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Nonlinear Co-Integration Between Unemployment and Economic Growth in South Africa

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In this paper, a momentum threshold autoregressive (MTAR) model is used to evaluate nonlinear equilibrium reversion between unemployment and economic growth for South African data between the periods 2000–2013. To attain this objective we estimate the first-difference and the gap model variations of Okun's specification. For the latter model variation, we employ three de-trending methods to obtain the relevant 'gap' data; namely, the Hodrick-Prescott (HP) filter, the Baxter-King (BK) filter and the Butterworth (BW) digital filter. A common finding from our empirical analysis is that Okun's law holds concretely for South African data regardless of the model specification or the de-trending technique that is used. Moreover, our analysis proves that unemployment granger causes economic growth in the long-run, a result which may account for the jobless-growth phenomenon experienced by South Africa over the last decade or so.

Key Words: unemployment, economic growth, Okun's law, South Africa, MTAR model, nonlinear unit root tests, nonlinear co-integration, nonlinear Granger tests, Hodrick-Prescott filter, Baxter-King filter, Butterworth high-pass filter

JEL Classification: C22, C51, E23, E24

Introduction

High economic growth in conjunction with low unemployment under a low inflation environment can be deemed as the ultimate objective of macroeconomic policy in South Africa. Over the last decade or so, two prominent macroeconomic policy frameworks have embodied these objectives, those being, monetary policy's 'inflation-targeting' regime and fiscal policy's Accelerated and Shared Growth Initiative of South Africa (ASGISA). Implemented in February 2002 and still in use to date, the inflation-target policy rule specifies that the South African Reserve Bank (SARB) should contain inflation at levels of between 3 and 6 percent, whereas the ASGISA initiative seeks to halve unemployment and attain a

6% economic growth rate by the year 2014. The assumed compatibility of the aforementioned policy objectives is inevitable demonstrated as monetary policy in South Africa is designated towards manipulating nominal variables like interest rates and inflation as a means of influencing real variables such as output growth and employment. Ultimately, the success of disinflation policy is reflected in its effect on unemployment and output growth. However, up-to-date South Africa has not only to managed to achieve arguably the highest economic growth rates in Africa since 1994, but the economy simultaneously boasts one of the highest youth unemployment rates in the world. So even though the South African Reserve Bank (SARB) can be credited for containing inflation within its set target which has been accompanied with steadily improved economic growth, such acquired growth has been characterized by what is popularly referred to as a 'jobless growth' syndrome (Hodge 2009). A mystery is warranted since the 'jobless growth' phenomenon contradicts the epic rise of unemployment caused by the sharp decline of real output experienced worldwide during the great depression. Therefore, a classical challenge for academics and policymakers alike is to provide an adequate account of unemployment-growth correlations in the South African economy.

The question regarding the linkage between economic growth and unemployment gained prominence after Okun (1962) depicted the extent to which the unemployment rate is negatively correlated with output growth. By analyzing data over the period of 1947 to 1960, Okun (1962) documented that unemployment in the United States tends to fall by a one percentage point for every 3 percentage point rise in output growth. Thereafter, the United States was dubbed as having an estimated 'Okun coefficient' of 3 and a plethora of subsequent authors sought to estimate Okun's coefficient by either adopting a single-country approach (see Caraiani 2010; Ahmed, Khali, and Saeed 2011), panel-data approach (see Dixon and Shepard 2002, 1997; Lal et al. 2010) or a multi-regional approach (see Freeman 2000; Adanu 2005; Villaverde and Maza 2009). The appeal of Okun's relationship is attributed to its simplicity and its extensive empirical support qualifies it to belong at the core of modern macroeconomics (Jardin and Gaetan 2011). As noted by Silvapulle, Moosa, and Silvapulle (2004), estimating the Okun coefficient has important implications for the business cycle since it relates the level of activity in the labour market to the level of activity in the product market. Whilst Okun's law implies that more labour is typically required for increased productivity

levels, Okun's coefficient serves as an indication of the cost of unemployment in terms of output growth (Noor, Nor, and Ghani 2007). And in consolidation with the Phillips curve; Okun's relationship assists macroeconomic policy in determining the optimal or desirable growth rate as a prescription for reducing unemployment (Moosa 1997). Overall, Okun's law is recommended as 'a rule of thumb' which provides policymakers with an understanding of how different markets adjust, and thus allowing for correct policies to be selected when facing shocks (Pereira, Bento in Silva 2009).

In reality, Okun's law is more of a statistical relationship rather than a structural feature of the macroeconomy (Knotek 2007). The development of a pure theoretical foundation for Okun's relationship has been largely neglected in the academic literature, such that empirically, no functional form has been dominantly preferred to any other on the basis of theory (Weber and West 1996). As a consequence, the empirical examination of Okun's law is typically subject to revisions with the co-movement between output growth and unemployment frequently being analyzed under different settings. So while there is no contention on the importance of Okun's law, debates have evolved on the econometric techniques used to establish this relationship; how the cyclical components are extracted; and whether a dynamic or static specification is adopted (Turturean 2007). Recently, the possibility of asymmetric behaviour between economic growth and the unemployment rate has added a new dimension in the development of the academic literature. Take for instance Jardin and Gaetan (2011) who consider asymmetries in Okun's relationship as being important because asymmetric behaviour can adequately account for the varying effectiveness of structural and stabilization policies.

Other commentators, such as Geldenhuys and Marnikov (2007), consider the impact of asymmetric behaviour on policy forecasting practices. In particular, these authors argue that if Okun's relationship is indeed found to be asymmetric, forecasts based on linear estimates of Okun's coefficient can lead to biased error terms. And yet another cluster of authors can also be identified, who advocate on the necessity of incorporating asymmetries in Okun's relationship as a means of reinforcing asymmetric behaviour in the Phillips curve. The rationale behind this line of thought is that if Okun's coefficient changes between regimes, then the sacrifice ratios should also change between regimes. In other words, different degrees of gradualism in the disinflation process may imply different im-

pacts on unemployment for the same reduction in inflation (Beccarini and Gros 2008).

Our study contributes to the literature by addressing the economic significance of asymmetric behaviour in Okun's relationship for South African data. To this end, our study makes use of the momentum threshold (MTAR) autoregressive framework of Enders and Granger (1998). The logic behind the choice of our adopted approach can be described as follows. Engle and Granger (1987) argue that evidence of unit roots between a pair of time series variables necessitates the use of co-integration analysis prior to the estimation of any regression formed by the variables. According to the authors, the presence of co-integration would then imply that the variables follow a common long-run trend and the OLS estimation of the time series will not yield spurious results. This is an important implication for our case study since previous empirical works have cautioned of unit root I(1) behaviour in output growth and unemployment variables for South African data (see Hodge 2006; Burger and Marnikov 2006; Gupta and Uliwingiye 2010). And yet it should also be noted that these conclusions are based on studies which assume a linear data generating process (DGP) among the series. Of recent, it has become widely accepted that standard unit root tests, suffer from low power when a linear approximation of an otherwise nonlinear time series is used to evaluate the integration properties of a time series (Enders and Granger 1998). A similar contention has risen for co-integration analysis, in which researchers like Enders and Dibooglu (2001) prove that the implicit assumption of symmetric adjustment is problematic if the adjustment towards long-run equilibrium is not linear. In particular, the authors argue that the presence of nonlinearities between a pair of time series signifies a high probability of nonlinear adjustment processes towards the long-run equilibrium for the data. With this in mind, our paper probes into the possibility of asymmetric behaviour between the unemployment rate and output growth using the MTAR model. We choose this model because it represents a simple yet flexible framework that can simultaneously facilitate for (1) nonlinear unit root tests, (2) nonlinear co-integration analysis; and (3) nonlinear causality analysis.

Therefore, against this backdrop, we present the remainder of the paper as follows. The following section of the paper presents the empirical framework of the study whereas section four presents the empirical results of the study. The paper is concluded in section five by providing policy recommendations and suggesting avenues for future research.

Empirical Framework

Our paper uses two classes of Okun's law specifications; namely, the first differences model and the gap model. To ensure that we obtain a balanced, robust view on the estimation results, we specify the Okun's specifications on both the direct and the reverse regressions of unemployment on output growth. For instance, in specifying the 'first differences' version of Okun's law, the link between the unemployment rate (ur) and economic growth (gdp) is represented as:

$$\begin{pmatrix} \Delta gdp_t \\ \Delta ur_t \end{pmatrix} = \begin{pmatrix} \beta_1 & 0 \\ 0 & \beta_2 \end{pmatrix} \begin{pmatrix} \Delta ur_t \\ \Delta gdp_t \end{pmatrix} + \begin{pmatrix} \xi_{t1} \\ \xi_{t2} \end{pmatrix}, \tag{1}$$

where Δ is the first difference operator such that $\Delta gdp_t = gdp_t - gdp_{t-1}$ and $\Delta ur_t = ur_t - ur_{t-1}$. On the other hand, the 'gap model' measures these variables in terms of their deviations from long-run trends and is specified as:

$$\begin{pmatrix} gdp_t^c \\ ur_t^c \end{pmatrix} = \begin{pmatrix} \beta_1 & 0 \\ 0 & \beta_2 \end{pmatrix} \begin{pmatrix} ur_t^c \\ gdp_t^c \end{pmatrix} + \begin{pmatrix} \xi_{t1} \\ \xi_{t2} \end{pmatrix}, \tag{2}$$

where $ur_t^c \equiv ur_t - ur_t^*$ and $gdp_t^c \equiv gdp_t - gdp_t^*$ are representative of the cyclical components of the unemployment rate and real output, respectively; with gdp_t^* denoting a measure of potential output gap and ur_t^* the unemployment gap variable. Having specified our baseline theoretical models, we can proceed to introduce co-integration analysis amongst the variables. We, therefore, take heed of Enders and Granger (1998) and model asymmetric adjustment between the unemployment and real output growth variables by allowing the residual deviations (i. e. ξ_{ti}) from the long-run equilibrium of regressions (1) and (2) to behave as a TAR process. Formally, these residuals are modelled as follows:

$$\delta\xi_{ti} = I_t\rho_1\xi_{t-1} + (1 - I_t)\rho_2\xi_{t-1} + \sum_{i=1}^{p}\beta_i\Delta\xi_{t-1} + \varepsilon_t. \tag{3}$$

In our paper, we identify four types of co-integration relations which govern the asymmetric dynamics within Okun's law, namely; TAR with a zero threshold; consistent TAR with a nonzero threshold; MTAR with a zero threshold; and consistent MTAR with a nonzero threshold. In the TAR model with a zero threshold, the indicator function, I_t, is set according to:

$$I_t = \begin{cases} 1, & if \backslash \xi_{t-1} \geq 0 \\ 0, & if\ \xi_{t-1} < 0 \end{cases}. \quad (4)$$

Under the TAR model with a nonzero threshold, we set I_t, as:

$$I_t = \begin{cases} 1, & if \backslash \xi_{t-1} \geq \tau \\ 0, & if\ \xi_{t-1} < \tau \end{cases}, \quad (5)$$

where τ is the value of the threshold variable. Enders and Granger (1998) suggest the use of a grid search procedure, as demonstrated in Hansen (1997), to derive a consistent estimate of the threshold i. e. the threshold estimate yielding the lowest RSS is considered the true threshold estimate. The TAR models are designed to capture potential asymmetric deep movements in the residuals if, for example, positive deviations are more prolonged than negative deviations (Enders and Dibooglu 2001). Enders and Granger (1998) and Caner and Hansen (2001) suggest that by permitting the Heaviside indicator function, It, to rely on the first differences of the residuals, $\Delta \xi_{t-1}$, a MTAR version of equation (11) can be developed. The implication of the MTAR model is that correction mechanism dynamic since by using $\Delta \xi_{t-1}$, it is possible to access if the momentum of the series is larger in a given direction relative to the direction in the alternative direction. In other words, the MTAR model can effectively capture large and smooth changes in a series whereas the TAR model shows the 'depth' of the swings in equilibrium relationship. In modelling MTAR threshold co-integration with a zero threshold, the indicator function M_t, is set as:

$$M_t = \begin{cases} 1, & if \backslash \xi_{t-1} \geq 0 \\ 0, & if\ \xi_{t-1} < 0 \end{cases}. \quad (6)$$

