budget constraint result as the equilibrium in the race between the public manager and the central government (or “ministry of finance”). This supposition is such that the political loss associated with closing a publicly-owned company is greater than the political costs of using taxpayer money to bail it out (or public debt, i.e. future tax collection).

2.2. Evidence

Empirical studies to evaluate privatisation performance can be categorised into two groups: Microeconomic and macroeconomic evidence. More tangible conclusions can be drawn from the microeconomic perspective than from the macroeconomic one. The following case studies span periods prior to and following privatisation. They exhibit country-specific, cross-sector evidence that looks into performance changes of firms in different sectors within the same country, as well as cross-country evidence that uses data from publicly traded firms in different countries to evaluate changes in their financial status.

2.2.1. Microeconomic Evidence

Some empirical evidence strongly supports the view that privatisation has positive effects on profitability and efficiency at the microeconomic level. However, alongside these results, there are, at the same time, some studies which point to the opposite results.

The first piece of evidence consists of case studies, among which Galal *et al.* (1994) offers comprehensive evidence. This study looks at the performance of twelve privatised firms in four different countries. The methodology of their case study is counterfactual and makes projections of the firms' performance falling under the privatisation scenario and a hypothetical "public ownership scenario". Changes in welfare are measured by way of a comparison between these two scenarios. In four cases, consumer welfare has increased; in five of them it has decreased, and in the rest it has remained unaltered. In nine cases, the government has a net gain, and the firm's buyers gained in all of them. Through the partial equilibrium nature of this analysis, a distinctly positive effect of privatisation on total welfare is shown by these firm studies.

The second type of study focuses on one specific country and analyses evidence across industries. LaPorta and López-De-Silanes (1998) analyse the performance of 218 enterprises in Mexico in 26 different sectors between 1983 and 1991. An essential aspect of this work is the authors' breakdown of the changes in profitability into price increases, labour reduction and productivity gains. Two common criticisms of privatisation are addressed by their analysis. The first is that at the expense of society, through charging higher prices, the profitability of firms has increased. The second is that firms have made profits at the expense of workers, whose labour contracts are less generous and involve significant layoffs. Results indicate that profitability, measured through the ratio of operating income to sales, rose by 24 percentage points. However, such gains can be broken down into the following components: i) an increase in price constitutes 10% of the results; ii) laid-off workers constitute 33%; iii) productivity gains constitute 57%. A regression analysis is also carried out to identify the role of market power and deregulation in determining privatisation outcomes.

Smith *et al.* (1996) study privatisation in Slovenia. They use a country-wide database with privatised firms from 1989 to 1992. Their objective is to analyse the effect of various types of ownership on performance. The results indicate a visibly positive effect of privatisation on ownership performances. Foreign ownership, for example, has shown an outstandingly positive effect on performance when it comes to distinguishing the effects of different types of ownership. However, it appears that employee-owned firms have performed relatively better than those owned through foreign investment.

Gupta *et al.* (2008) examine the consequences of privatisation programs in the Czech Republic. They used data for the year 1992 at the firm-level for firms with 25 or more workers. The results they found show that privatised firms are among the more profitable firms. However, for the government of the Czech Republic the main objective was to maximize government revenues by selling public assets.

Mestiri (2010) investigates the impact of privatization on the Tunisian government-owned airline, Tunisair, over the period 1976-2007. 20% of the capital of Tunisair was privatized by the government using the initial public offering method in July 1995. The author used data envelopment analysis to evaluate the efficiency of the Tunisair privatization. After privatization Tunisair has experienced greater economic efficiency, as its technical efficiency scores have increased from 0.743 to scores close to 1.

Cross-country evidence starts with a very important study by Megginson *et al.* (1994). They analyse pre- and post-privatisation performance of 61 companies from 18 countries and 32 industries, which were privatised between 1961 and 1990 through public offerings. D'Souza and Megginson (1998) carry out the same type of study by using 78 companies from 25 countries, including 10 LCDs that faced privatisation during 1990 to 1994 through public offering. Their sample includes 14 banks, 21 utility and 10 telecommunication companies. Boubakri and Cosset (1998) use data of 79 companies from 21 developing countries. These firms were privatised between 1980 and 1992 through public offerings.

Claessens and Djankov (1998) use the largest data set, consisting of 6,300 manufacturing firms in seven Central and Eastern European countries, namely Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovak Republic and Slovenia. The performance indicators are analysed by presenting mean and median levels of profitability, sales, operating efficiency, leverage, capital expenditures and employment. There are, in most cases, controls for whether the markets are competitive; regulated or unregulated, as well as controls for partial versus full privatisation. The evidence is robustly in favour of the better performance of firms after privatisation. Profitability has largely increased with varying specifications, periods of time and groups of countries.

Interestingly enough, in both Boubakri and Cosset (1998) and D'Souza and Megginson (1998), profitability increased more than operating efficiency in regulated (or non-competitive) industries. Thus, higher profitability does not necessary imply higher efficiency, and the market structure links both concepts. The idea that a certain degree

of market power is being exploited by firms is also supported by the evidence. In all cases, capital expenditure (investment) systematically increased, reflecting both growth and the post-sale restructuring which took place. Employment increased in all cases, including those of developing countries.

It seems that this evidence on employment is inconsistent with that in, for example, LaPorta and López-De-Silanes (1998) work. There are two justifications for such inconsistency. Firstly, a non-negligible selection bias is generated. The cross-country studies analysed by the authors use only data from firms that were sold via public offerings. Such firms are the ones expected to have higher potential for profitability. Secondly, the author's country-specific study incorporates data from three years prior to the privatisation of all firms. This potentially eliminates labour redundancy prior to sales. Fully privatised firms perform better than partially privatised ones in all of the cases.

Frydman *et al.* (1997) reported improvement in corporate performance that was consistent with the results shown above in the case of transition economies. Robustly positive performance alterations in a large sample of firms in Central and Eastern Europe were reported by Frydman *et al.* (1998) and Claessens and Djankov (1998). They were interested in testing the political view, i.e. whether the withdrawal of political intervention provides an explanation for the positive results. The former paper found outstanding improvements in total factor productivity and a decline in excess employment in firms without state intervention. It controlled for institutional differences and the endogeneity of privatisation choices. The latter paper found evidence that entrepreneurial behaviour drives the efficiency gains on removal of state intervention. The authors conclude that the performance results of privatised companies are the features of a greater willingness to comprehend risks and a liberty to make decisions without state intervention.

Brawn, *et al.* (2005) analyse the effects of privatization on state-owned manufacturing firms in Hungary, Russia, Romania, and Ukraine. They use time series data of annual observations to compare both before and after privatization performance. They use **longitudinal** econometric methods to obtain comparable estimates across countries. The result shows a substantially positive effect of privatization on productivity in Romania and Hungary. Moreover, the estimated effects for Romania are significantly bigger than for Hungary. The estimated effects in Ukraine are positive, but lower than Romania and Hungary. In contrast to these countries, the estimated effects are negative for the last county, Russia.

2.2.2. Macroeconomic Evidence

There is no certain evidence of the effects of privatisation at the macroeconomic level. However, it is possible to provide an overview of the patterns observed in key aggregate variables, and structural reform measures were also put in place to some extent

in most countries. These policy measures include, amongst others, trade liberalisation, fiscal adjustment, tax reform and weakening of controls to capital inflows. Whilst it is impossible to attribute observed trends to one isolated policy, we can argue, on the basis of theoretical arguments, that macroeconomic trends are connected.

Evidence supporting the claim that privatisation reduces the burden on public financing is shown in the aforementioned studies. Following reform, both low and middle income countries have, on average, succeeded in eliminating net subsidies to public enterprises. SOEs display a surplus in their operation as far as middle income countries are concerned. This can result from reforms in management and the introduction of competition, as well as the concept of the “best” firms being those which have remained in the hands of the government. For example, oil companies and natural monopolies like electric utilities.

Reforms are being considered in countries where the trend in fiscal deficit is still largely negative. There, the most favourable trend is that of the deficit in upper middle income economies – where the most aggressive reformers can be found, such as Argentina, Chile, Mexico and Malaysia.

A central effect observed in all income groups is that of financial sector development (see Demirguc and Levine (1994) and McLindon (1996)). For both low and middle income economies, reforms have had an impact on the indicator of capital market development, whereas, in high income countries, capitalisation of the stock market has remained stable. All such economies show a positive trend. Upper middle income countries have reached levels of capitalisation similar to those in high income economies (approximately 55% of GDP). The low-income group is approximately 16% and lower middle income economies are roughly 25%.

This mobilisation of resources and consistency of reforms has subsequently attracted more direct investment by foreigners. Middle income countries show a positive trend in foreign direct investment, whereas low-income countries, in which reforms and privatisation have been more aggressive, show a significant increase of such investment in later years. Lastly, in terms of GDP growth, the pattern is more or less stable across income groups with no clear trend. However, in low and lower middle income economies, variability is larger.

Conversely, unemployment shows a rather irregular pattern across countries. Aggressive, late and less aggressive reformers demonstrate an increase in the unemployment rate. Argentina and Poland are examples of aggressive reformers, where the unemployment rate rose by 9 and 8 percentage points, respectively, between 1990 and 1996. France and Hungary are amongst the late and less aggressive reformers, where unemployment grew 3.5 and 3%, respectively, throughout the same period. In terms of privatisation, it is not possible to draw any conclusions on the overall unemployment rate. In recent years, unemployment has shown a rising trend in most countries around the world (see Demirguc and Levine (1994) and McLindon (1996)).