While in the MTAR model with a nonzero threshold, M_t, is set as:

$$I_t = \begin{cases} 1, & if \backslash \xi_{t-1} \geq \tau \\ 0, & if\ \xi_{t-1} < \tau \end{cases}. \quad (7)$$

For both TAR and MTAR specifications, Enders and Silkos (1998) demonstrate that a sufficient condition for stationary of ξ_{t-1} is that $\rho_1, \rho_2 <$ 0. If ξ_{t-1} is found to be stationary, the least squares estimates of ρ_1 and ρ_2 have an asymptotic multivariate normal distribution for any given value of a consistently estimated threshold. Moreover, the null hypothesis of no

co-integration (i. e. H_{01}: $\rho_1 = \rho_2 = 0$) can be formally tested using a standard F-statistic for both TAR and MTAR models. If the null hypothesis of no co-integration is rejected, it is possible to test for the null hypothesis of symmetric adjustment (i. e. H_{02}: $\rho_1 = \rho_2$) against the alternative of asymmetric adjustment (i. e. H_{12}: $\rho_1 \neq \rho_2$) using a similar F-test. The empirical F-distribution for the null hypothesis; $\rho_1 = \rho_2 = 0$ is tabulated in Enders and Dibooglu (2001) whereas Enders and Siklos (2001) report critical values for testing the null hypothesis of $\rho_1 \neq \rho_2$. If both null hypotheses of no co-integration and no asymmetric co-integration can be simultaneously rejected, the granger representation theorem is satisfied and thus an associated error correction model can be estimated for the pair of time series variables. Thus in validating the presence of threshold co-integration, the error correction model can be modified to take into account asymmetries as in Blake and Fomby (1997). In our study we augment each of our threshold co-integration regressions with thresholds error correction specifications. In particular, the TAR-TEC model can be expressed as:

$$\begin{pmatrix} \Delta gdp_t \\ \Delta ur_t \end{pmatrix} = \lambda_{11} I_t \xi_{t-1} + \lambda_{12} (1 - I_t) \xi_{t-1}$$

$$+ \sum_{i=1}^{p} \alpha_{1i} \Delta gdp_{t-1} + \sum_{i=1}^{p} \beta_{1i} \Delta ur_{t-1}. \tag{8}$$

Whereas the MTAR-TEC model is specified as:

$$\begin{pmatrix} \Delta gdp_t \\ \Delta ur_t \end{pmatrix} = \lambda_{21} M_t \xi_{t-1} + \lambda_{22} (1 - M_t) \xi_{t-1}$$

$$+ \sum_{i=1}^{p} \alpha_{2i} \Delta gdp_{t-1} + \sum_{i=1}^{p} \beta_{2i} \Delta ur_{t-1}, \tag{9}$$

where the indicator functions for the TAR and MTAR model specifications are represented by I_t and M_t respectively. Through the above described systems of error correction models, two types of joint hypotheses can be tested. Firstly, the presence of asymmetries between the variables could initially be examined by examining the signs on the coefficients of the error correction terms. This involves testing the null hypothesis of H_{03}: $\lambda_{i1} \xi_{t-1} = \lambda_{i2} \xi_{t-1}$ against the alternative H_{13}: $\lambda_{i1} \xi_{t-1} \neq \lambda_{i2} \xi_{t-1}$. The second type of hypothesis tested is that of granger causality effects which

relatively examines whether all Δgdp_{t-k} and Δur_{t-k} are statistically different from zero. Granger tests are used to examine whether the lagged values of one variable do not improve on the explanation or 'granger-cause' another variable. In particular, the null hypothesis that urt does not lead to gdpt can be denoted as: $H_{04}: \alpha_i = 0, i = 1, \ldots, k$; whereas the null hypothesis that gdp_t does not lead to ur_t is: $H_{05}: \beta i = 0, i = 1, \ldots, k$. All aforementioned hypotheses are based on a standard F-test. Furthermore, three types of joint hypotheses can be formed from the TEC model. Firstly, granger causality tests can be implemented by testing whether all Δgdp_{t-k} and Δur_{t-k} are statistically different from zero based on a standard F-test and if the λ coefficients of the error correction are also significant.

Empirical Analysis

EMPIRICAL DATA

The data used in the empirical analysis consists of the annual percentage change in the real gross domestic product which is gathered from the South African Reserve Bank (SARB) online database whereas the unemployment rate for all persons aged above 15 years of age is collected from various issues of the quarterly labour force surveys (QLFS) as complied by Statistics South Africa (STATSSA). Our empirical analysis uses quarterly adjusted data obtained for the periods extending from 2000 to 2014. The choice of our sample period and periodicity reflects the limitations in the availability of the time-series data on unemployment and economic growth for South Africa. Although it would be desirable to employ a longer span of data, the available data provides the advantage of avoiding the issue of potential structural breaks related to South Africa's political and structural reforms such as those experienced in 1994. Moreover, we take note that while our data is relatively short, it is, however, up-to-date and further eliminates the problem of data unreliability associated with the South African unemployment series before 2000. Further given that gross domestic product is available on a quarterly basis and the unemployment rate is limited to half-yearly data, we use cubic spline interpolation to convert the half-yearly unemployment data into quarterly data over the same time period. We favour the use of cubic spline interpolation over other time series data conversion techniques due to its computational accuracy and stability of computation. Moreover, cubic spline interpolations satisfy the further condition at the end point.

As a part of our data construction, we introduce the de-trending meth-

ods used to extract the 'potential output' and 'unemployment gap' variables necessary to estimate the gap version of Okun's specification. The construction of these 'gap variables' is necessary since there exists no observable data on the trend components of the unemployment and output growth variables. Also taking into consideration that a majority of these de-trending techniques are not without scepticism, it is standard practice to apply a variety/different de-trending techniques to ensure robustness in the regressions analysis. Therefore in following along this course of reasoning, our study considers three alternative de-trending techniques, namely the Hodrick-Prescott (HP) filter; the Baxter-King (BK) filter and the Butterworth (BW) digital filter as respectively introduced by Hodrick and Prescott (1997), Baxter and King (1999); and Pollock (2000). The purpose of using these three de-trending techniques is to enable a robust analysis concerning the sensitivity of the estimated Okun's coefficient to the different choices of our gap variable estimates.

UNIT ROOT TESTS

In testing for unit roots, we begin on the simple premise of subjecting a univariate time series, y_t, to the following generalized autoregression:

$$Y_t = \varphi y_{t-1} + \varepsilon_t, \quad \varepsilon_t \sim N(0, \sigma_\varepsilon^2). \tag{10}$$

Heuristically, one can test the null hypothesis of a unit root as $H_0: \varphi = 1$ against the alternative hypothesis of an otherwise stationary series. However, as previously discussed, there exists a problem of low power associated with traditional unit root tests when the underlying data generating process of time series is proven to be asymmetric. Therefore, in order to accommodate asymmetric behaviour in the unit root testing procedure, we re-formulate regression (10) in terms of first differences. This enables us to follow in pursuit of Enders and Granger (1998) and specify the unit root testing regressions for the TAR model with a zero threshold and a consistent threshold estimate, respectively, as:

$$\Delta y_t = \varepsilon_t(\varepsilon_{t-1} < 0) + \varepsilon_t(\varepsilon_{t-1} \geq 0) + \upsilon_t, \tag{11}$$

$$\Delta y_t = \varepsilon_t(\varepsilon_{t-1} < \tau) + \varepsilon_t(\varepsilon_{t-1} \geq \tau) + \upsilon_t, \tag{12}$$

Whereas the MTAR version of the unit root test regression with a zero threshold and a consistent threshold estimate threshold are, respectively, specified as:

$$\Delta y_t = \varepsilon_t(\Delta \varepsilon_{t-1} < 0) + \varepsilon_t(\Delta \varepsilon_{t-1} \geq 0) + \upsilon_t, \tag{13}$$

TABLE 1   Nonlinear Unit Root Tests

Variable	Model	Lag	Asymmetry test (i. e. $\rho_1 = \rho_2$)	Unit root test (i. e. $\rho_1 = \rho_2 = 0$)	Decision
gdp	TAR	2	0.94 (3.32)*	12.63*** (16.46)***	Linear $I(0)$ Nonlinear $I(0)$
	C-TAR	2	3.94* (7.87)*	15.59*** (21.28)***	Nonlinear $I(0)$ Nonlinear $I(0)$
	MTAR	2	0.95 (9.46)**	12.13*** (22.89)***	Linear $I(0)$ Nonlinear $I(0)$
	C-MTAR	2	4.90* (6.67)*	16.03*** (19.96)***	Nonlinear $I(0)$ Nonlinear $I(0)$
ur	TAR	0	2.45 (4.96)*	2.86* (7.22)**	Linear $I(0)$ Nonlinear $I(0)$
	C-TAR	0	2.37 (5.21)*	2.81* (7.40)**	Linear $I(0)$ Nonlinear $I(0)$
	MTAR	0	2.59 (3.44)*	2.94* (6.17)**	Linear $I(0)$ Nonlinear $I(0)$
	C-MTAR	0	2.70 (3.37)*	3.00* (6.12)**	Linear $I(0)$ Nonlinear $I(0)$

NOTES   Significance level codes: ***, ** and * denote the 1%, 5% and 10% significance levels respectively. Tests statistics for the first differences of the variables, i. e. Δgdp_t and Δur_t are given in parenthesis.

$$\Delta y_t = \varepsilon_t(\Delta\varepsilon_{t-1} < \tau) + \varepsilon_t(\Delta\varepsilon_{t-1} \geq \tau) + \upsilon_t. \tag{14}$$

Thereafter, two hypotheses can be formed from regressions (11)–(14). The first hypothesis tests for asymmetries within the time series. To this end, we test the null hypothesis of no asymmetric effects as H_{00}: $\rho_1 = \rho_2$ against the alternative hypothesis of an asymmetric data generating process (i. e. H_{01}: $\rho_1 \neq \rho_2$). Subsequent to testing for asymmetric effects, we then proceed to test for unit root behaviour within the time series. Pragmatically, the null hypothesis of a unit root is tested as H_{10}: $\rho_1 = \rho_2 = 0$ against the alternative hypothesis of an otherwise stationary asymmetric process (i. e. H_{10}: $\rho_1 \neq \rho_2 \neq 0$). The aforementioned tests of asymmetry and unit root behaviour are performed on time series variables of economic growth and the unemployment rate. The lag length of the threshold models which facilitate these tests are determined by the AIC information criterion.

As is evident from table 1, the empirical test results obtained for the time series in their levels are quite mixed. For instance, in scanning

through the model tests conducted on the unemployment variable, we find that we cannot reject the null hypothesis of a symmetric process and yet we are able to reject the null hypothesis of a unit root process for same time series. Thus for the unemployment variable in its levels, we conclude a linear, stationary data generating process for the series. However, for the output growth variable in its levels, we conversely find that the c-tar and c-mtar versions of the employed tests simultaneously reject both null hypotheses of symmetry and unit root behaviour. This particular result implies a nonlinear, nonstationary data generating process for the output growth variable in its levels. And yet, in turning to the empirical results obtained for the time series in their first differences, our analysis reveals a common finding of a nonlinear yet stationary process for all variables under all model specifications. All in all, we can conclude that all utilized time series appear to be both nonlinear yet stationary processes in their first differences. Therefore, the results obtained from our preliminary unit root analysis paves the way for the threshold co-integration analysis which we conduct next.