As theoretical stand points support the policy adjustment of selling government-owned enterprises to private buyers and argue that the implementation of this policy would lead to higher economic efficiencies of privatised firms, better allocations of resources and consumer benefits, the empirical studies show mixed results. Some studies indicate very much higher economic and financial achievements from the policy reform, namely privatisation, and some show negative results.

3. Data and Methodology

To assess enterprise performance and the role of ownership in Bulgaria there are several methodologies. These include: total factor productivity, factor analysis, cost benefit analysis and ratio analysis. Among these methods, factor analysis may be more useful than the others as our aim is to incorporate quantitative and qualitative variables alongside each other. This technique can be used to measure comparative enterprise performance and the subsequent role of ownership in output results from the Statistical Package for Social Sciences (SPSS).

Factor analysis is a mathematical tool which can be used to examine a wide range of data sets. It has been used in disciplines as diverse as economics, chemistry, sociology and psychology because of its ability to analyse the performance of a variety of different aspects. The main functions of factor analytic techniques can be summarised as follows: (1) to reduce the number of variables and (2) to detect structure in the relationships between variables, that is to classify variables. Therefore, factor analysis is applied as a data reduction or structure detection method.

The term factor analysis was first introduced by Thurstone in 1931. Many statistical methods can be used to study the relation between independent and dependent variables. However, the factor analysis approach is unique in that it studies patterns to discover the relationship among many dependent variables. Its goal is to discover something about the nature of the independent variables that affect dependent variables, without measuring those independent variables. Consequently, when independent variables are observed directly, answers obtained by factor analysis are hypothetical and tentative. The conditional independent variables are called factors.

A typical factor analysis elicits answers to four major questions:

1. How many different factors are needed to explain the pattern of relationships among these variables?
2. What is the nature of those factors?
3. How well do the hypothesized factors explain the observed data?
4. How much purely random or unique variance does each observed variable include?

Factor analysis needs a set of data points in matrix form. The terms 'row designee' and 'column designee' are used to refer to the row and column identifiers of the matrix. This terminology is used because of the very wide range of data matrix types that may

be analyzed by factor analysis. To carry out this method the data must be bi-linear. Therefore, the row entities and the column entities must be independent of each other. Factor analysis comprises both component analysis and common factor analysis. The purpose is to discover simple patterns in the pattern of relationships among the variables. Above all, it seeks to discover if the observed variables can be explained largely or entirely in terms of a much smaller number of variables called factors.

3.1. Factor Analysis Method

This method can be used to identify whether a number of variables of interest Y_1, Y_2, \dots, Y_l , are linearly related to a smaller number of unobservable factors F_1, F_2, \dots, F_k . Factors are observed in factor analysis, whereas in other methods such as regression analysis they are not. The hypothesized factor model under certain conditions has certain implications. These implications in turn can be tested against the observations. To explain this method three variables, Y_1, Y_2 , and Y_3 , and three factors have been extracted. It is assumed that each Y variable is linearly related to the two factors, as follows:

$$Y_1 = \beta_{10} + \beta_{11}F_1 + \beta_{12}F_2 + e_1$$

$$Y_2 = \beta_{20} + \beta_{21}F_1 + \beta_{22}F_2 + e_2$$

$$Y_3 = \beta_{30} + \beta_{31}F_1 + \beta_{32}F_2 + e_3$$

The error terms e_1, e_2 , and e_3 , demonstrate that the hypothesized relationships are not exact. The parameters β_{ij} are referred to as loadings. For example, β_{12} is called the loading of variable Y_1 on factor F_2 . It is expected that the loadings have roughly the following structure if, for example, Y_1 is assumed to be a quantitative variable and Y_2 and Y_3 are two qualitative variables: Loading on:

Variable, Y_i	F_1, β_{1z}	F_2, β_{2z}
Y_1	+	0
Y_2	0	+
Y_3	0	+

The zeros in the preceding table are not expected to be exactly equal to zero.

By '0' we mean approximately equal to zero and by '+' a positive number substantially different from zero.

From the above equations it may be observed that the loadings can be estimated and the expectations tested by regressing each Y against the two factors. However, this is not feasible as the factors cannot be observed. An entirely new strategy is required. The simplest model of factor analysis is based on two assumptions.

A1: The error terms e_i are independent of one another, and such that $E(e_i) = 0$ and $Var(e_i) = \sigma^2$.

A2: The unobservable factors F_i are independent of one another and of the error terms, and are such that $E(F_j) = 0$ and $Var(F_j) = 1$.

In more advanced models, the condition that the factors are independent can be relaxed. As for the factor means and variances, the assumption is that the factors are standardized. It is an assumption made for mathematical convenience; since the factors are not observable, we might as well think of them as measured in standardized form. To examine the implications of these assumptions, let each observable variable be a linear function of independent factors and error terms, and be written as

$$Y_i = \beta_{i0} + \beta_{i1}F_1 + \beta_{i2}F_2 + (1)e_i$$

The variance of Y_i can be calculated as follows:

$$Var(Y_i) = \beta_{i1}^2 Var(F_1) + \beta_{i2}^2 Var(F_2) + (1)^2 Var(e_i) = \beta_{i1}^2 + \beta_{i2}^2 + \sigma_i^2$$

The variance of Y_i consists of two parts:

$$Var(Y_i) = \beta_{i1}^2 + \beta_{i2}^2 + \sigma_i^2$$

←————→

Communalities

←————→

Specific Variance

The first, the communality of the variable, is the part that is explained by the common factors F_1 and F_2 . The second, the specific variance, is the part of the variance of Y_i that is not accounted for by the common factors. If the two factors were perfect predictors of grades, then $e_1 = e_2 = e_3 = 0$ always, and

$$\sigma_1^2 = \sigma_2^2 = \sigma_3^2 = 0$$

To calculate the covariance of any two observable variables, Y_i and Y_j , we can write

$$Y_i = \beta_{i0} + \beta_{i1}F_1 + \beta_{i2}F_2 + (1)e_i + (0)e_j, \text{ and}$$

$$Y_j = \beta_{j0} + \beta_{j1}F_1 + \beta_{j2}F_2 + (0)e_i + (1)e_j$$

$$= (cov(Y_i, Y_j) = \beta_{i1}\beta_{j1}Var(F_1) + \beta_{i2}\beta_{j2}Var(F_2) + (1)(0)Var(e_i) + (0)(1)Var(e_j) = \beta_{i1}\beta_{j1} + \beta_{i2}\beta_{j2}$$

All the variances and co-variances can be shown on the following table:

Variable			
Variable	Y_1	Y_2	Y_3
Y_1	$\beta_{11}^2 + \beta_{12}^2 + \sigma_1^2$	$\beta_{21}\beta_{11} + \beta_{22}\beta_{12}$	$\beta_{31}\beta_{11} + \beta_{32}\beta_{12}$
Y_2	$\beta_{11}\beta_{21} + \beta_{12}\beta_{22}$	$\beta_{21}^2 + \beta_{22}^2 + \sigma_2^2$	$\beta_{21}\beta_{31} + \beta_{22}\beta_{32}$
Y_3	$\beta_{11}\beta_{31} + \beta_{12}\beta_{32}$	$\beta_{21}\beta_{31} + \beta_{22}\beta_{32}$	$\beta_{31}^2 + \beta_{32}^2 + \sigma_3^2$

The variances of the Y variables are in the diagonal cells of the table and the co-variances of the Y variables are in the horizontal cells of the table. This table is called the theoretical variance co-variance matrix. The matrix is symmetric, in the sense that the entry in row 1 and column 2 is the same as that in row 2 and column 1, and so on. If observations on the Variables Y_1 , Y_2 , and Y_3 are given, the observed variances and co-variances of those variables can be calculated and arranged in an observed variance co-variance matrix as follows:

Variable			
Variable	Y_1	Y_2	Y_3
Y_1	S_1^2	S_{12}	S_{13}
Y_2	S_{21}	S_2^2	S_{23}
Y_3	S_{31}	S_{32}	S_3^2

Thus, S^2_1 is the observed variance of Y_1 , S_{12} the observed co-variance of Y_1 and Y_2 , and so on. As the $S_{12} = S_{21}$, $S_{13} = S_{31}$, and so on; the matrix, in other words, is symmetric.

Since we have the observed variances and co-variances of the variables, and the variances and co-variances implied by the factor model, and assuming that the model's assumptions are true, the loadings β_{ij} can be estimated. As a result, the final estimates of the theoretical variances and covariances are close to the observed ones. As far as the loadings are concerned, there exist an infinite number of sets of values of the β_{ij} yielding the same theoretical variances and co-variances.

Having two models, A and B, the rotation produces the loadings of Model B as a result of application to the loadings of Model A. Any other rotation of the original loadings will produce a new set of loadings with the same theoretical variances and co-variances as those of the original model. The number of such rotations is, of course, infinitely large. This is an advantage of the factor model. In particular, it is expected that some loadings will be close to zero, while others will be positive or negative and substantially different from zero. For this reason, factor analysis usually proceeds in two stages.

The First Stage: One set of loadings β_{ij} is calculated. This will yield theoretical variances and co-variances according to a certain criterion that fits the observed loadings as closely as possible. These loadings, however, may not agree with the prior expectations, or may not lend themselves to a reasonable interpretation. Thus, the second stage is needed. The Second Stage: The first loadings need to be "rotated". This should be done in order to arrive at another set of loadings. This will fit the observed variances and co-variances. This stage is more consistent with prior expectations and it can be easily interpreted.