CO-INTEGRATION ANALYSIS

Having investigated the integration properties of the unemployment and economic growth variables, we proceed to investigate threshold co-integration and error correction effects amongst the times series. However, prior to estimating any threshold models, we must first test a number of hypotheses to select which models best capture asymmetric behaviour in Okun's specification. To this end, we employ three threshold tests which have been previously discussed previously discussed. To recall, (1) we test for co-integration effects; (2) we test for threshold co-integration effects and (3) we test for threshold error correction effects. The results of these tests are reported in table 2. In referring to these results, we find that at least one type of threshold model manages to reject all three hypotheses at least a 10 percent significance level for all variations of Okun's law. This is quite an encouraging result since it implies that the data displays at least one form of nonlinearity for each version of Okun's specification.

Another interesting result is that the MTAR specification is most suitable for modelling nonlinear behaviour between unemployment and economic growth for South African data. The only exception holds for the CF filter estimates which favour a TAR model specification. Furthermore, all estimated versions of Okun's law unveil significant asymmetric

co-integration behaviour only when output growth is placed as the dependent variable in the regression.

In summing up the test results reported in table 2, we can draw two broad conclusions thus far. Firstly, our analysis infers significant asymmetric behaviour between unemployment and economic growth for South African data. In this respect, our results adhere with those obtained in Geldenhuys and Marnikov (2007). However, in slightly differing from Geldenhuys and Marnikov (2007), we find smooth nonlinear adjustment behaviour in the data as opposed to an abrupt one. This result is expected since the otherwise abrupt nonlinearity is most suited for data containing structural break periods. Seeing that our data does not cover such periods, it therefore becomes reasonable that we detect smooth nonlinear behaviour among the data. Our second conclusion is that we establish economic growth as being the driving variable in the asymmetric relationship detected between the time series. This is worth observing since it serves as a guideline on how to estimate each of the selected threshold regressions. In our instance, we specify the MTAR models under the assumption that economic growth is regressed on the unemployment rate. This is of course with the exception of the CF filter regression in which we model TAR nonlinearity and yet retain economic growth as the dependent variable in the regression. Our estimation results of the first difference model specifications are reported below in table 3 whereas the results obtained for the gap model versions are reported in table 4.

Starting with the results reported in table 3 for first differences model, we take note of a long-run coefficient estimate of −0.09. Technically speaking, the magnitude of this coefficient estimate as obtained under both first difference models implies that a 1 percent decrease in the unemployment rate is associated with a −0.09 percent increase in productivity output. This result is seemingly plausible as it does not violate traditional theory of a negative unemployment-growth co-relationship as initially postulated by Okun (1962). Furthermore, the magnitude of this relationship is consistent with some of the Okun coefficient estimates obtained in previous studies. Among these previous studies are the works of Adanu (2005) who obtain a similar estimate of −0.09 for Alberta province in Canada; Villaverde and Maza (2009) who find a −0.08 estimate for a regional group of Spanish data and also Geldenhuys and Marnikov (2007) who obtain an estimate of −0.11 for South African data.

In moving on to examining the regime switching behaviour among the co-integration error terms, we firstly note that all threshold estimates

TABLE 2 Threshold Cointergation and Error Correction Tests

Model	(1)	(2)	TAR-TEC			MTAR-TEC		
			$\mathrm{H}_0^{(1)}$	$\mathrm{H}_0^{(2)}$	$\mathrm{H}_0^{(3)}$	$\mathrm{H}_0^{(1)}$	$\mathrm{H}_0^{(2)}$	$\mathrm{H}_0^{(3)}$
First differences	Δgdp_t	Δur_t	25.36 (0.00)***	4.10 (0.05)*	0.47 (0.50)	32.71 (0.00)***	9.16 (0.01)**	2.47 (0.13)*
	Δur_t	Δgdp_t	41.82 (0.00)***	0.68 (0.42)	0.01 (0.91)	50.82 (0.00)***	1.66 (0.21)	0.01 (0.95)
HP filter	gdp_t^c	ur_t^c	6.84 (0.01)**	1.07 (0.31)	0.66 (0.43)	6.15 (0.01)**	0.16 (0.69)	0.25 (0.62)
	ur_t^c	gdp_t^c	4.36 (0.02)*	0.22 (0.64)	2.78 (0.11)*	4.46 (0.02)*	1.19 (0.28)	0.49 (0.49)
BK filter	gdp_t^c	ur_t^c	28.51 (0.00)***	3.56 (0.07)*	2.94 (0.11)*	33.43 (0.00)***	6.70 (0.02)*	1.59 (0.23)
	ur_t^c	gdp_t^c	27.28 (0.00)***	0.01 (0.91)	0.23 (0.64)	32.79 (0.00)***	0.09 (0.76)	1.10 (0.32)
BW filter	gdp_t^c	ur_t^c	26.51 (0.00)***	4.34 (0.05)*	0.65 (0.43)	34.03 (0.00)***	9.29 (0.01)**	3.51 (0.08)*
	ur_t^c	gdp_t^c	54.27 (0.00)***	1.06 (0.31)	0.01 (0.94)	55.93 (0.00)***	0.96 (0.34)	0.66 (0.43)
			C-TAR-TEC			C-MTAR-TEC		
			$\mathrm{H}_0^{(1)}$	$\mathrm{H}_0^{(2)}$	$\mathrm{H}_0^{(3)}$	$\mathrm{H}_0^{(1)}$	$\mathrm{H}_0^{(2)}$	$\mathrm{H}_0^{(3)}$
First differences	Δgdp_t	Δur_t	29.08 (0.00)**	6.84 (0.02)*	0.79 (0.39)	32.75 (0.00)***	9.19 (0.01)**	2.78 (0.11)*
	Δur_t	Δgdp_t	42.23 (0.00)***	0.86 (0.36)	0.96 (0.34)	67.86 (0.00)***	8.18 (0.01)**	1.85 (0.19)
HP filter	gdp_t^c	ur_t^c	6.84 (0.01)**	1.06 (0.31)	0.01 (0.98)	10.04 (0.00)***	5.27 (0.03)*	3.75 (0.07)*
	ur_t^c	gdp_t^c	5.20 (0.01)*	1.47 (0.24)	3.64 (0.07)*	6.85 (0.01)*	4.81 (0.04)*	5.26 (0.03)**
BK filter	gdp_t^c	ur_t^c	28.74 (0.00)***	3.71 (0.07)*	1.08 (0.32)	33.91 (0.00)***	7.01 (0.01)*	1.82 (0.20)
	ur_t^c	gdp_t^c	27.71 (0.00)***	0.27 (0.61)	0.23 (0.64)	32.79 (0.00)***	0.09 (0.76)	1.10 (0.32)
BW filter	gdp_t^c	ur_t^c	32.08 (0.00)***	8.35 (0.01)**	1.27 (0.28)	33.28 (0.00)***	8.77 (0.01)**	2.22 (0.15)
	ur_t^c	gdp_t^c	56.83 (0.00)***	1.99 (0.17)	0.24 (0.63)	60.65 (0.00)***	2.58 (0.12)	0.44 (0.52)

NOTES Column headings are as follows: (1) dependent variable, (2) independent variable. Significance level codes: ***, ** and * denote the 1%, 5% and 10% significance levels respectively.

| | MTAR-TEC | | C-MTAR-TEC | |
| | Y | X | Y | X |
	Δgdp	Δur	Δgdp	Δur
β_i	−0.09		−0.09	
	(0.00)***		(0.00)***	
$\rho_1\xi_{t-1}$	−0.72		−0.72	
	(0.01)**		(0.01)**	
$\rho_1\xi_{t-1}$	−1.76		−1.76	
	(0.00)***		(0.00)***	
τ	0		0.11	
$\Delta\Delta gdp^+_{t-k}$	−0.39	−1.18	−0.38	−1.26
	(0.47)	(0.31)	(0.47)	(0.27)
$\Delta\Delta gdp^-_{t-k}$	−0.30	−0.50	−0.29	−0.47
	(0.36)	(0.47)	(0.36)	(0.50)
$\Delta\Delta ur^+_{t-k}$	−0.04	−0.80	−0.04	−0.80
	(0.64)	(0.00)***	(0.66)	(0.00)***
$\Delta\Delta ur^-_{t-k}$	−0.09	−0.99	−0.09	−0.99
	(0.28)	(0.00)***	(0.29)	(0.00)***
$\lambda^+\xi_{t-1}$	0.21	2.39	0.19	2.53
	(0.83)	(0.27)	(0.85)	(0.23)
$\lambda^-\xi_{t-1}$	−1.82	−1.05	−1.81	−1.06
	(0.00)***	(0.14)*	(0.00)***	(0.13)*
R^2	0.80	0.86	0.80	0.85
DW	1.61	2.42	1.61	2.39
p-value	0.37	0.31	0.35	0.31
LB	0.31	0.55	0.27	0.59
JB	3.59	3.82	3.65	3.98

NOTES   Significance level codes: ***, ** and * denote the 1%, 5% and 10% significance levels respectively. DW and LB respective denote the Durbin Watson and Ljung-Box test statistics for autocorrelation whereas JB denotes the Jarque-Bera normality test of the residuals.

are encouragingly close to zero in value. Moreover, the threshold error term estimates satisfy the convergence condition of error term stationarity i.e. $\rho_1, \rho_2 < 0$ and $(1 - \rho_1)(1 - \rho_2) < 1$. In further diagnosing these co-integration threshold error terms, we observe that negative deviations are eliminated quicker than positive ones. We can make such inference

since the estimate of 1 is of a lower absolute value in comparison to its 2 counterpart. Notably, Harris and Silverstone (2001) make similar inferences in their study for both US and UK data. In addition, our estimates of the threshold error correction terms also bear a slight resemblance to those obtained in Harris and Silverstone (2001), in the sense of producing correct negative estimates in the lower regimes of the estimated models. However in differing from these authors, we are able to obtain significant values for the estimates of the threshold error correction terms and thus we can draw meaningful interpretations of the error correction coefficients. In this respect, we not only discover that the long-run error correction terms for both MTAR-TEC and C-MTAR-TEC models are almost identical in magnitude, but we more importantly note that the speed of adjustment in both models is quicker when there is a shock to economic growth as opposed to a shock to the unemployment rate. Meanwhile, we are only able to identify significant short-run effects for the lagged coefficients of the economic growth variable when shock has been induced on the unemployment rates, whilst we are find no short-run effects for shocks to economic growth variable.

In diverting our attention to the empirical results of the estimated gap versions of Okun's law as reported in table 5, we generally observe that the regression estimates, more or less, bear close resemblance to those attained for the first difference models. For instance, the long-run regression coefficient obtained from the gap version models produce similarly negative estimates, albeit the magnitude of these estimates vary between 0.09 and 0.98 for the different de-trending methods employed. In further considering the absolute coefficient values of the threshold error terms formed by the long-run regressions, we note that the gap model estimates also bear similarities to those obtained for the first difference models. Specifically, we observe that the absolute values of p_1 are significantly higher when the unemployment rate is the driving variable, whilst the values of p_2 are higher when the unemployment rate is the dependent variable in the co-integration system. As previously explained, this result infers that negative shocks are eliminated quicker when economic growth is the driving variable, whereas positive shocks are eliminated quicker when the unemployment rate is the dependent variable.