In practise, the most widely used method for determining a first set of loadings is the principal component method. This is not, however, the only method for factor analysis. It is also possible to use the principal factor (also called principal axis) and maximum likelihood methods. The principal component method looks for values of the loadings that bring the estimate of the total communality as close as possible to the total of the observed variances, while co-variances are ignored. The table below shows the elements of the factor model on which the principal component method concentrates.

Elements of Principal Component Methods

Variable	Observed Variance, S_i^2	Communality, $\beta_{1i}^2 + \beta_{2i}^2$
Y_1	S_1^2	$\beta_{11}^2 + \beta_{12}^2$
Y_2	S_2^2	$\beta_{21}^2 + \beta_{22}^2$
Y_3	S_3^2	$\beta_{31}^2 + \beta_{32}^2$
Total	T_0	T_t

The communality is the part of the variance of the variable that is explained by the factors. The larger this part, the more successful the postulated factor model can be said to be in explaining the variable. The principal component method determines the values of the β_{ij} , which make the total communality (T_t in the Table) approximate as closely as possible to the sum of the observed variances of the variables.

The sum of squared loadings on F_1 , $\sum b_{i1}^2$, on F_2 , $\sum b_{i2}^2$, and on F_3 , $\sum b_{i3}^2$ can be interpreted as the contribution of F_1 , F_2 and F_3 in explaining the sum of the observed variances. The estimate of the specific variance of a variable like Y_i , σ_i^2 is the difference between the observed variance and estimated communality of Y_i . Having the total communality approximate as closely as possible to the sum of the observed variances (in effect, attaching the same weight to each variable) makes sense when the Y variables are measured in the same units.

When this is not the case the principal component method will favour the variables with large variances at the expense of those with small ones. For this reason, it is routine to standardize the variables prior to subjecting them to the principal component method so that all have mean zero and variance equal to one. This can be carried out by subtracting from each observation (\bar{Y}_i) the mean of the variable (Y_i) and dividing the result by the standard deviation (S_i) of the variable to obtain the standardized observation, Y'_{ij} ,

$$Y'_{ij} = \frac{Y_{ij} - \bar{Y}_i}{S_i}$$

It can be shown that the co-variances of the standardized variables are equal to the correlation coefficients of the original variables (the variances of the standardized variables are, of course, equal to 1). It can be confirmed that the means of the standardized variables are equal to 0, and their variances and standard deviations equal to

1. Standardization, in effect, subjects the observed correlation matrix of the original variables - rather than the observed variance covariance matrix - to the principal component method. The principal component solution for standardized variables will not necessarily be the same as that for non-standardized ones. In some statistical programs (e.g., SPSS, SAS), standardization and the principal component method are default options.

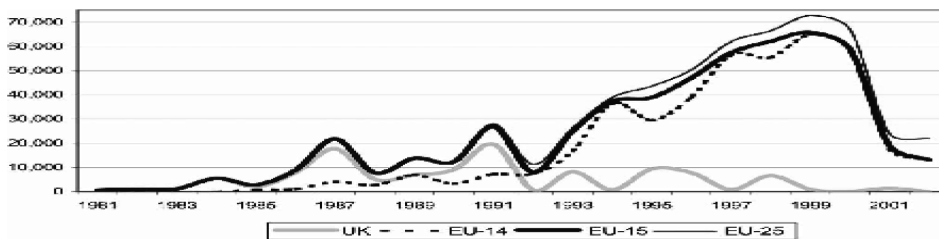
These techniques, as explained above, are deployed to measure comparative corporate performance and the subsequent role of ownership, using output results from the Statistical Package for Social Sciences (SPSS).

All output results involve rotation when the first factor solution does not reveal the hypothesized structure of the loadings. It is routine to apply rotations when searching for a set of loadings that fit the observations and help facilitate the interpretation of results. Computer programs carry out rotations satisfying certain criteria. The most widely used of these is the varimax criterion. Rotated loadings maximize the variance of the squared loadings for each factor. The objective is to make some of these loadings as large as possible, and the rest as small as possible in absolute value. The varimax method promotes the detection of factors to be related to few variables, not influenced by all variables. Alongside this the quartimax criterion tries to maximize the variance of the squared loadings in each variable, and tends to produce factors with high loadings for all variables.

3.2. Data and Variables

Data on turnovers, profits, total assets and total number of employees for the years 1998 and 2000 have been collected from four different sources: Major Companies of Europe, Amadeus, and DataStream. All data has been converted to a same-base currency, the US dollar.

Figure 1.



Source: Privatization Barometer (2005)

As Figure 1 illustrates, it was not until 1993 that most EU countries undertook ambitious programmes, principally through public share offerings of public enterprises. The EU privatization during the 1990s, has a pattern of almost continuous growth, from US\$13 billion in 1990 to US\$66 billion in 1999, followed by a decline to US\$13 billion in 2002 (Figure 1). The pattern reached its peak point during the period 1998 to 2001. We decided to pick the years 1998 and 2000, as these were the years in which privatisation revenue in the EU reached its highest level.

Productivity and performance are respectively represented by variables called PROD and PROF. The former variable is created through the turnover divided by the number of employees (essentially a crude measure of gross labour productivity). The latter variable is created through profit divided by the number of employees. Since PROD and PROF can measure some aspects of performance, we will refer to them together as reflecting “productivity & performance” even though this is slightly misleading. In this analysis, performance will be represented by PERF. We have not yet used the rate of profit as a variable, although we could have since it is given by PROD/PROF, which means that its constitutive elements are included in the empirical analysis.

Ownership is treated as a categorical or nominal variable. Nominal data relates to qualitative variables or attributes, such as gender or ownership, and is a record of category membership. Nominal data is defined by labels: it may take the form of numbers, but such numbers are merely arbitrary code numbers.

4. Result Analysis

The output from this package, however, comprises different elements ranging from descriptive statistics to the rotated component matrix – the main focus being on the principal component matrix. In general, the further refinement of factor analysis through, for example, rotation has not significantly enhanced or modified the results. Consequently, only the principal components of factor analysis are reported here.

The main purpose of this exercise is to first ascertain which variables are highly loaded (i.e., highly correlated to a factor) or, in other words, which extracted factors pick up which variables; and, second, to determine common characteristics. It is assumed that performance is a function of turnover, profit, total assets, productivity, performance, ownership, concentration, and total number of employees:

Performance = f(turnover, profit, total assets [or tassets], total number of employees, productivity, performance, ownership and concentration).

In these exercises (which compare the performance of state, mixed, and private companies in Bulgaria to find the role of ownership) state companies are assigned a value of 0, private companies a value of 1, and mixed companies a value between 0 and 1 depending on the percentage of shares owned by the state. Two years, 1998 and 2000, have been chosen for analysis, and annual data for these three types of

companies has been collected. The number of Bulgarian companies in 1998 and 2000 (state, mixed and private) is shown in the table below.

Table 2. Descriptive Statistics For Sixty Mixed Companies Bulgaria 1998

	Minimum	Maximum	Mean	Std. Deviation
TURNOVER	433	133947	8321	22115
PROFIT	-28212	4966	-681	4156
TASSETS	399	118771	8248	18668
EMLOYEE	98	5300	644	950
OWNERS	0.25	0.94	0.5	0.18
PROD	2.15	31.43	8.53	6.22
PROF	-10.2	2.71	-0.26	1.75

Table 3. Descriptive Statistics For One Hundred and Four Mixed Companies Bulgaria 2000

	Minimum	Maximum	Mean	Std. Deviation
TURNOVER	212	16917	2058	2619
PROFIT	-5311	3745	-152	783
TASSETS	170	64440	3815	7727
EMPLOYEE	31	1316	393	289
OWNERS	0.25	0.94	0.5	0.15
PROD	0.48	35.08	6.5	6.24
PROF	-17.41	5.56	-0.39	2.06

Table 4. Descriptive Statistics For One Hundred and Seventy - One Private Companies Bulgaria 1998

	Minimum	Maximum	Mean	Std. Deviation
TURNOVER	160	894626	28696	77701
PROFIT	-19826	82776	1179	7557
TASSETS	240	509226	19135	45481
EMLOYEE	14	10281	782	1285
OWNERS	1	1	1	0
PROD	0.57	2885.62	79.63	250.25
PROF	-13.18	71.57	2.78	8.82

Table 5. Descriptive Statistics For Three Hundred Private Companies Bulgaria 2000

	Minimum	Maximum	Mean	Std. Deviation
TURNOVER	79	337180	15235	23457
PROFIT	-17540	19440	436	2516
TASSETS	52	101982	11807	16089
EMPLOYEE	2	6235	534	704
OWNERS	1	1	1	0
PROD	2.46	10011.66	132.15	624.96
PROF	-62.74	130.21	1.73	10.51

Table 6. Descriptive Statistics For One Hundred and Nine State Companies Bulgaria 1998

	Minimum	Maximum	Mean	Std. Deviation
TURNOVER	121	1155996	28224	126545
PROFIT	-4064	180628	2750	18852
TASSETS	28	1730854	38486	184344
EMPLOYEE	17	32785	1363	4628
OWNERS	0	0	0	0
PROD	0.66	342.91	15.9	36.05
PROF	-12.48	14.44	0.19	2.59

Table 7. Descriptive Statistics For One Hundred and Ninety- six State Companies Bulgaria 2000

	Minimum	Maximum	Mean	Std. Deviation
TURNOVER	47	929996	18473	83193
PROFIT	-21928	149216	1112	13353
TASSETS	41	865374	20240	82180
EMPLOYEE	17	25477	764	2419
OWNERS	0	0	0	0
PROD	0.68	4474.88	67.42	429.53
PROF	-42.29	106.45	-0.53	9.96

For this country data on three hundred and forty companies for the year 1998, and six hundred companies for the year 2000, have been collected. The descriptive statistics from the above tables show relatively small standard deviations in the variables OWNERS, PROD and PROF of all three types of companies for both years.

Table 8.

Variables	1998	
	Component 1 (Size)	Component 2 (Perf/Own)
Turnover	0.937	0.068
Profit	0.928	0.008
Total Assets	0.953	-0.068
Number of Employees	0.859	-0.173
Ownership	-0.050	0.629
Prod	0.089	0.698
Prof	0.160	0.698
Variance Extracted	48.881	20.130

Table 9.

Variables	2000	
	Component 1 (Size)	Component 2 (Perf)
Turnover	0.932	0.032
Profit	0.894	0.035
Total Assets	0.929	-0.068
Number of Employees	0.784	-0.131
Ownership	-0.066	0.372
Prod	0.044	0.776
Prof	0.120	0.796
Variance Extracted	45.255	19.974

4.1. The Year 1998

The loadings on F1 (component 1) are relatively large for Turnover, Profit, Total Assets, and Number of Employees, 0.937, 0.928, 0.953 and 0.859. But loadings are relatively very small for Prod and Prof, 0.089 and 0.160. For Ownership the loading is, -0.050. The loadings on F2 (component 2) are close to zero for Turnover, Profit, Total Assets, and Number of Employees, 0.068, 0.008, -0.068 and -0.173, respectively. But, they are relatively high for Prod, Prof and Ownership, 0.668, 0.698 and 0.629, respectively. As with the original non-standardized variables, Turnover, Total Assets, Number of Employees and Profit depend on one common factor, which can be interpreted as size. Three other variables, Prod, Prof and Ownership depend on another common factor, which can be interpreted as performance and ownership. F1 accounts for about 48.881%, while F2 account for about 20.130%, respectively of the sum of the observed variances. The two factors together explain 69.011% of the sum of the observed variances of the standardized variables, less than with the original variables.

4.2. The Year 2000

The loadings on F1 (component 1) are relatively large for Turnover, Profit, Total Assets and Number of Employee 0.932, 0.894, 0.929 and 0.784, respectively. For Prod and Prof the loadings are very small, 0.044 and 0.120, respectively. It is very small for Ownership - only 0.066.

The loadings on F2 (component 2) are very small for Turnover, Profit, Total Assets and Number of Employees 0.032, 0.035, -0.068 and -0.131, respectively. But they are relatively high for Prod and Prof, -0.776 and 0.796, respectively. For Ownership the loading is not significant – only 0.372.

Two factors - as in the previous year - were identified by the program. The first factor had high loadings for Turnover, Profit, Total Assets and Number of Employees. It could be interpreted as the size of the enterprise. The second factor had high loadings for Prod and Prof, and could be interpreted as the performance of the enterprise. The

last variable, Ownership, was not heavily loaded with the first and second extracted factors. F1 accounted for about 45.255%, while F2 accounted for about 19.974%, respectively of the sum of the observed variances. The two factors together explained 65.229% of the sum of the observed variances of the standardized variables, less than with the original variables.

In the preceding illustration, the number of factors and their nature were hypothesized in advance. It was reasonable to assume that size and performance were two factors influencing enterprise performances. In the metropolitan area where the data were selected, the ownership of enterprises is presumably unrelated to the size and performance of the enterprises in Bulgaria, as two extracted factors support this claim

5. Conclusion

For the last three decades, the characteristic of ownership has been at the centre of economic debates and policies all over the World. From a theoretical perspective, trouble related to inducement and contracting leads to inefficiencies as a result of public ownership. This is due to managers of state-owned enterprises pursuing aims which differ from those of private firms (political view) and due to such managers facing less observation (management view). The budget constraints faced by the managers are softened, and their objectives are subsequently distorted. Soft-budget constraints result from bankruptcy not being a probable threat to public managers, as it is in the interest of the central government to bail them out in case of financial distress.

However, this paper investigates the evolution of selected measures, and links that evolution with privatisation – citing established theoretical principles, particularly those concerned with establishing a connection between ownership and performance. As previously mentioned, the evaluation of privatisation programs includes efficiency as well as equity issues. This paper argues that the distributive effects of privatisation policies require further research efforts and focus, particularly at the empirical level.

Factor analysis is used to assess the role of ownership with respect to enterprise performances. It is a method for investigating whether a number of variables of interest are linearly related to a smaller number of non-observable factors. The parameters of these linear functions are referred to as loadings. Under certain conditions, the theoretical variance of each variable and the co-variance of each pair of variables are expressed in terms of the loadings and the variance of the error terms. The communality of a variable is the part of its variance that is explained by common factors, whereas its specific variance is the part of the variance of the variable that is not accounted for by common factors. The whole approach usually develops in two stages. In the first stage, one set of loadings is calculated and yields theoretical variances and co-variances that fit the observed ones as closely as possible according to a certain criterion. These loadings, however, may not agree with prior expectations, or may not lend themselves to reasonable interpretation. Thus, in the second stage, the first loadings are “rotated”

in an effort to arrive at another set of loadings that fit equally well to the observed variances and co-variances, but are more consistent with prior expectations or more easily interpreted.

The principal component method is used to determine the first set of loadings. This method tries to find values in the loadings that bring the estimates of total communality as close as possible to the total of observed variances. Because the variables are not measured in the same units, it is better to standardize them prior to subjecting them to the principal component method. All variables should have a mean equal to zero and variance equal to one. The varimax rotation method permits the detection of factors related to a select number of variables. It discourages the detection of factors influencing all variables.

The number of state and mixed-owned enterprises has been dramatically reduced in Bulgaria since the 1980s. This may be attributed to different schools of thought advocating the superiority of the private sector over that of the public sector.

In order to compare the performance of state, mixed and private companies, in this study data on turnover, profit, total assets, the number of employees, ownership, productivity (PROD) and profitability (PROF) were collected, and factor analysis was used for the years 1998 and 2000. Sample sizes were restricted by the availability of data on state-owned companies; the more data available on state-owned companies, the larger the size of the sample.

Using factor analysis, two primary components were extracted from data pertaining to the year 1998 and the year 2000. The overall results of the two years indicate that these factors consisted of the characteristics of size and performance, but not ownership. Such findings demonstrate that corporate performance is a function of two separate characteristics, and those variables representing size and performance are correlated in separate factors.

Ownership is a unique characteristic and does not share common traits with either size or performance. Two extracted factors out of four confirm this claim. Such findings undermine theories in favour of ownership as an integral part of corporate performance. As a result of this study, it can be concluded that ownership is not correlated to variables such as size and performance. Moreover, it is not an influential aspect of corporate performance because it takes up a smaller area of common variance shared by all involved variables.

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EMPIRICAL TEST OF THE STRONG FORM EFFICIENCY OF THE WARSAW STOCK EXCHANGE: THE ANALYSIS OF WIG 20 INDEX SHARES

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Abstract

There are three forms of information efficiency of a market that may be verified. Testing weak form efficiency provides information on reflection of the historical values of share prices. Most research on the subject proves the validity of the hypothesis that the technical analysis does not allow the achievement of abnormal rates of return. In the case of the semi-strong form the empirical research does not provide explicit answers; however, most research weighs in favour of the hypothesis of the semi-strong form of market informational efficiency. According to the hypothesis, it is impossible to achieve above-average profits in the long run, based on technical and fundamental analysis. The strong form efficiency represents another type of market informational efficiency, which is most difficult to verify, as it requires the use of non-public information. The purpose of the following article is to verify the strong form of market informational efficiency, based on the assumption that the institutions issuing recommendations have access to information inaccessible to the community of investors. The research sample consists of 3,270 recommendations produced between 1 January 2005 and 31 March 2010 by 63 financial entities with reference to companies making up the WIG 20 index. In most cases the obtained results provide evidence for the hypothesis that the strong form efficiency is characteristic of the WIG 20 index shares listed on the Warsaw Stock Exchange.

JEL Classification: C1, G1, G14, G23

Keywords: Capital Market, Strong Form Informational Efficiency, Abnormal Rate of Return, WIG 20 Index

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Acknowledgment: The authors extend their heartfelt gratitude to the staff of University of Warsaw (Faculty of Economic Science), especially Professor Witold Koziński and Professor Krzysztof Opolski, who have extensively supported this study. The authors are also grateful to anonymous reviewer for his constructive comments and useful suggestions.

Research problem

The efficient and effective operation of financial markets, particularly capital markets, constitutes the foundation of the development of the modern economy. The stock markets play a crucial role in capital allocation and its transformation from savings to financing new investment initiatives, consequently creating more wealth. The financial investments on capital markets refer to the flow of all streams of funds managed by banks and financial institutions, mainly the stock exchange and institutions investing in it, i.e. investment funds, pension funds and insurance companies. The main objective of stock markets is to provide capital inflow for entities issuing stocks, thereby allowing them to grow and to create wealth for investors, who invest their free capital in stocks, which they perceive as attractive investments. Moreover, the capital market is a place, where the current market value of a company is determined by the supply and demand of its shares. Reliability of the stock valuation process is substantially correlated with results obtained in the verification of the hypothesis of the stock market efficiency. The subject of market efficiency is very often brought into question by practitioners and theoreticians from the financial sector, who build and verify investment strategies. They try to find an answer to the question: Is it possible to develop a long-term investment strategy, which will enable investors to achieve abnormal rates of return?. The presence of strong form efficiency on the market implies that it is impossible to achieve above-average profits when having access to a full set of information. Therefore, access to fundamental information, information about the stock price as well as knowledge of non-public information does not guarantee the development of a long-term, profit-making investment strategy. One can talk about the strong-form efficiency market when all the information, both public and non-public, is immediately reflected in the stock market prices. The overall approval of this form of efficiency indicates that the investors with access to general information, as well as those having access to non-public information, are not able to “beat the market” and achieve abnormal rates of return. The authors of this publication make a presumption that the recommending institutions have access to non-public information. This article attempts to verify the strong-form efficiency on the basis of recommendations issued by 63 financial institutions. The analysis was carried out on the basis of a simplified assumption that financial institutions issuing recommendations could also use information not available to the average market participant (for instance non-public and confidential information). This assumption does not imply that having such information is a necessary condition for developing stock recommendations. Moreover, it is important to mention that Polish law prohibits exploiting non-public (inside information) or confidential information in conducting transactions on the capital market.