However, after scrutinizing through the threshold error correction model estimates, we find the estimates from the gap models to be less encouraging. This especially becomes apparent when mainly considering the long-run error correction terms, from which we observe that only two

TABLE 4 Threshold Co-Integration and Threshold Error Correction Estimates for First De-Trended Model Specification

	HP filter C-MTAR-TEC		HP filter C-MTAR-TEC		BK filter TAR-TEC		BW filter MTAR-TEC	
	Y	X	Y	X	Y	X	Y	X
	Δgdp	Δur	Δgdp	Δur	Δgdp	Δur	Δgdp	Δur
β_i	−0.2 (0.02)**		−0.15 (0.01)		−0.09 (0.03)*		−0.10 (0.01)**	
$\rho_1 \xi_{t-1}$	−0.13 (0.66)		−0.88 (0.01)**		−0.97 (0.01)**		−0.73 (0.01)**	
$\rho_1 \xi_{t-1}$	−0.98 (0.00)***		−0.16 (0.48)		−1.68 (0.00)***		−1.77 (0.00)***	
τ	−0.286		−1.747		0		0.254	
$\Delta\Delta gdp_{t-k}^{+}$	0.32 (0.27)	0.37 (0.55)	0.44 (0.45)	0.48 (0.11)	−0.30 (0.40)	−0.56 (0.34)	−0.32 (0.55)	−1.55 (0.19)
$\Delta\Delta gdp_{t-k}^{-}$	0.32 (0.61)	−0.26 (0.84)	−1.09 (0.10)*	−1.29 (0.00)***	−1.22 (0.05)*	0.32 (0.74)	−0.30 (0.35)	−0.30 (0.66)
$\Delta\Delta ur_{t-k}^{+}$	0.08 (0.63)	−1.07 (0.00)***	−0.48 (0.23)	0.13 (0.54)	0.06 (0.73)	−1.14 (0.00)***	−0.02 (0.82)	−0.78 (0.00)***
$\Delta\Delta ur_{t-k}^{-}$	−0.09 (0.42)	−0.39 (0.14)	−0.48 (0.07)*	−0.19 (0.16)	0.12 (0.50)	−0.36 (0.22)	−0.10 (0.23)	−0.99 (0.00)***
$\lambda^{+} \xi_{t-1}$	0.09 (0.83)	−1.63 (0.07)*	−0.64 (0.03)	−0.05 (0.73)	−0.09 (0.91)	1.82 (0.19)	0.08 (0.94)	3.03 (.017)
$\lambda^{-} \xi_{t-1}$	−0.88 (0.07)*	−0.53 (0.61)	0.12 (0.59)	0.18 (0.12)*	−0.44 (0.57)	−1.54 (0.24)	−1.83 (0.00)***	−1.16 (0.12)
R^2	0.54	0.57	0.61	0.50	0.46	0.80	0.80	0.85
DW	2.10	1.56	1.43	1.68	2.42	1.85	1.60	2.63
p-value	0.89	0.23	0.09	0.28	0.39	0.62	0.31	0.13
LB	0.54	0.62	0.25	0.18	0.50	0.58	0.23	0.44
JB	3.56	4.10	3.89	4.86	3.79	4.26	3.98	4.58

NOTES Significance level codes: ***, ** and * denote the 1%, 5% and 10% significance levels respectively. DW and LB respective denote the Durbin Watson and Ljung-Box test statistics for autocorrelation whereas JB denotes the Jarque-Bera normality test of the residuals.

models manage to produce negative and significant estimates i. e. the HP and BW filter specifications with economic growth placed as the driving variables in both models. Therefore, we are restricted to interpreting the error correction coefficient estimates solely for these two model specifi-

cations. In drawing inference from these estimates, we conclude equilibrium reverting behaviour over the business cycle for the HP filter model when a shock has been induced on either the economic growth or the unemployment variables. Similarly, for the BW filter estimates, long-run equilibrium reversions occur only in the event of a shock to economic growth. It is also interesting to find that for both cases of the first difference models, we obtain significant short-run coefficient estimates of the lagged unemployment variable when a shock has been induced on the unemployment rate. Thus we collectively observe a distinct pattern over the business cycle, in which the unemployment rate is a driving factor of equilibrium conversions over the short-run whilst economic growth is responsible for equilibrium adjustment over the long-run.

Having established various forms of threshold co-integration within Okun's law for the data implies that there must exist some form of causality between the variables in the granger sense. However, the direction of causality cannot be assumed a prior and thus should be investigated through a formal analysis. We are permitted to examine causality effects amongst the variables via a standard *F*-test. The construction of these tests has been adequately discussed in the previous section of the paper. Table 7 reports the results of the causal analysis. The most striking feature of our obtained results is that, in all cases save one, we are able to reject the null hypothesis of unemployment not causing output growth at conventional levels of significance. Conversely, we fail to reject the null hypothesis of economic growth not leading the unemployment rate. We have noted an exceptional case for the HP filter model with economic growth as the driving variable, in which we detect no causal effects within the data. In summing up these results, we can safely assume that our results depict unidirectional causality running from the unemployment rate to economic growth for the data as a whole. This result is plausible seeing that we have already established that economic growth is regressed as being the dependent on the unemployment rate but not vice versa.

Concluding Remarks

The goal of this paper was to examine nonlinear co-integration and causality effects in Okun's law for South African data dating between the periods of 2000 and 2013. This objective was facilitated through the use of MTAR modelling techniques. We favour this approach on the premise of allowing for unit root testing, co-integration analysis and causality analysis under a single, comprehensive framework. Moreover, our study dif-

TABLE 5   Granger Causality Tests

Model		Y	X	$H_{o3}: Y \rightarrow X$	$H_{o3}: X \rightarrow Y$	Decision
First differ- ences	MTAR-TEC	*gdp*	*ur*	1.11 (0.35)	34.71 (0.00)***	*ur → gdp* *gdp ≠ ur*
	C-MTAR-TEC	*gdp*	*ur*	1.19 (0.33)	35.24 (0.00)***	*ur → gdp* *gdp ≠ ur*
HP filter CF filter BW filter	C-MTAR-TEC	*gdp*	*ur*	0.65 (0.54)	0.36 (0.70)	*ur → gdp* *gdp ≠ ur*
	C-MTAR-TEC	*ur*	*gdp*	3.97 (0.04)**	1.50 (0.25)	*ur → gdp* *gdp ≠ ur*
	C-TAR-TEC	*gdp*	*ur*	0.49 (0.62)	12.61 (0.00)***	*ur → gdp* *gdp ≠ ur*
	C-MTAR-TEC	*gdp*	*ur*	1.27 (0.31)	32.37 (0.00)***	*ur → gdp* *gdp ≠ ur*

NOTES   Significance level codes: ***, ** and * denote the 1%, 5% and 10% significance levels respectively. Definitions of notations: →, ↔ and ≠ represent unidirectional causality, bi-directional causality and no causality, respectively.

fers from previous South African case studies as we are able to introduce nonlinearity in a strict co-integration sense. Having applied the MTAR framework to South African unemployment and economic growth data has produced a number of interesting policy considerations. First of all, in quantifying the long run correlation coefficient, we find negative Okun coefficients ranging from −0.09 to −0.20 for all estimated threshold models. Clearly, these observations have far reaching ramifications as they give rise to the intriguing possibility of a long run trade-off between unemployment and economic growth. However, the aforementioned observations are of limited policy value in absence of knowing the causal relations amongst the variables.

In examining the empirical results obtained from the causal analysis, we discover that during abrupt shocks to the economy there are no causal effects between the variables. This essentially means that in the event of sharp or anticipated shocks to the economy there is very little that policy intervention can do for long-run equilibrium restoration between unemployment and economic growth. However, during smooth shocks, unemployment granger causes economic growth thus allowing for direct labour policies to have an impact on output productivity. We substantiate these smooth shocks as carefully implemented and monitored policies directives which are aimed at narrowing the existing gap between

the demand and supply within South African labour markets. Inclusive of such shocks are policy programmes aimed at improving the higher education system through intensifying further education and training (FET) programmes and the recently proposed 'target wage subsidy' programme which is intended to facilitate for the school-to-work transition within the youth population. We also note that under no circumstance does economic growth granger cause unemployment thus insinuating that policies aimed directly at improving economic growth such as foreign exchange policies would exert little or no influence on eradicating unemployment over the long run. This is particularly worth noting since it has been previously assumed that the stability of the exchange rate would lead to a direct improvement of employment growth in import-competitive and export-oriented sectors, especially the manufacturing sectors. Our study implies that, whilst these macro-policies may create a sustainable environment for improved economic growth, they are of little use with regards to directly eradicating unemployment. Therefore, the overall finding of uni-directional causality from unemployment to economic growth provides an adequate explanation for the 'job-less' growth pandemic experienced in South Africa over the last two decades or so.

In recent South African recession periods, unemployment has continued to rise despite economic growth seemingly returning to its previous long-run trend. Deriving from our study, there exist two rational explanations to this pandemic. Firstly, negative shocks to economic growth are eradicated quicker than negative shocks to unemployment. This implies that in the event of smooth shocks to output productivity, it should be expected that economic growth should return back to its long-run steady state at a quicker rate than its unemployment counterpart. Secondly, our general finding of causality running from unemployment to economic growth highlights the ineffectiveness of macroeconomic policies aimed at reducing unemployment through improved productivity growth. Specifically, our empirical estimates suggest that smooth unemployment shocks, in the form of structural labour policies, would help stabilize the structural and cyclical components of unemployment over both the short and the long run. Therefore, for the specific case of South Africa, the job-less growth pandemic can be attributed to structural factors underlying the overwhelming unemployment rates facing the economy. Specifically, structural unemployment in South Africa is a result of a mismatch between jobs offered by employers and potential workers. Thus factors which can minimize the extent of structural unemployment

within the economy need to be addressed in policies. These factors include the rigidity of labour markets, real wage rigidity, high minimum wages compared to relatively low productivity and other factors which would lead to job creation and job security. Overall, we conclude that labour policies aimed at stabilizing and eradicating structural unemployment within the economy may be a panacea towards simultaneously reducing overall unemployment and boosting economic growth over the long run.

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Behind the Exporters' Success: Analysis of Successful Hungarian Exporter Companies From a Strategic Perspective

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The purpose of the study is to provide an overview of export success from a strategic management perspective. The paper empirically tested the relationships between the firm's export performance, strategic thinking, adaptation to the changing environment and companies' capabilities. The research is based on the Hungarian Competitiveness Research database of 2013 that consists of 300 firms. Cluster analysis differentiated successful export-oriented and stagnant companies. Both of them had high export intensity (higher than 75%), but significant differences could be observed in export volume and profitability. More than 90% of total export revenue belonged to the successful export-oriented cluster. Successful export-oriented companies proved to be more proactive and innovative than stagnant, thus they were capable of adapting to the changing environment better. The study highlighted that appropriate strategic thinking could play a significant role in improving export success. The implication of the study is that stagnant companies need to develop their forecast abilities, flexibility to adapt to the changing environment and operational efficiency. Stagnant companies lagged behind successful exporters concerning industry forecast, production level, number of innovations, competitive prices and employee qualifications.

Key Words: internationalisation, export, performance,
    Hungarian Competitiveness Research Survey, strategy
JEL Classification: C38, L21, M16

Introduction

Over the past few decades, exporting has been one of the economic topics to be explored. It is a common view amongst researchers that exporting firms' competitiveness has a strong effect on national export competitiveness (Porter 1990). In addition, there is an increasing attention to global

competition in the foreign markets by researchers as well as practitioners particularly with respect to determinants of export success. Exporting can be an engine for the individual firm's growth and profitability, and for the growth of national economies (Hatemi and Irandoust 2001; Wolff and Pett 2000).

The analysis of export performance is a very important issue in case of Hungary as well. Studying the Hungarian firms' export performance in a small open economy better contributes to the improvement of export competitiveness on a national level. Several researches were concluded on a macroeconomic level in Hungary (Munkácsi 2009) in terms of how export competitiveness can be improved. The analysis from a microeconomic perspective revealing exporter firms' characteristics can serve significant information to export development implications (to economic policy makers in the government as well as academic researchers too). In this paper, we analyse the export success from a strategic management point of view and intend to reveal factors behind the success.

The main idea of this analysis is that export performance can be an indicator of firms' international competitiveness and that export success is boosted by the growth of international markets and diminished by factors dominating in the years of the economic recession. However, competitive and non-competitive firms are not equally influenced by the economic situation: less competitive firms' export activity will be much more influenced by negative effects, measurable on export volume, export prices and/or profitability.

Much of the research in export performance analysis has categorized firms into stages of export development, distinguishing exporters from non-exporters, analysing variables of how exporters perceive various aspects of their organization, market, environment, resources, strategy, etc. (Dean, Mengüc, and Myers 2000; Kor and Mesko 2013). We also used the method of distinguishing firms based on different characteristics. In our study, one of the main questions is what the difference between successful and non-successful exporter companies is. This study focuses on strategic capabilities of successful exporters and intends to reveal in depth what is behind their success.

A Review of Relevant Literature and Hypotheses

The export performance of firms has been studied in a wide range of literature. Due to this, our research focus was to identify the relationship between firms' strategy and export performance. In this paper, we present the literature related to strategic management approach. We present three

strategic theories, the industrial organization-based theory, the resource-based view of firms, especially the dynamic capabilities-based theory, and contingency theory.

FIRM'S STRATEGY AND PERFORMANCE

A fundamental axiom of strategic management and industrial organizational economics is the relationships between strategy and performance. Industrial organization theory views that economic competitiveness is based on its enterprises. A considerable amount of literature has focused on the relationship between strategy and performance and emphasized the importance of a distinctive strategy in determining the firm's economic performance (Porter 1980; 1990).

There is no consensus in the literature on the importance of the many variables that have been identified as determinants of export success. The literature reports on the correlations of export performance that are both internal and external to firms. The most analysed internal factors are managerial experience, marketing strategy, organizational structure, product and market diversification and resources. Industry competitiveness, business environment or product characteristics are linked to export performance as external variables (Barney 1991; Barney, Wright, and David 2001; Leonidou, Katsikeas, and Samiee 2002). Calantone et al. (2006) concluded that export performance is positively linked with the level of product adaptation strategy and organizations' openness to innovation. This may imply that the costs to adapt products are recouped through improved export performance.

Case study method is also used as a qualitative survey in understanding the determinants of export success. Ábel and Czakó (2013) emphasised the importance of management/owner role, organisational resources and capabilities and learning process based on analysing ten case studies of exporter companies.

The relevant literature suggests that export development and internationalization are complex phenomena. Instead of focusing on a particular aspect of export activity, this research measures several organizational dimensions including firm characteristics, firm competency, perceptions and strategy. A complete view on the relationship between export performance and firms' strategic characteristics is likely to be given.

The main idea behind this analysis is that export performance can be an indicator of firms' international competitiveness and that export success is boosted by the growth of international markets and diminished by factors dominating in the years of the economic recession. However,

competitive and non-competitive firms are not equally influenced by the inward and outward economic situation. Competitive firm operations are characterised by strong strategic thinking that shows itself in conscious goal orientation, valuable and dynamic capabilities and good/deep knowledge of the external environment. Less competitive firms are characterised by the lack of these abilities so their export activity will be much more influenced by negative effects, measurable on export volume, export prices and/or profitability. It is therefore hypothesized that:

H1 *There is significant connection between strategic thinking and export performance.*

Based on previous research we assume that behind the export performance there is a more conscious strategic thinking such as strategic planning and implementation. In a strategic management approach, it means the realisation of the long-term objectives, improving the firm's value thus increasing shareholder value.

THE FIRM'S STRATEGY AND ITS CONTEXT/ENVIRONMENT

One of the theories used in strategic management literature is the contingency-based approach. It posits that the firm's export performance is dependent on the context in which the firm operates. Robertson and Chetty (2000) adopted a conceptual model of export performance in their research, based on contingency theory. They analysed the relationship between export performance and strategic orientation in a different external environment. The study emphasised that exporting is a dynamic process because the context of a firm changes continually throughout its exporting ventures. Export strategy research usually places its starting point at the analysis of the relationships between the firm and its environment. As it is suggested by Knudsen and Madsen (2002) the theoretical background of export strategy researches has to be completed with dynamic capabilities approach.

H2 *There is a significant connection between the firms' ability to adapt to the changing environment and export success.*

FIRM'S STRATEGY AND CAPABILITIES

The researches examining export performance from capabilities are grounded in the resource-based view (RBV) of the firm (Wernerfelt 1984) and its extensions as knowledge-based (Grant 1996) view. The RBV emphasises unique resources and capabilities of a firm for sustained competitive advantage. We contend that knowledge is a key strategic resource

and a firm's capability in integrating and exploiting knowledge in exporting is a source of competitive advantage (Dhanaraj and Beamish 2003). A conceptual model presented by Haahti et al. (2005) proposes that export market knowledge accumulated from various sources constitutes a valuable 'entrepreneurial resource' and that both domestic and foreign cooperative strategies directly influence export performance. The synergistic effect of export on performance will also be multiplied when the export activity is well utilized under a proper selection of organizational strategy in the case of firm, product, market and technology (Lee and Habte-Giorgis 2004).

According to Reid (1981) we emphasise that exporting must be considered as a dynamic process, because the context of a firm changes continually throughout its exporting ventures. This idea is connected to the dynamic capabilities perspective (DCP). The most important issue of DCP is to explore the way the firm comes to terms with the continuous emergence of novel circumstances caused by rapid technological changes (Teece, Pisano, and Shuen 1997). Thus, the firm's central strategic problem is to create new productive knowledge and to coordinate the cumulative process of knowledge development and creation. The framework developed by Teece (2014) explains how strategy and dynamic capabilities together determine firm-level sustained competitive advantage in a global environment. The internalization models complemented by export performance analysis seek to understand why some firms' export activities are successful while others' fail. Hence, we advance the following hypothesis:

H3 *There is a significant connection between the firms' resources and capabilities and export success.*

Numerous authors of export performance studies compare the exporters' characteristics in an attempt to reveal the factors that make a difference between success and failure in foreign market activities. In this paper we intend to identify the distinctive factors of export success and based on these findings develop better practice-related suggestions for firms with low performance.

Method of Research

The phrased three hypotheses were tested on the Hungarian Competitiveness Research database of 2013. The connection between export performance and the selected influencing factors (strategic thinking, re-

TABLE 1 Cluster Centre Points

Category	(1)	(2)
Export intensity (1–4 scale)	3.75	3.57
Export volume (0–6 scale)	4.85	3.34
Change in export volume (1–3 scale)	2.23	2.06
Profitability compared industry average (1–5 scale)	4	3

NOTES (1) successful ($n = 40$), (2) stagnant ($n = 34$).

sources and capabilities) could be analysed by several statistical methods. One of the key elements of the research was measuring export success. Since four export performance metrics were used cluster analysis was conducted to differentiate successful exporters from non-successful. Independent sample t-test was applied to compare the characteristics of successful and non-successful firms and through this method we tried to obtain a deeper insight into the influencing factors of export success.

DATABASE

The research is based on the Hungarian Competitiveness Research database of 2013, which was launched by the Competitiveness Research Centre, Institute of Business Economics of Corvinus University of Budapest. It contains four questionnaires (more than 60 pages altogether): top management, marketing, production, finance, which enables us to make a complex analysis about companies' environment, strategic and functional areas. Generally, the survey targeted incorporated companies with more than 50 employees to build a corporate sample, as well as keeping an eye on representativeness (in terms of staff size, geographical location, industry). The final database consists of 300 firms.

Firms in the sample operated in different industries, except the financial sector. Processing industry dominated (45%), following it, the proportion of service sector was 34.7%, construction industry was 7.7%, agriculture was 8%. 72.7% of the firms was medium-sized, the proportion of large firms was 16.7%. In terms of ownership structure, the domestic owned companies dominated (71.3%), the proportion of foreign companies was 23% and the rate of state owned was 5.7%. The majority (53%) of firms had export activities, and this rate characterised the small and medium sizes companies, which is significantly higher than the average rate in Hungary (22.5% according to Szerb-Márkus, 2008). A very high export concentration can be observed in the sample, which

TABLE 2   The Composition of Successful Export-Oriented and Stagnant Companies
by Export Revenue in 2013

Category	(1)	(2)
Under 100 mio HUF	0.00	0.00
100–499 mio HUF	0.00	11.40
500–999 mio HUF	0.00	42.90
1000–4999 mio HUF	47.50	45.70
5000–9999 mio HUF	20.00	0.00
Over 10000 mio HUF	32.50	0.00
Total	100	100

NOTES   (1) successful ($n = 40$), (2) stagnant ($n = 34$). In percent.

reflected the high Hungarian export concentration (Kállay and Lengyel 2008; Munkácsi 2009). In the samples, the share of large foreign owned companies from total export revenue was 79.38%, foreign owned companies' 90%, domestic companies' 10%. (For the descriptions of the samples of the questionnaire survey of 2013, see Matyusz 2014.)

CLUSTER ANALYSIS – IDENTIFYING SUCCESSFUL AND STAGNANT EXPORT-ORIENTED COMPANIES

In our previous researches, we used cluster analysis to study firms' export performance, since we preferred using more than two export performance metrics and more objective grouping. For cluster analysis, we used financial data as well as managerial self-evaluation. The generally used metrics were applied for measuring export performance (Leonidou, Katsikeas, and Samiee 2002), these are export intensity, export revenue, export sales growth. The fourth factor in cluster analysis was profitability, we used managerial self-evaluation of companies' return of investment compared to industry average. The applied k-means cluster analysis resulted in four clusters: successful export-oriented companies, stagnant companies, leading minor exporters and exporters. The export intensity of leading minors and minors was under 20% so in this research we only concentrated on comparing successful and stagnant companies (table 1)

Since our hypothesis, testing was based on comparing successful and stagnant companies it is crucial to describe the main features of the two clusters. The successful export-oriented companies could be characterised by high export revenue, high export intensity and high profitability. All of them have more than one billion HUF export revenue per

TABLE 3   The Composition of Successful Export-Oriented and Stagnant Companies
by Export Intensity in 2013

Category	(1)	(2)
Under 25	0.00	2.90
25–75	25.00	37.10
Over 75	75.00	60.00
Total	100	100

NOTES   (1) successful ($n = 40$), (2) stagnant ($n = 34$). In percent.

TABLE 4   The Composition of Successful Export-Oriented and Stagnant Companies
by Size in 2013

Category	(1)	(2)
Small	2.50	8.60
Medium	52.50	80.00
Large	45.00	11.40
Total	100.00	100.00

NOTES   (1) successful ($n = 40$), (2) stagnant ($n = 34$). In percent.