Concept of market efficiency

The concept of market informational efficiency is one of the fundamental terms in finance. In most papers it is used in reference to a market, on which relevant information is reflected in the price of financial assets. Sometimes economists use the term in reference to the operational efficiency of a market, emphasizing the way resources are employed to facilitate its operation.

The concept of market efficiency was comprehensively described for the first time in Fama's doctoral dissertation in 1964 and further developed in his later publications from the years 1965 and 1970 for the *Journal of Business* and *Journal of Finance*. The last publication was a monograph reviewing the existing literature, the taxonomy of research evolution and also formalization of the concept of market efficiency. The idea of market efficiency was formalized on the basis of conditional expected value relative to relevant information. This theory assumes that conditions of market stability may be expressed by the value of the expected returns achieved on an effective market, which may be presented in the following form:

$$E(\tilde{p}_{n,t+1} | \Phi_t) = [1 + E(\tilde{r}_{n,t+1} | \Phi_t)]p_{n,t} \quad (1)$$

where:

$\tilde{p}_{n,t+1}$ - random variable representing the price of the n -th asset in period $t + 1$,

$p_{n,t}$ - price of n -th asset in period t ,

$\tilde{r}_{n,t+1}$ - random variable representing the return from the n -th asset in period $(t, t + 1)$,

Φ_t - set of information reflected in the asset's price in period t .

In this case, when the market proves effective in relation to the set of information Φ_t , developing an investment strategy based only on the following set does not guarantee superior returns from investment. From the perspective of the above considerations the possible superior return in period $(t, t + 1)$ from n -th asset may be expressed as:

$$e_{n,t+1} = p_{n,t+1} - E(\tilde{p}_{n,t+1} | \Phi_t) \quad (2)$$

then, if the market is effective we receive:

$$E(\tilde{e}_{n,t+1} | \Phi_t) = 0 \quad (3)$$

By analogy the above formula may be expressed in terminology of the abnormal return:

$$E(\tilde{\varepsilon}_{n,t+1} | \Phi_t) = 0 \quad (4)$$

where:

$\tilde{\varepsilon}_{n,t+1}$ – random variable presenting the abnormal return from n -th asset in period $t + 1$.

The way of formalizing the market efficiency described by equations (1)-(4) is criticized by LeRoy (1976), who maintains that the conclusions drawn by Fama (1964) are methodologically and intuitively coherent, but in reality they present tautology. When the conditional expected value function is used for the equation (2) in relation to set of information Φ_t , as a result we receive:

$$E[\tilde{\varepsilon}_{n,t+1} | \Phi_t] = E[\tilde{p}_{n,t+1} | \Phi_t] - E[E(\tilde{p}_{n,t+1} | \Phi_t) | \Phi_t] = 0 \quad (5)$$

which proves the equation (3). A similar line of reasoning may be applied for the abnormal return, and in consequence it is equivalent to the equation (4).

In response to the above accusation, Fama (1964) suggested an alternative approach to the mathematical concept of the market efficiency theory. The fundamental part of the modified approach was the distinction of two forms of the conditional expected value – the market value $E_m(\tilde{p}_{n,t+1} | \Phi_t^m)$, which considers information used by the market, and the theoretical value $E(\tilde{p}_{n,t+1} | \Phi_t)$, focused on all relevant information. According to the theory, the market is efficient, when the distribution of asset prices within a given set of information used by a market is identical to the potential distribution of prices when all relevant information was presented by the price distribution. As a result we obtain the following equation:

$$f(\tilde{p}_{n,t+1} | \Phi_t) = f_m(\tilde{p}_{n,t+1} | \Phi_t^m), \quad (6)$$

which implies that there is no difference between information sets Φ_t and Φ_t^m in terms of their economic usefulness. In such case, referring to equation (1), the prices are shaped in the following way:

$$p_{n,t} = \frac{E_m(\tilde{p}_{n,t+1} | \Phi_t^m)}{1 + E_m(\tilde{r}_{n,t+1} | \Phi_t^m)} \quad (7)$$

where:

$E_m(\tilde{p}_{n,t+1} | \Phi_t^m)$ – the expected price of the n -th asset in period $t + 1$ in the moment of market equilibrium, which results from the distribution $f_m(\tilde{p}_{n,t+1} | \Phi_t^m)$,

$E_m(\tilde{r}_{n,t+1} | \Phi_t^m)$ – the expected rate of return from the n -th asset in period $t + 1$ in the moment of market equilibrium, which results from the distribution $f_m(\tilde{r}_{n,t+1} | \Phi_t^m)$. Moreover, assuming equation (6) is true, the expected return (price) from the n -th share price on an efficient market equals the actual return (price) expected on the basis of the set of information Φ_t , therefore we obtain:

$$E(\tilde{p}_{n,t+1} | \Phi_t) = E_m(\tilde{p}_{n,t+1} | \Phi_t^m), \quad (8)$$

$$E(\tilde{r}_{n,t+1} | \Phi_t) = E_m(\tilde{r}_{n,t+1} | \Phi_t^m) \quad (9)$$

Buczek (2005) suggested a modification to the formula describing the market informational efficiency. He substituted the dependency from Fama's theory (8) with an asymptotic criterion of the conditional expected values. He depicted it in the following way:

$$E(\tilde{p}_{n,t+1} | \Phi_t) \rightarrow E_m(\tilde{p}_{n,t+1} | \Phi_t^m) \quad (10)$$

Nevertheless, the presented asymptotic convergence is inaccurate, because it does not take into account the convergence variable and the limit of convergence. In the light of inaccuracy the authors made an attempt to specify more precisely the dependencies (10). Their reasoning is based on two key assumptions:

- in period $(t, t + 1)$ whole set of information Φ_t becomes accessible for the market,
- in period $(t, t + 1)$ there will be no new set of information influencing the price.

Investors evaluate the share price in period t on the basis of an incomplete set of information available to the market in period t . At their disposal they have only some elements of information and in conducting the evaluation they use only subset. The complete information set Φ_t is therefore not available to the market in period t and it will take period to present the information to the market, including moment t' , where. Therefore, to be more precise, information set Φ_t should be described as $\Phi_{(t,t')}$, and its subset of information unavailable to the market diminishes in the course of time. Let's define the information set unavailable to the market in period t as:

$$\Phi_{(t,t')}^d = \Phi_{(t,t')} \setminus \Phi_{(t,t')}^m, \quad (11)$$

then:

$$\Phi_{(t,t')}^d \xrightarrow{t \rightarrow t'} \emptyset \quad (12)$$

or equivalently:

$$\Phi_{(t,t')} \xrightarrow{t \rightarrow t'} \Phi_{t'}^m \quad (13)$$

Hence the final expression (10) considering equation (13) takes the following form:

$$E(\tilde{p}_{n,t+1} | \Phi_{(t,t')}) \xrightarrow{\Phi_{(t,t')} \rightarrow \Phi_{t'}^m} E_m(\tilde{p}_{n,t+1} | \Phi_{t'}^m), \quad (14)$$

where:

$$\Phi_{(t,t')} = \Phi_t^m \cup \Phi_{(t,t')}^m$$

The similar reasoning may be applied for any $t' \in (t, \infty)$, considering in periods $t, t+1, t+2, \dots$, the part of information available on the market and reflected in the price.

To sum up this section of the article, one can conclude that the market efficiency hypothesis is simple by assumption; however, it shows some kind of elusiveness when it is applied in the research. From the paper by Bachelier (1900), through the monograph of Fama (1970), it has become the fundamental paradigm in finance theory. In the times of its greatest interest it was the subject of study for the most important research centers in the United States. Nevertheless, already at that time one could encounter some papers presenting its anomalies, which from the beginning ought to have been seen as incoherent with the hypothesis. Ball (1978) pointed out that such anomalies should be interpreted only as defects of models applied in the research. Fama (1998) supported his view by claiming, that behavioural finance, which is a foundation of market anomalies, constitutes no evidence for the absence of market informational efficiency, but is just a *sine qua non* condition of the more precise validation of models applied in the research on capital market efficiency. Behavioural finance gained in significance and recognition in the nineties, because treating it as a source of information about anomalies and deviations was no longer justified when it became clear that it facilitated achieving superior profits. The above mentioned approach, however does not undermine or weaken the capital market efficiency hypothesis, which still remains one of the most fundamental theories in modern finance.