TABLE 5   The Composition of Successful Export-Oriented and Stagnant Companies
by Owner Structure in 2013

Category	(1)	(2)
State	2.50	0.00
Domestic	25.00	74.30
Foreign	72.50	25.70
Total	100	100.00

NOTES   (1) successful ($n = 40$), (2) stagnant ($n = 34$). In percent.

year. 75% of them had more than 75% export intensity (tables 2 and 3). The successful export-oriented firms represented about the quarter of exporters in the sample, but their economic power was significantly higher, more than 90% of total export revenue belonged to this group (table 6). Their profitability was over industry average according to self-evaluations (table 7).

More than half of them (52.5%) belonged to medium-sized companies, the proportion of large companies was lower (45%), but compared to the average rate (16.7%) in the sample, it could be seen that the large companies are still overrepresented in this cluster (table 4).

More than 75% of firms were active in the processing industry due to

TABLE 6   Share of Clusters

Cluster	(1)	(2)
Share of cluster from total export revenues	91.60	4.90
Share of cluster from total exporters	25.20	22.00
Share of cluster from total number of companies	13.30	11.60
Share of cluster from total employees	34.40	8.50

NOTES   (1) successful ($n = 40$), (2) stagnant ($n = 34$). In percent.

TABLE 7   Profitability Relative to Industry Average According to Managerial
Self-Evaluation

Category	(1)	(2)
Return on sales	3.73	2.71
Returns on investment	3.85	2.57

NOTES   (1) successful ($n = 40$), (2) stagnant ($n = 34$). 5-point Likert scale, 1 – best, 5 – under average.

the characteristics of the samples, but there were some representatives of food industry and services too. Foreign owned companies dominated (72.5%) (table 5). Each of them had dominant owners, 66.7% of them had owners with 75% share or more. The proportion of subsidiaries is 65%. Strong owner control could be observed in about 10% of firms. 15% of them had owners with more than 70% share from revenue.

Companies belonging to the stagnant clusters lagged behind successful export-oriented companies in regard of export performance and company profitability. Although they had high export intensity (76%), it was significantly lower than the average rate of successful export-oriented firms (84%). 60% of them had more than 75% export intensity (table 3). Their export revenue was significantly lower than the revenue of successful companies. There were no companies with over 5 billion HUF export revenue (table 2). Although 22% of exporters belonged to this cluster, their share from total export revenue was under 5% and their share from total employees was 8.5% in contrast with the fact that successful exporters' share was 34.4% (table 6). Their profitability was under industry average according to self-evaluations (table 7).

77% of the firms was active in the processing industry due to the characteristics of the samples, followed by it the rate of service companies (22.9%). The majority of them was medium-sized (80%) and domestic owned (74.3%). The proportion of large companies was only 11.4%. The

TABLE 8 Fundamental Purpose

Fundamental purpose	(1)	(2)
Satisfying customer needs as much as possible	4.53	4.46
Gaining more profit	4.15	3.86
Increasing shareholder value	3.85	3.26
Surviving crises and preserving the ability of future development	4.08	4.2

NOTES (1) successful ($n = 40$), (2) stagnant ($n = 34$). 5-point Likert scale, 1 – not true at all, 5 – perfectly true.

TABLE 9 Financial Goals

Financial goals	(1)	(2)
Liquidity preservation, improvement	3.73	4.11
Compliance with payment commitments, deadlines	3.81	3.89
Sales revenue increase	4.00	4.11
Cost reduction	3.88	4.07
Increase in return on sales (profitability)	4.04	4.00
Increase in return on assets (profitability)	3.92	3.43
Increase in return on investment (profitability)	3.76	3.79
High owner (shareholder) return	3.52	3.21
Payment of high rewards	2.92	2.89
Payment of high dividends	3.16	2.64
Regular dividend payments	3.24	2.68

NOTES (1) successful ($n = 40$), (2) stagnant ($n = 34$). 5-point Likert scale, 1 – not true at all, 5 – perfectly true.

TABLE 10 Sales Opportunities in 2013 Relative to 2009

Sales opportunities	(1)	(2)
In domestic market	2.73	2.51
In export market	3.5	3.23

NOTES (1) successful ($n = 40$), (2) stagnant ($n = 34$). 5-point Likert scale, 1 – become unfavourable in large extent, 5 – became favourable in large extent.

proportion of foreign owned companies was much lower (25.7%) in this cluster than in the case of successful export-oriented companies (72.5%) (tables 4 and 5). The ownership concentration is high (only 5.7% of them had no dominant owner) but lower than successful export-oriented companies'. 31% of them are subsidiaries. The role of owners as customers is

TABLE 11   Effect of the Financial Crisis: Proportion of Firms

(i)	(ii)		(iii)		(iv)		(v)		(vi)	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
(a)	5.1	20.0	7.9	20.0	5.1	8.6	5.1	25.7	5.1	22.9
(b)	25.6	14.3	21.1	14.3	20.5	17.1	25.6	22.9	15.4	34.3
(c)	30.8	37.1	39.5	45.7	41.0	57.1	25.6	25.7	38.5	20.0
(d)	30.8	22.9	26.3	11.4	25.6	14.3	33.3	20.0	23.1	17.1
(e)	7.7	5.7	5.3	8.6	7.7	2.9	10.3	5.7	17.9	5.7

NOTES   (i) direction of change, (ii) change in revenue, (iii) change in production, (iv) change in number of employees, (v) change in EBIT, (v) change in net profit; (1) successful (*n* = 40), (2) stagnant (*n* = 34); (a) decreasing on a large extent, (b) decreasing stagnant, (c) increase, (d) increasing on a large extent. In percent.

lower than in the group of successful export-oriented firms. 17% of them had owners with more than 20% share from revenue, but only two companies (5.7%) had owners with more than 70% share from revenue.

We concluded that the export performance of stagnant companies was weaker than successful ones', the largest differences could be observed in case of export volume and profitability. The differences in export volume might derive from the company size and the owner structure. Foreign owned companies dominated (72.5%) in successful export-oriented clusters, and 65% of them was subsidiary. The majority of stagnant companies were medium sized domestic owned firms. One of the main purposes of the research was to point out that the export success does not derive from the size and owner structure but different skills and capabilities are behind export performance. Investigating the correlation between skills/capabilities, and company size and owner structure was not the purpose of this research.

Discussion of Findings

We present the findings in the same logic as relevant literature review was demonstrated. First, we show the factors analysed in connection with strategy and export performance. Then strategy in context analysis is presented. Finally, results of company resources and capabilities are included.

COMPANY STRATEGY AND EXPORT PERFORMANCE

Based on the relevant literature we assumed that firms' export performance was related to their strategic characteristics. Thus, it can be re-

vealed in main strategic goals, applied strategies and main operational parameters in a changeable environment. We analysed the questions about main strategic goals and used independent-sample *t*-test to compare means to test our hypothesis.

The analysis of the fundamental purpose of companies (table 8) indicated that successful exporters are more profit-oriented compared with the stagnant companies. In their strategic thinking increasing shareholder value appears more forcefully than in the case of stagnants. Surviving the economic crisis is the least important factor for successful exporters, however it is the most crucial for stagnants. So after satisfying customer needs, surviving the crisis constituted as the second main goal in the analysed period. It suggested that stagnant firms were much more influenced by the effects of the economic crisis, while the successful companies could concentrate better on increasing shareholder value.

The differences in strategic thinking could be observed in the case of financial goals too. In connection with surviving the financial crisis, preserving liquidity was one of the most important financial goals (4.11 in 5-point Likert scale) for stagnant companies. Preserving liquidity proved to be more important for stagnant companies than for successful exporters (3.33). After preserving liquidity, increasing revenue (4.11), cost reduction (4.07) and increasing the return on sales (4) were the most important financial goals for stagnant companies. Increasing revenue (4) and return on sales (4.04) were important for successful companies as well, and there were no statistically significant differences between the two clusters' opinions. Besides liquidity being less important, successful exporters gave significantly less priority to cost reduction (3.88) than stagnants, but increasing shareholder value (3.55) proved to be significantly more important (table 9).

We examined overall strategic thinking and some elements of strategy implication more deeply (see table 12). Successful export-oriented companies proved to be better in possessing adequate strategy, working out detailed action plans, having multiple visions for better reaction and in connection with the last, they had quicker reactions than stagnants. These factors indicated that firms in successful exporters' cluster have more conscious strategic thinking and better strategy implementation. The findings revealed that there were no significant differences between successful exporters and stagnants concerning written strategy and vision. We can assume that stagnant companies know what they want to achieve, but they are weaker in realisation. Successful exporters had multiple vision

TABLE 12   Some Elements of Strategic Thinking and Strategy Implication

Strategic types	Clusters	(1)	(2)	(3)	(4)
Adequate strategy	(a)	40	4.18	.813	.129
	(b)	35	3.43	1.037	.175
Detailed action plans	(a)	40	3.93	.859	.136
	(b)	35	2.83	1.175	.199
Multiple vision for better reaction	(a)	40	3.78	.947	.150
	(b)	35	2.97	1.248	.211
No written strategy, but strong vision	(a)	40	3.48	1.062	.168
	(b)	35	3.37	1.060	.179
Quick reactions	(a)	40	4.05	.749	.118
	(b)	35	3.94	.906	.153

NOTES   (1) n, (2) mean, (3) standard deviation, (4) standard error mean; (a) successful exporters, (b) stagnants. 5-point Likert scale, 1 – not true at all, 5 – perfectly true.

and different scenarios for the future. The adaptation to environmental changes is realised by using detailed action plans of these scenarios. Stagnants are characterised by the lack of detailed action plans. It suggests that stagnant firms fail to implement their strategies because they do not plan the realisation by detailed action plans.

In the beginning of the economic crisis, successful exporters were less forced to apply defensive strategy. More than a half of this cluster's firms followed stabilization strategy (see tables 13 and 14). In the case of stagnants, it was only 16%. The majority of stagnants applied defensive strategy. It suggests that in the first year of recession stagnants were more influenced by the effect of the crisis. In 2010, stabilization strategy became dominant in both export clusters. The group of successful exporters could exploit the growth in 2011. Almost half of the group could switch to offensive/growth strategy. It shows that they managed to overcome the crisis earlier than stagnants. In 2012 along with growth strategy, the focusing strategy also came to the front. The rate of companies implementing focusing strategy has doubled in both clusters.

One of the main characteristics of a firm strategy is how it will be implemented. An organisation might have a range of strategic directions: the company could improve its profile to launching new products, it could enter new markets, it could transform its existing products through radical innovation. These strategic directions could be realised by different methods. In economic recession situations, the most common methods

TABLE 13   Strategy Directions 2009–2010

Strategy direction	2009				2010			
	(a)		(b)		(a)		(b)	
	n	%	n	%	n	%	n	%
Defensive strategy	11	31.4	18	58.1	6	17.6	6	18.8
Stabilization strategy	18	51.4	5	16.1	20	58.8	18	56.3
Offensive/growth strategy	3	8.6	5	16.1	6	17.6	6	18.8
Focusing strategy	3	8.6	1	3.2	2	5.9	1	3.1
No strategy	0	0.0	2	6.5	0	0.0	1	3.1
Total	35	100.0	31	100.0	34	100.0	32	100.0

NOTES   (a) successful exporters, (b) stagnants.

TABLE 14   Strategy Directions 2011–2012

Strategy direction	2011				2012			
	(a)		(b)		(a)		(b)	
	n	%	n	%	n	%	n	%
Defensive strategy	2	5.6	6	18.2	1	2.7	4	12.1
Stabilization strategy	12	33.3	11	33.3	12	32.4	9	27.3
Offensive/growth strategy	17	47.2	10	30.3	12	32.4	8	24.2
Focusing strategy	5	13.9	5	15.2	10	27.0	10	30.3
No strategy	0	0.0	1	3.0	2	5.4	2	6.1
Total	36	100.0	33	100.0	37	100.0	33	100.0

NOTES   (a) successful exporters, (b) stagnants.

are connected with increasing operational efficiency by reducing costs. In the used questionnaire the increase of production efficiency, the product differentiation, rationalization of product range and suspension of investments were connected to this issue. The companies were asked about how their operations were characterised by the mentioned actions in the period between 2009 and 2012.