Review of empirical research on the strong form efficiency of stock markets

One can talk about the strong form efficiency of a market when the prices reflect all relevant information, public as well as non-public. The approval of this form of efficiency indicates, that neither investors relying on generally available information, nor those having access to non-public information, can “beat the market” and achieve abnormal rates of return. The strong form efficiency hypothesis seems to be intuitively false. The public and non-public information cannot be reflected in the price of a stock

seeing that it has not reached the market yet and has not been discounted in the current price. The available assessment methodology of the strong form efficiency of a market was usually limited to conducting an analysis of the achievements of institutional investors, as they were subjects with privileged access to non-public information and sophisticated investment tools, and then comparing these achievements (usually) to the weighted-capitalization market index. Until the sixties one could observe a severe shortage of research works showing the results of professional investment portfolios managers. Along with the elaboration of Markowitz's theory, the CAPM model became a *benchmark* for comparing profitability of investment fund performance. One of the first publications evaluating returns achieved by investment funds was the analysis of 115 investment funds covering the years 1945-1964, conducted by Jensen (1969). The results of the analysis showed that investment funds achieve abnormal rates of return; however, taking into account the payment of fees and expenses, the researcher concluded that *"on average the funds apparently were not successful enough in their trading activities to recoup even their brokerage expenses"*. This indicates that activities undertaken with the use of relevant information do not guarantee generating profits exceeding the average rate of return. The above mentioned conclusions are meant to be treated as supporting evidence for the hypothesis of the strong form efficiency of a market. Other research, conducted by Jaffe (1974), produced contrary results to Jensen's as presented above. This research showed the possibility of achieving profits superior to the market average by using non-public information, and therefore rejected the hypothesis of the strong form efficiency of a market. In respect to the research on the strong form efficiency one can come across the above mentioned analysis of investment fund results and another analysis of profitability of recommendations prepared by professional analysts. The issue provides both arguments for a discussion on the semi-strong and the strong form efficiency theory, due to the inconsistencies in assigning recommendations to the set of public or non-public information. Moreover, it is difficult to determine which subset of information available to an analyst has more significant influence on assets evaluation. The presented research results were obtained in the course of an *ex post* analysis of non-public information. The significant part of the research conducted in the initial development stage of the subject provides evidence for the statistical and economic relevance of recommendations and reports prepared by professional analysts in the process of achieving abnormal rates of return. The results of the research conducted on the American market by Ambachtsheer (1972, 1974) and on the British market by Fitzgerald (1975), provide reasons to reject the strong form efficiency market hypothesis of a given capital market and to admit the possibility of "beating the market". Nevertheless, the reliability of the above mentioned papers was challenged by Elton and Gruber (1998), who criticized the selection of data used in the research. There was a suspicion that the process of providing access to the reports by the recommending institutions may have been linked with manipulating some *ex*

post data. The aforementioned accusation was refuted by Dimson and Marsh (1984), who based their research on a large set of information produced by the investment fund operating on the British market. The data used for the analysis was gathered from 35 brokerage houses and they referred to 200 companies listed on the British capital market. The authors, on the basis of a set of almost 4000 forecasts, proved poor dependency between the forecast returns and those actually realized. It shows that professional analysts are not able to forecast movement of asset prices. Nevertheless, transactions completed on the basis of such recommendations allowed investors to achieve better results in a given period than one would achieve in the case of a reference interest rate. Up to this point one can draw the conclusion that non-public recommendation and forecasts prepared by analysts allow investors to “beat the market”, which in turn contradicts the existence of the strong form efficiency of a market. Research conducted by Keown and Pinkerton (1981), however provided evidence for achieving abnormal rates of return by insiders before the public announcement of planned mergers. The research refers to the years 1975-1978 and covers 194 companies. The analysed rates of return allow us to make an assumption that trade and use of non-public information is a common practice. According to the authors, making use of non-public information within a period of 12 days before its announcement, enables investors to achieve abnormal rates of return. These results obviously contradict the hypothesis on the existence of the strong form efficiency of a market. The results obtained by Morse (1980) and Penman (1982) proved the inefficiency of the American stock market. Morse has shown significant increase of sales volume and possibility of achieving abnormal rates of return one day before publishing the report of a merger or the financial statements of a company. At the same time Penman made use of data collected by U.S. SEC (Security and Exchange Commission), which gathers and analyses data on almost 8000 stocks, 15000 investment funds and many other financial instruments and institutions.¹ He proved that insiders may achieve premium profits by buying assets just before the public announcement of the information and selling them straight after it takes place. This means that insiders possessing non-public information, which is not reflected in the share price, can “beat the market” in the short run. It would support the hypothesis previously brought forward by other researchers. Evidence for the possibility of achieving abnormal rates of return through the use of non-public information was presented and there were a number of research works rejecting the hypothesis of the strong form efficiency of capital markets.

1. See: <http://www.sec.gov>.

Other researchers dealing with the subject were Kara and Denning (1998). They analysed 370,000 transactions carried out by insiders in the years 1979-1980, with help of the U.S. SEC. The hypothesis of the strong form efficiency of the financial instruments' market (N.Y.S.E. and Amex) was rejected on the basis of the collected data on purchases and sale transactions of financial instruments by insiders. It was established that the average return from the analysed funds was on average 3% higher than the reference rate of return, even though *circa* 40% of the completed transactions were deemed unprofitable.

Brown, Richardson and Trzcinka (2003) verified the strong form efficiency of the Canadian stock market. In their work they analysed forecasts of stock prices made by brokerage companies' analysts and proved that the analysts operating on the Canadian market had access to non-public information. The article demonstrated that the choice between CAPM and ATP models has no impact on the results of the analysis, which confirms the fact that the analysts have access to relevant non-public information enabling them accurately to forecast movements of prices. These findings imply that forecasts made by analysts are an accurate estimator of the future situation on the market and they contradict the strong form efficiency of the stock market in Toronto. Therefore, numerous publications indicate that early identification of new information may bring considerable profits. Insiders who trade with the use of non-public information may achieve abnormal rates of return, which contradicts the hypothesis of the strong form efficiency.

In comparison to the extensive literature on the strong form efficiency published in other countries, research regarding the Polish capital market seems to be very limited. The only example of such research are papers analysing results obtained by investment funds operating on the Polish market. The estimation of the strong form efficiency of the Warsaw Stock Exchange in different development phases: hibernation, manipulation and speculation was carried out by Czekaj, Woś and Żarnowski (2001). They assessed the skills of selection and market timing of investment fund managers. According to the authors, the selectivity skill ought to be understood as "increasing the portfolio efficiency by a wise choice of stocks based on public as well as non-public information" and the timing skills as "choosing the right time for changing the proportion of risky assets in a portfolio" (Czekaj, Woś, Żarnowski, 2001, p. 133). The latter skill is closely correlated with the anticipation of the future situation on the market. The presented results (based on the ratios of portfolio analysis) show that information available to investment fund managers does not allow them to achieve abnormal rates of return, both in case of a wise selection of assets in the portfolio and making accurate forecasts of the economic situation on the market. In consequence, this supports the hypothesis of the existence of a strong form efficiency on the Warsaw Stock Exchange. Another Polish author conducting research in this area is Buczek (2005), who verified results of 12 existing investment funds, which operated in the period 2001-2004 and 6 funds,

which were set up during that time. The research hypothesis presented referred to the possibility of achieving abnormal rates of return from investment funds, which changed their managers or were newly created. His results confirmed the thesis of achieving abnormal rate of return in both cases, which could indicate that the Warsaw Stock Exchange was inefficient in its consolidation phase. Nevertheless, according to Buczek (2005, p.163), the obtained results do not present the evidence in the discussion on the strong form efficiency. According to his conclusions it is impossible to verify in practice the strong form efficiency. Therefore the above mentioned research results relating to the Polish capital market provide no clear answers. This indicates the need to conduct further research on the topic, aiming to verify the strong form efficiency hypothesis using a different approach.

Research hypotheses and methodology

The following methodology devised by the authors aims to verify two research hypothesis:

RH I: Having access to information set Φ_{t-1} allows the institution issuing recommendations to achieve positive capital flow in the period between receiving the information and the moment of its publication in the form of a recommendation in period t .

RH II: Having access to information set Φ_{t-1} allows the institution issuing recommendations to achieve abnormal rates of return in period $(t-1, t)$ in reference to the market index rate of return, i.e. WIG index (if and only if the **RH I** is true).

The lack of evidence to reject **RH I** and **RH II** will allow formulation of a thesis that there is no strong form of market informational efficiency of selected stocks quoted on the Warsaw Stock Exchange.

The strong form efficiency hypothesis of the Polish capital market was verified with the use of statistical and econometric methods. The analysis of correlations and one of the regression methods (depending on the properties of the analysed empirical data) was to provide information on the potential relationships between the analysed random variables. The analysis of the efficiency of the part of the Polish capital market included three random variables:

X - random variable "recommendation" with values of "buy", "neutral" or "sell",

Y - return from a financial instrument, which is an element of the WIG 20 index between the moment of receiving access to information set Φ_{t-1} and the moment of its publication (assuming a 5 working day period length between them),

Z - return from the WIG index – as a measure corresponding to the possibility of achieving superior profits to a stock recommended in the period of the analysis $(t-1, t)$ (assuming a 5 working day period length between them).

For the purpose of the analysis the 'recommendation' random variable has been presented in the following way:

$$X_{nt} = \begin{cases} 1 & \text{for the recommendation value } \textit{buy} \text{ for } n\text{-th company in period } t \\ 0 & \text{for the recommendation value } \textit{neutral} \text{ for } n\text{-th company in period } t, \\ -1 & \text{for the recommendation value } \textit{sell} \text{ for } n\text{-th company in period } t. \end{cases}$$

Due to the wide and differentiated (in terms of nomenclature used by the recommending institutions) set of recommendations used in the research, it was necessary to classify each kind of recommendation into one of the recommendation values. Table 1 shows the distinction established after conducting a thorough analysis of contents of the available recommendations.