As it can be seen in table 15 in the context of the economic crisis, successful exporters' operations are characterised principally by two-sided efficiency. It is significantly confirmed by the independent sample t-test. From one point of view they continued the new product launches and sought out new markets, and from another, they significantly aimed better at production efficiency, rationalization of product range and compared to stagnants they are less characterised by postponed investments.

TABLE 15 Strategic Actions in the Economic Crisis between 2009 and 2012

Strategic actions	Clusters	(1)	(2)	(3)	(4)
New product launches	(a)	40	2.83	1.035	.164
	(b)	35	2.49	1.269	.214
New markets	(a)	40	3.73	1.086	.172
	(b)	35	3.46	1.094	.185
Innovations vs. Competitors	(a)	40	3.35	.921	.146
	(b)	35	3.17	1.294	.219
Production efficiency	(a)	40	3.85	.949	.150
	(b)	35	3.54	.919	.155
Product differentiation	(a)	40	4.08	.829	.131
	(b)	35	3.74	1.094	.185
Rationalization of product range	(a)	40	2.85	1.331	.210
	(b)	35	2.34	1.187	.201
Postponed investments	(a)	40	3.23	1.165	.184
	(b)	35	3.26	1.462	.247

NOTES (1) n, (2) mean, (3) standard deviation, (4) standard error mean; (a) successful exporters, (b) stagnants. 5-point Likert scale, 1 – not true at all, 5 – perfectly true.

The conducted hypothesis tests (independent sample t-tests) confirmed hypothesis 1, there is a significant connection between strategic thinking and export performance. Successful export-oriented companies focused more on increasing shareholder value, they had a more adequate strategy and they proved to be more successful in implementing it.

ADAPTATION TO THE CHANGING ENVIRONMENT

Both successful and stagnant exporters considered the domestic sales opportunities more unfavourable than they were in 2009. The judgment of export markets was more favourable than domestic market, the managers felt improving sales opportunities relative to 2009 (table 10). There was no significant statistical difference between the evaluation of the two clusters. At the same time, significant statistical differences could be observed between the actual export performances of the two groups. Between 2009 and 2013 more than half of the successful exporters (54.5%) reported an increase in export volume, while this proportion was only 33.4% in the case of stagnants. A decrease in export volume characterized 33.4% of stagnant companies, while less than 20.0% of successful ex-

TABLE 16 Change in Export Volume

Change in export volume	Successful (n = 40)		Stagnant (n = 35)	
	(1)	(2)	(1)	(2)
More than 10% reduction per year	9.10	6.50	12.10	18.20
Less than 10% reduction per year	9.10	12.90	9.10	15.20
Stagnant market	27.30	16.10	39.40	33.30
Less than 10% increase per year	42.40	48.40	21.20	18.20
More than 10% increase per year	12.10	16.10	18.20	15.20

NOTES (1) 2009–2012, (2) expected in 2013.

TABLE 17 Firms' Adaptation to Environmental Changes between 2009 and 2012

Firms' behaviour	Successful (n = 40)		Stagnant (n = 35)	
	n	%	n	%
Procrastinated recognition	0	0.0	1	2.9
Inability to answer	3	7.5	5	14.3
Reaction	13	32.5	12	34.3
Proactivity	15	37.5	12	34.3
Influence	9	22.5	5	14.3
Total	40	100.0	35	100.0

porters experienced this. Successful exporters considered the year of 2013 more favourable as well, 64.5% of them expected an increase while the same rate among stagnants was only 39.4% (table 16). One of the weaknesses of stagnants, according to the results of the survey is the adaptation to the changing environment.

The majority of successful exporters was capable of monitoring the surrounding environment and was prepared to give adequate answers to its changes. Moreover, 60.0% of them not only recognised the changes and gave post-reactions but they were capable of proactivity and influencing the environment. On the other hand, 17.2% of stagnant companies procrastinated the recognition of changes and were unable to answer them. The proportion of those stagnant companies who were able to influence their environment was significantly lower (14.3%) than successful companies' (22.5%) (table 17).

We assumed that successful export-oriented companies were better in forecasting and adapting to the changing environment. The financial crisis affected stagnant companies more unfavourably than successful exporters. 20% of stagnant companies suffered from a forceful decrease in

TABLE 18 Actual Effect of the Crisis Relative to the Expected Effect in September 2008

Actual effect	(1)	(2)
More favourable than expected	5.0	8.8
More moderate than expected	15.0	8.8
Equal with expectation	60.0	35.3
Deeper than expected	20.0	11.8
More serious than expected	0.0	35.3

NOTES (1) successful ($n = 40$), (2) stagnant ($n = 34$).

TABLE 19 The Date of the Expected Boom

The date of the expected boom	(1)	(2)
We are over the crisis	55.00	11.80
We expect the recovery nowadays	10.00	14.70
We expect recovery within one year	17.50	23.50
We have to wait more than one year until the boom	17.50	50.00

NOTES (1) successful ($n = 40$), (2) stagnant ($n = 34$).

revenue and more than 20% suffered from a forceful decrease in profitability, while this rate was only 5.1% in the successful exporters' cluster. 38.5% of successful exporters realized increasing revenue during this period, while this proportion was 28.6% in the case of stagnants. Stagnant companies reduced production level and the number of employees to a greater extent than successful exporters did. The biggest differences could be observed in the changes of net profit, while the least differences existed in the changes of employees' number (table 10).

Successful exporters proved to be better in forecasting the effect of the financial crisis. 60% of successful exporters' managers thought that the actual effect of the crisis was equal with their expectation in September 2008, in the case of stagnant companies this rate was only 35.5%. 47% of them felt the crisis was deeper and more serious than their previous expectation suggested (table 18).

At least half of the successful companies were negatively affected by the crisis, but the majority of them (55%) thought that they were over it. Only 17.5% of them thought that they had to wait more than one year until the boom. Stagnant companies suffered from the crisis to a larger extent, the majority of them were not able to forecast the effect of the crisis and half of them thought that the date of the expected boom is over one year. Only 11.8% of them recovered from the crisis (table 19).

TABLE 20   Self-Evaluation Relative to the Strongest Competitor

Item	(1)	(2)
Cost efficiency	3.5	3.16
Competitive prices	3.5	2.94
Product quality	3.9	3.59
Product range	3.85	3.47
Production level	3.9	3.28
Short delivery time	3.9	3.69
Delivery on time	3.98	3.63
Flexibility of logistics	3.55	3.31
Creating customer value (opinion of mark. managers)	3.67	3.38
Knowledge of customer needs (opinion of mark. managers)	3.56	3.09
Direct contact with customers	3.69	3.58
Responding to customer needs (opinion of mark. managers)	3.87	3.67
Adjustment to changing customer demand	3.68	3.41
Use of innovative sales incentives	3.28	3.13
Market forecast	3.63	3.16
Responding to competitors' actions (opinion of mark. managers)	3.44	3.48
Industry forecast (opinion of mark. managers)	3.51	2.76
Employee qualifications	3.83	3.28
Number of innovations	3.46	2.84
R&D expenditure level	3.18	2.81
Ethical conduct	3.7	3.72
Using environmentally friendly material	3.38	3.09

NOTES   (1) successful ($n = 40$), (2) stagnant ($n = 34$). 5-point Likert scale, 1 – not true at all, 5 – perfectly true.

Overall, the successful export-oriented companies proved to be better in adapting to a changing environment than stagnants. The conducted analyses verified our second hypothesis that there is significant connection between the firms' ability to adapt to changing the environment and export success.

EXPORT PERFORMANCE AND CAPABILITIES

We assumed that better capabilities are behind export success based on resource-based view. Successful export oriented-companies had better export performance as well as higher profitability. CEOs and marketing

managers were asked to evaluate their companies' performance relative to strongest competitors. We compared CEOs' opinions using 17 factors and marketing managers' opinions using 5 factors. There were no significant differences in the case of only two factors (ethical conduct, responding to competitors' actions). Independent samples *t*-test confirmed that the successful exporters' self-evaluations were better than stagnants'. The biggest differences can be observed in the industry forecast. The marketing managers of stagnant companies considered their forecasting abilities weaker than their competitors'. In connection with it, stagnants' self-evaluation proved to be weaker than successful companies concerning market forecast, knowledge of customer needs, responding to customer needs, adjustment to the changing customer demand. These results underpin our previous conclusions that successful export-oriented companies are better at adjusting to a changing environment. Beyond this, the biggest differences occurred in production level, number of innovations, competitive prices and employee qualifications but significant differences could be observed in logistics, product quality, product range and cost efficiency. We have to highlight that stagnants evaluated their own performance weaker than strongest competitors' not only in industry forecast but in level of prices and innovations (table 20).

Managerial self-evaluation might contain several distortion factors. The reliability of these results was increased by the fact that two different persons within a company gave similar evaluations and the analysis of different parts of the questionnaires indicated similar conclusions. We also compared the managerial capabilities based on self-evaluations. Statistically significant differences can only be observed in half of the investigated factors (this rate was 90% in the case of companies' characteristics). Managers of successful exporters proved to be better at professional skills, leadership capabilities, analytical and computing skills, but there were no differences for example in problem solving, communication and business skills, and willingness to take risks.

We conducted a regression analysis to identify the capabilities that had the strongest influence on export performance (measured by export volume). The explanatory power of the regression function was weak (5.3%), the most deceiving factors were customer value creation and delivery time, which are consistent with the previous results.

Overall, the successful export-oriented companies proved to be better at operational characteristics than stagnants, the biggest differences could be observed in forecasting and innovation. The conducted analyses ver-

ified our third hypothesis that there is a significant connection between the firms' capabilities and export success.

Discussion

Successful export-oriented companies are more proactive and innovative than stagnants, thus they are capable of adapting to the changing environment. The study confirms the view held by Reid (1981) that exporting must be considered as a dynamic capability because the context of a firm changes continually throughout its exporting processes. Managers of less successful exporter companies need to develop the capabilities to monitor environmental changes. They need to lead the company in a manner that allows them to become more proactive and more flexible in their strategy.

The study highlighted that the appropriate strategic thinking could play a significant role in improving export success. Stagnants were weaker in the realisation of their strategic goals because of the lack of strategic planning and detailed action plans. The implication of the study is that stagnant companies need to develop their forecast abilities, flexibility to adapt to the changing environment and operational efficiency. Stagnant companies lagged behind successful exporters concerning industry forecast, production level, number of innovations, competitive prices and employee qualifications.

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Differentiation in Police Services in City Neighborhoods

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The demand for security depends on several socio economic characteristics such as income, property, family size that may affect the demand for pure public security or private security. In the case of a homogeneous population, the identical demands lead to an equal use of the shared public good along with an equal sharing of payments. In a heterogeneous population with a rectangular distribution of demands, security will be composed of both the pure equally shared public security along with private security that is paid individually and purchased in different quantities as a supplement to the pure public security. This combination could be applied permanently in order to achieve a social welfare improvement in comparison to the solely public security provided for the heterogeneous population.

Key Words: local public goods, police services, heterogeneous customers
JEL Classification: H3, H42, D6

Introduction

It is often observed that localities with similar crime patterns and security needs exhibit constant provision of public police and private security services. However, constituents' preferences differ among localities, and may evolve differently overtime. Thus, local policymakers need to apply policy which devises different combinations of the supply for both public and private security to better address preferences of their constituents.