Table 1. Classification of recommendation values

Positive (buy)	Negative (sell)
above the market	sell
over the market	avoid
better than the market	reduce
capitalize	take profit
buy	below the market
definitely buy	limit
buy speculative	worse than the market
overweight	underweight
hold	

Source: Own analysis

Moreover, the realization of random variables Y and Z were defined in the following way:

- rate of return from n – th instrument at moment t :

$$y_{nt} = \frac{p_{nt+1} - p_{nt}}{p_{nt}}, \quad t = 1, 2, \dots, T - 1; \quad n = 1, 2, \dots, N, \quad (15)$$

where:

p_{nt} - price of n - th asset at moment t ,

p_{nt+1} - price of n - th asset at moment $t + 1$.

- rate of return from the WIG index in period t :

$$z_{Mt} = \frac{p_{Mt+1} - p_{Mt}}{p_{Mt}}, \quad t = 1, 2, \dots, T-1 \quad (16)$$

where:

p_{Mt} - value of the WIG index at moment t ,

p_{Mt+1} - value of the WIG index at moment $t + 1$.

Scope and assumptions of the empirical research

- The research on the strong form efficiency of the Warsaw Stock Exchange covers the period between 01.01.2005 - 31.03.2010. The reason for choosing the presented start date is that most authors specializing in the analysis of the life cycle of the stock market refer to year 2005 as the beginning of the maturity phase of the Warsaw Stock Exchange. This choice may also be supported by the fact that Poland joined the European Union a few months earlier.
- The entities covered by the research are companies comprising the WIG 20 index at the time of conducting the analysis. Therefore, the research also covered companies which on the 31.03.2010 were not a part of the WIG 20 index. The companies of the WIG 20 index were collected from the website: www.gpw.pl/zrodla/gpw/spws/portfele,
- Table 2 shows the number of recommendations available between 01.01.2005 and 31.03.2010 (the elements of the index are revised every quarter), whereas in most cases the recommendations were of “buy” and “sell” values.
- The recommending institutions (63 entities) are: ABN AMRO, DM BOS, Erste Bank, ING, Pioneer PDM, Fortis Securities Polska, DI BRE Banku, Nomura, Wood & Company, IDSMA, Morgan Stanley, BNP Paribas, CSFB, Societe General, J.P. Morgan, Lehman Brothers², PBK AM, DM Penetrator³, Suprema⁴, Millennium DM, KBC Securities, UniCredit CAIB, CDM PEKAO, DM BZ WBK, ING Securities, Merrill Lynch, SSSB, Citigroup, Elimar, AmerBrokers, DM BH, Deutsche Bank, Goldman Sachs, DM Polonia NET, DM Ipopema, BM Banku BPH, DM PKO BP, HSBC Securities, Raiffeisen, WDM, BDM, USB Warburg, BM BGZ, BM BISE⁵, Macquarie, BM DnB Nord, Otkriete Securities, CSFB, Bank of America, Barclays Bank.

2. The Bank declared bankruptcy on 15 September 2008 and was taken over by Barclays Bank and Nomura.

3. 2009 taken over by DM Trigon.

4. Since the year 2009 has functioned under the name Copernicus Securities.

5. Taken over by Bm DnB Nord.

Table 2. Number of recommendations for WIG 20 companies in the period 01.01.2005 - 31.03.2010.

Company	Companies' Code	Number of recommendation
Agora S.A.	AGO	185
Asseco Poland	ACP	115
Bank Pekao S.A.	PEO	198
Bank Zachodni WBK	BZW	200
Bioton	BIO	29
BRE Bank	BRE	170
Cersanit S.A.	CST	83
CEZ	CEZ	82
Getin Holding	GTN	70
Globe Trade Centre	GTC	88
Grupa LOTOS	LTS	131
KGHM Polska Miedz	KGH	195
PBG SA	PBG	79
PKN Orlen	PKN	206
PKO BP	PKO	233
Polimex-Mostostal	PXM	100
Polnord	PND	18
PGNiG	PGN	132
Telekomunikacja Polska S.A.	TPS	220
TVN	TVN	178
Kety	KTY	117
Netia	NET	68
rokom (presently Asseco Poland)	PKM	64
Bank BPH	BPH	80
Mol	MOL	92
Orbis	ORB	43
CompLand/Sygnity	CPL/SGN	111
Boryszew	BRS	0
ftbank (presently Asseco Poland)	SFT	63
Mondi Swiecie	MPP	94
Debica	DBC	16
Stalexport	STX	0
Polska Grupa Energetyczna	PGE	10
	Total	3470

- All recommendations have their preparation date stated. It was assumed, that the information published in the recommendations was known by the institutions as non-public information 5 days prior to its announcement.
- More than 95% of recommendations referred to average term, that is why the research focused only on the period defined as the 6-month verifiability period of a recommendation, under the assumption that no new information was published.
- Recommendation set (3470 events) was downloaded from the website: www.bankier.pl

- Due to shortage or insufficient number of recommendations (less than 30) the analysis does not include the following companies: Bioton, Boryszew, Dembice, PGE, Stalexport i Polnord. What is more, Prokom and Softbank were also excluded from the research, because they were taken over by Asseco Poland. The final number of companies covered by the research is 25, with the total number of recommendations amounting to 3270.
- The rate of return values (based on the opening price) referring to the analysed stocks and values of the WIG index were collected from the website: *www.bossa.pl*
- The conducted analysis excluded recommendations of a “neutral” value, because they do not favour the decision making process and therefore provide no added value to the research.
- The regression analysis considers only case studies, where the sign of the rate of return from the stock is equivalent to the sign of recommendation variable.

Results of the empirical research

The analysis of the correlation between the conformity of the recommendation sign and the movement of the asset price (i.e. rate of return sign) was conducted for the one-sided alternative hypothesis ($H_1: \rho_{XY} \neq 0$) at the significance level $\alpha=0,05$. The results obtained are presented in Table 3.

The analysis of the correlation between variables of the recommendation and the rate of return of the recommended instrument shows in most cases (22 out of 25 cases) the absence of such correlation or poor correlation between variables and therefore this correlation is not statistically significant. The only correlation coefficient estimator statistically different from 0 was found in the case of the following companies: Bank Zachodni WBK, Mol and Polimex-Mostostal, -27,54, -36,37 and -56,74, respectively. Nevertheless, in each of these cases the sign of the estimator contradicts the ability to estimate the movement of the asset's price in the period of the analysis ($t-1, t$). Moreover, the correlation analysis conducted for the whole information set (3270 events), considering all analysed assets, confirms the obtained results for assets handled individually. In such cases the correlation coefficient estimator amounted to -1,57. All in all, in most cases the institutions issuing recommendations having access to information set Φ_{t-1} did not achieve a positive cash flow in period ($t-1, t$), which is a premise for rejecting **RHI** and supporting the hypothesis of the strong form efficiency on the Warsaw Stock Exchange.

The application of the regression method requires firstly the verification of assumptions of the Gauss-Markov method of least squares, referring to autocorrelation and homoscedasticity of the residuals. The authors used the Durbin-Watson test to verify the autocorrelation of the residuals with the use of the first order condition. The conducted analysis eliminated the possibility of using the method of least squares for the following companies: Compland/Sygnity, KGHM Polska Miedź, PGNiG i

PKO BP. The homoscedasticity was in turn verified by conducting the F-test, which provided results rejecting the hypothesis of homoscedasticity of the residuals for the following companies: Asseco Poland, Grupa LOTOS, Mondi-Świecie i PGNiG. In a further part of the analysis the authors use the generalized least squares method (GLS) to estimate the structural parameters of regression in case of autocorrelation and/or homoscedasticity of the residuals for the above mentioned companies.

Table 3. The analysis of correlations between variables X and Y for companies making up the WIG 20 index in the period 01.01.2005 - 31.03.2010.

Company	ρ_{XY} [in%]	t-student test	p-value	Hypothesis
Agora S.A.	12,16	1,42	0,08	H_0
Asseco Poland	6,11	0,43	0,32	H_0
Bank BPH	10,51	0,77	0,21	H_0
Bank Pekao S.A.	-3,56	-0,14	0,39	H_0
Bank Zachodni WBK	-27,54	-2,38	0,01	H_1
BRE Bank	2,75	0,21	0,41	H_0
Cersanit S.A.	3,09	0,14	0,43	H_0
CompLand/Sygnity	-12,47	-1,07	0,17	H_0
CEZ	-12,11	-1,12	0,15	H_0
Getin	-5,22	-1,17	0,15	H_0
Globe Trade Centre	-4,33	0,52	0,28	H_0
Grupa LOTOS	7,12	0,55	0,31	H_0
Kęty	-0,55	-0,04	0,48	H_0
KGHM Polska Miedź	14,49	1,37	0,07	H_0
Mol	-36,37	-3,07	0,02	H_1
Mondi Swiecie	13,26	1,01	0,14	H_0
Netia	6,02	0,29	0,37	H_0
Orbis	-7,67	-0,43	0,31	H_0
PBG SA	6,83	0,14	0,45	H_0
PGNiG	3,91	0,16	0,41	H_0
PKN Orlen	-6,67	-0,76	0,29	H_0
PKO BP	-2,71	-0,35	0,42	H_0
Polimex-Mostostal	-56,74	-4,11	0,00	H_1
TP S.A.	-0,77	-0,09	0,46	H_0

Source: Own analysis

The analysis of the coefficient of determination and the linear correlation between variables allow us to define the model and quality of the conclusion. The empirical results excluded companies with no linear correlation between the analysed variables, among them: Netia, Orbis, PGNiG i Polimex-Mostostal. Moreover, they were characterized by a very low coefficient of determination.

The last stage of verifying the **RH II** is the analysis of alternative hypothesis in the following form: $H_0: \beta_1 = 0$ versus $H_1: \beta_1 \neq 0$. What is more, next to the analysis of significance of the structural parameter, the most important aspect is to draw conclusions on the basis of structural coefficients' values, and therefore when $\beta_1 > 1$, one can support the **RH I** and reject the hypothesis of the strong form efficiency of chosen shares listed on the Warsaw Stock Exchange. The results of this part of the research are presented in Table 4.

Table 4. The analysis of the structural coefficient for companies making up the WIG 20 index in the period 01.01.2005 - 31.03.2010.

Company	$\hat{\beta}_1$	t -student test	p -value	Hypothesis
Agora S.A.	0,82	2,55	0,01	H_1
Asseco Poland	0,71	5,33	0,00	H_1
Bank BPH	0,71	2,53	0,02	H_1
Bank Pekao S.A.	0,94	9,87	0,00	H_1
Bank Zachodni WBK	0,84	3,73	0,00	H_1
BRE Bank	1,09	6,31	0,00	H_1
Cersanit S.A.	1,45	2,02	0,04	H_1
CEZ	0,57	2,11	0,04	H_1
Getin	0,87	9,12	0,00	H_1
CompLand/Sygnity	0,57	2,43	0,01	H_1
Globe Trade Centre	0,71	2,23	0,04	H_1
Grupa LOTOS	1,05	2,55	0,02	H_1
Kęty	0,77	2,87	0,01	H_1
KGHM Polska Miedź	1,51	6,54	0,00	H_1
Mol	0,77	3,02	0,03	H_1
Mondi-Świecie	0,86	2,12	0,04	H_1
PBG SA	0,81	5,12	0,00	H_1
PKN Orlen	0,83	4,72	0,00	H_1
PKO BP	0,84	6,27	0,00	H_1
TP S.A.	0,76	6,03	0,00	H_1

Source: Own analysis

The results of the analysis confirm in each case the statistical significance of the structural parameter $\hat{\beta}_1$ ($p < \alpha$). Nevertheless, the analysis of the parameters does not provide an unequivocal answer to the question about the possibility of achieving the above-market returns. The following companies were described by the $\hat{\beta}_1 > 1$ coefficient: Bank Pekao S.A., BRE Bank, Cersanit S.A., Grupa LOTOS i KGHM Polska Miedź. However, when estimating the confidence intervals for each of those cases, with confidence level equal to $\alpha = 0,01$ holds that $\hat{\beta}_1 - t_{(\alpha, T-3)} D(\hat{\beta}_1) < 1$ in 4 of 5 cases, which could be caused by estimator variance. Nonetheless, further analysis of the results shows that in most cases (17 out of 21 observations, i.e. 76% of cases) having access to the information set Φ_{t-1} could not guarantee the achievement of an abnormal rate of return. The results of the research point to the rejection of **RH II** and support the hypothesis of the strong form efficiency of the WIG 20 index shares, which could be treated as a representative stock portfolio for the Warsaw Stock Exchange.

Conclusions

Can the use of non-public information in developing investment strategies help to “beat the market” and are there grounds for accepting or rejecting the hypothesis of the strong form efficiency of the Polish capital market? The following paper aimed at answering these questions. The results obtained in course of the empirical research provided arguments for rejecting **Research hypothesis I** and in most cases also **Research hypothesis II**, and therefore, they support the thesis of the existence of the strong form efficiency of the Warsaw Stock Exchange. Nevertheless, the results do not allow us to draw unequivocal conclusions and cannot be related to each capital market. The aim of the following paper was rather an attempt to conduct introductory research into a complex problem and use the results obtained to initiate further and more detailed research into the issue. The possible confirmation of the obtained thesis may play a crucial role in building investment portfolios, because, even if access to some information does not guarantee the achievement of abnormal rates of return, all costs incurred in order to get the information automatically become unjustified financial losses. In such circumstances technical and fundamental analysis, as well as the use of non-public information, does not allow investors to “beat the market”, giving arguments for constructing passive portfolios as the best investment strategy. These most often are replaced by the market capitalization-weighted index or investment in Index Participation Units, which, from the perspective of reducing transaction costs and mitigating risk, could be an attractive investment alternative.

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Economy and Society in Europe: A Relationship in Crisis

edited by L. Burroni, M. Kuenne and G. Meardi

Edward Elgar Publishing Lt. 2012, pp. 256

reviewed by Theodore P. Lianos*

This volume consists of ten papers presented at a meeting in Venice. The occasion for the meeting was to celebrate Colin Crouch's career, in the year of his 65th birthday. All the authors of these papers are Professor's Crouch's former students and research assistants and all the papers are in the spirit of Crouch's work.

The framework of the research presented in this volume is the relationship between economy and society and the influence of social institutions on the economy. According to the introductory chapter, written by Burroni, Kuenne and Meardi, the studies in this volume are guided by 'two major dimensions of the study of contemporary capitalism: (i) the prevalence of a variety of models of capitalism with different relationships between economy and society, and (ii) the occurrence of changes in these models as actors confront their ideas and interests and react to changing contexts'. The source of inspiration is the 'governance approach', that is, the study of the role of various forms of governance pertaining to the state, the society and the economy, and their interactions. Basically, the idea here is to examine how, in specific capitalist environments, various powerful groups, representing specific interests, act and interact and what results they produce. As such, this area of research is of great theoretical and practical (political) interest.

In addition to the very informative introduction, this volume also contains a paper by Kuenne entitled 'The Social Dimension of European Integration', a paper by A. Hemerijk on the political economy of social investment, an empirical paper by T. Jurado-Guerrero, M. J. G. Lopez and M. Naldini on gender, family and the labor market, a paper by S. Jong on academia's place in Europe, a paper by G. Meardi on industrial relations in the European state tradition, a paper by R. Erne on European unions after the crisis (of 2008), a paper by R. Le Gales on States in transition, a paper by U. Glassmann on changing varieties of capitalism, a paper by Burroni on economy and society in European cities and a paper by H. Farrell on social institutions among economists.

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The papers in this volume are all interesting. They all have something to say about the relationship between the economy, society and the State - which is the focus of this group of researchers. However, as is usually the case, the papers differ in originality and in depth of analysis. Some papers seem to be prepared for the occasion of the meeting, while other papers are the result of extensive research projects.

Given this reviewer's tastes and biases the best pieces in this volume are the papers by Meardi on industrial relations, by Erne on European unions and by Jurado-Guerrero *et al.* on gender, family and the labor market. It is interesting that the econometric analysis of the last paper rejects the authors' new hypothesis (conflict hypothesis), namely that a 'high degree of conflict within couples in the organization of housework reflects an intense bargaining process', and thus they 'expect that higher degrees of conflict produce an increase in male participation in household work'.

Two minor but related points. In a book of papers on this subject matter, namely the economy and society, one would expect to find Marxian and Marxist ideas appearing and mentioned directly or indirectly. Yet there is only one indirect reference to Marx (p. 1020) and a passing comment on Marx and on Marxist accounts of the State (p.144). This is perhaps explained by the fact that perhaps all of this group of researchers - and certainly R. Erne - reject the Marxian notion of the primacy of the economy in determining the social structure. Erne clearly states that the primacy of society over the system ought to be restored.

My second point has to do with the characterization of money as a fictitious commodity. I think it is erroneous to put together labor, land and money as fictitious commodities, as Erne does following Polanyi. It is basically correct, in an historical context, to say that labor and land were not originally produced for the market and therefore they may be thought of as fictitious commodities. But I believe money is different for two reasons. First, money is not in general and in principle an object of exchange (except in the foreign exchange markets). Second, money was originally produced together with the market. It did not exist before the market. By definition, the act of exchange, which requires a market, implies the existence of money in some form. In other words, money without a market has no meaning.

In overall terms, those readers who want to know what is going on in the European economy and society, beneath the surface of things, will find this volume very rewarding.

announcement

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**SYSTEMIC ECONOMIC CRISIS:
CURRENT ISSUES AND PERSPECTIVES**

May 30-31st, 2013
in Skopje
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Deadline for receipt of abstracts: November 15th, 2012

Deadline for receipt of papers: February 15th, 2013

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We welcome submissions addressing the ASECU 2013 International Conference theme:

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The conference objectives are:

- Assessing the alternative models of economic growth and development as a response to the systemic economic crisis;
- Determining challenges of the macroeconomic policies posed by the fiscal constraints and the way of their overcoming;
- Accessing the perspectives of regional integration in Europe by putting focus on further deepening of the integrative processes, particularly in the area of fiscal policies;
- Analysis of the impact of the systemic economic crisis on various aspects of the business environment and the investment climate ;
- Searching for new business opportunities by enhancing regional cooperation and supporting technical innovations and Green Economy.

Accepted papers will be published in a review book only after their presentation in the Conference.

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The conference official language will be English.

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- Abstracts should be written in letter quality type Times New Roman, font 10, line spacing single, top 5 cm, bottom 5 cm, left 4.4 cm, right 4.2 cm, gutter 0 cm, header 4 cm, footer 4 cm. Between paragraphs one line space; paragraph justify.
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