Tiebout (1956) in his seminal paper suggested that differences among communities in the same metropolitan areas emanate from a more unified structure of tastes within a community than among communities. Thus, new households moving within or to the metropolitan area choose the locality that provides the level and mixture of public services that best match their preferences. That variability of public services increases social welfare more so than a unified structure of services throughout the metropolitan area. The spatial Tiebout model rests on the model of monopolistic competition that yields higher social welfare than pure competition provides.

This paper suggests a model complementary to Tiebout's general model which addresses just the case of public and private security services. It supplements the spatial Tiebout economic model with a public administration hypothesis. Tiebout explains why households choose a specific community within a metropolitan area which best reflects their specific preferences. In our model households are already located in a given community with existing demands and supply of public security which differ from the individual's preferences while payments through taxes are the same for all. Individual households supplement their missing security services by paying privately for various forms of private security. This behavior of all households creates a mosaic of security services consumed within the locality. Our model complements the Tiebout model by allowing household obtain additional security services to permanently satisfy long-run varying specific preferences. Again, the model explains variation among localities in a given metropolitan area in public police services and their supplementation with private security.

Historically, in the us and Great Britain, there has been changing reliance on the relative roles of public and private police. Early in its development, the us followed the British practice of relying on nongovernmental enforcement of law and order. Private police did not satisfy the needs of the general public, especially the growing security problems in urban area, leading to the growth of public police. The first public police force was established in New York City in 1844. However, since government at the time was small with limited resources, many groups still utilized the services of private forces. Even in the us civil war, President Lincoln used Pinkerton, the private company security company for his protection. During much of the 20th century, the role of government has increased in the us leading to expansion in public police. The expansion of government led to a trend towards privatization where government

services, including police, are contracted out to private firms. Beginning in the 1980s the public police share in total security has declined relative to private security. Private police have been contracted out to perform some of the traditional functions of public police like escorting prisoners to court, hospital, and to other prisons, crime laboratory investigation, guarding police stations and public facilities, and responding to burglar alarms (Blackstone and Hakim 2013; Müller and Wright 1994). Further, the growth in the ethnic and income heterogeneity of the population has led to differentiation in demands of residents and businesses for security, giving additional impetus for private security. Also, the almost monopolistic public police have traditionally addressed the same types of violent and property crimes. However, the mosaic of crime has changed where the extent and share of these crimes has declined since the 1970s while new crimes like identity theft, internet related crimes, counterfeit goods, credit card fraud, and business espionage have grown. State and local police are not well equipped to deal with these crimes and their wide geographic occurrence and origins. The police also have limited interest in dealing with them. Market driven private police have been entering the void by providing security services to specific cliental with varying demands. Indeed, private security personnel are estimated to be three times that of public law enforcement agencies of federal, state and local levels (McCrie 1992; Shearing and Wood 2003).

Local public services within small suburban communities reflect the preferences of the residents and changes in those preferences. A main reason why local governments are sensitive and react to changes of preferences is the 'political' distance between residents and both the local policymakers and local government officials. In relatively small suburban localities, each vote is important. Further, greater acquaintance with residents requires local elected and non-elected officials to address individual and specific concerns. As the size of the community increases, the 'distance' between residents and local officials grows. Thus, the importance of individual voters and their concerns becomes diminishes, and as a result public services reflect a consistent shrinkage of residents' well-being. Local decision makers and officials become more rigid to change and address more the median voter. As such, in the larger localities more enclaves of residents are not satisfied with the level and composition of public security services, become more pessimistic about their chances of being able to make changes, and resort to the use of private, volunteer and self-security. Also, based on the Tiebout model, smaller localities

incorporate homogeneous socio-economic residents with similar preferences about the quantity of police services desired. Larger localities include greater variability in socio economic characteristics, and sufficient population threshold to reflect wide spread preferences that are more difficult to be accommodated by existing average resident oriented police force, and thus yield greater and consistent search for non-public security services. There is ample evidence that there is positive and permanent correlation between the size of the locality and the greater reliance of non-public security services. Gated communities usually exist in larger localities with residents mostly of higher income and older.

Literature Review

The level and composition of public police in a community are determined through the political and the executive systems and presumed to satisfy the median voter (Holcombe 1989). Households chose to locate in one of multitude of communities available in the metropolitan area that is the closest to their set of preferences (Tiebout 1956). However, the demands of most residents still deviate from the actual quantity of services offered by public police. Further, the literature of Public Choice suggests that households' preferences change overtime but unlike competitive markets, the monopolistic government does not adjust the level and mixture of services to better reflect these changes. The complexity and rigidity of local governments does not allow individual concerns to be easily addressed. Often, the transaction costs to the household wishing in changing local public supply consistently exceed the expected private benefits.

Lack of satisfaction of households with public police also emanates from the supply side factor of congestion. The burden on public police has substantially increased since the 1990s because of the 911 system, increased demand for response to burglar alarm activations, and since 2001 homeland security obligations. This has created congestion (for discussion of congestion of public goods, see Oates 1988 and McMillan 1898). Police have changed their nature of activities from an umbrella like protection to response to specific incidents.

A second choice for the household is to resort to private supply of security services. Examination of the host of services offered by public police runs the gamut from club goods to totally private. A club good is a pure public good where exclusion is feasible (Buchanan 1965). Examples include security for gated communities and commercial or residen-

tial districts where defined populations who pay for the security receive the services.

Some scholars argue for the adverse effects of private security. Private security personnel are of lower skill than sworn officers and therefore their performance is weaker. Also, public police are more accountable than profit seeking private security and therefore less likely to act abusively. The wealthy are using private security causing crime to be displaced to less protected neighborhoods (see sources and evaluation of these issues in Blackstone and Hakim 2013).

The Theoretical Model

The question is whether we consider public security like police patrol as a pure local public good that should be financed by government through tax revenues, or should public security be privatized and financed by payments of private individuals. This issue is raised in several papers in the literature. The main concern arises when consumers have different requirement and needs for public safety, either because they have different requirements or needs for public safety or because they have different tastes or incomes and properties (wealth levels) and therefore their real benefits from the sense of security they gain are different. As we see below, equal needs that lead to equal sharing the cost burden of uniform coverage is efficient in welfare terms. This is not the case where the different needs that are represented by different distributed demands require coverage through uniform pricing. Then the question becomes as to who pays and how the cost burden is distributed between or among customers and furthermore, how much public safety will be supplied. It is possible that too much security may cause damages and disabilities to several customers, but for others it can be still important and very valuable.

Another issue is the possibility that public security is not homogeneous in its characteristics. Thus, we cannot add all kinds of police activity under one umbrella, and as a matter of fact the cost side of paying for police protection can also be more complicated, since not all of them should be sworn officers who graduate from the police academy. For some security activities like controlling car traffic or helping young students cross the road to school only very limited and basic training are required. On the other hand, some sophisticated economic crimes involving the underground economy or the internet require very specific talents on a much higher level that a standard police academy graduate can supply. The simple aggregation of demands for distributed qualities of security should be

decomposed on both sides of the demand and the supply simultaneously. This is the purpose of our current paper.

Let us start with the model where all consumers for the public security, G, are identical in taste income or demands. This is described in case 1 below:

CASE 1

Let us assume that in the market we have N identical consumers whose identical demand to the public security, G, is as follows:

$$D_i: P_i = A - \alpha G \quad \text{for all} \quad 1 \ldots N. \tag{1}$$

The aggregate demand of the market for G can be derived by vertical summarization:

$$D: P = N \cdot P_i = NA - \alpha NG. \tag{2}$$

Assuming a linear cost function of G with marginal cost per unit, C, the cost function is:

$$TC = C \cdot G. \tag{3}$$

According to the simple Lindhal solution for pure public good we can find the optimal value of G as follows:

$$MC = \sum P_i. \tag{4}$$

From (3) – (4) we get:

$$C = NA - \alpha NG. \tag{5}$$

Or, we can find the optimal value of G:

$$G = \frac{NA - C}{\alpha N}. \tag{6}$$

From (6) and (5) we can measure the total consumer's surplus, TCS, as follows:

$$TCS = \frac{(NA - C)^2}{2\alpha N}. \tag{7}$$

For simplicity of presentation we assume further that $\alpha = 1$, therefore consumers surplus of case 1 can be rewritten as:

$$TCS_1 = \frac{(NA - C)^2}{2N}. \tag{7'}$$

CASE 2

In the following case we assume heterogeneous customers so that on average the representative consumer I, has the same demand for G as at (1) above. However, the demand curves of all N consumers are rectangular (uniformly) distributed. Therefore the demand of any consumer i is defined as (8) below:

$$D_i : P_i = A + \frac{N}{2} - i - G. \tag{8}$$

Further, since we face some consumers with very low reservation price that is equal to $A_i + \frac{N}{2} - i$, for specific consumer I, it is possible to gain disutility from certain level of G demonstrating negative consumers' surplus. Those citizens (consumers) are 'fed up' from too much police patrol and too many policemen controlling their habits and interfering with their lives and do not feel that they need as much service supplied by the government. In order to simplify our analysis we ignore the possibility of negative marginal utility from excess supply of the public good.

Therefore we can introduce the demand curves for different value of G as follows

$$
P = \begin{cases}
A \cdot N + \frac{N^2}{2} - \frac{(1+N) \cdot N}{3} - 0 \cdot N & G = 0 \\[2mm]
A \cdot N + \frac{N^2}{2} - \frac{(1+N) \cdot N}{3} - 1 \cdot N & G = 1 \\[2mm]
\vdots & \vdots \\[2mm]
\vdots & \vdots \\[2mm]
A \cdot N + \frac{N^2}{2} - \frac{(1+N) \cdot N}{3} & \\
\quad -(A + \frac{N}{2} - N)^2 \cdot N = \frac{N \cdot (N-1)}{2} & G = A + \frac{N}{2} - N \\[2mm]
\vdots & \vdots \\[2mm]
0 & G = A + \frac{N}{2} - 1
\end{cases} \tag{9}
$$

In more general terms we can write the equations of (9) in reduced forms as:

$$
P = \begin{cases}
A \cdot N + \frac{N^2}{2} - \frac{(1+N) \cdot N}{2} - N \cdot G & G \le A - \frac{N}{2} \\[2mm]
\frac{(N-i) \cdot (N-i-1)}{2} & G > A - \frac{N}{2}
\end{cases} \tag{9'}
$$

We assume that government ignores the differences in preferences, and treat identically all constituents, like in case 1. We assume also that all

local governments in the metropolitan area have the same cost function as above: $T = CG$ to determine the same level of $(6')$.

$$G = \frac{N \cdot A - C}{N} = A - \frac{C}{N} \tag{6'}$$

and charge all customers the equal cost sharing burden as follows:

$$P_i = \frac{C}{N}. \tag{10}$$

For any customer we can define his consumer surplus as:

$$P_i = A + \frac{N}{2} - i - \left(A - \frac{C}{N}\right) = \frac{N}{2} - i + \frac{C}{N}. \tag{11}$$

Therefore the total consumers' surplus in case 2 is:

$$TCS_2 = \sum_{i=1}^{N} \frac{\left(A + \frac{N}{2} - 1\right)^2}{2} - \sum_{i=1}^{i^*} \frac{\left(\frac{N}{2} + \frac{C}{N} - i\right)^2}{2} - \left(A + \frac{C}{N}\right). \tag{12}$$

Or,

$$TCS_2 = \left(A + \frac{N}{2}\right)\left(A - \frac{N}{2} - 1\right) \cdot \frac{N}{2} + \frac{N(1 + N)(2N + 1)}{12}$$

$$- \frac{1}{2} \cdot \left(\frac{N}{2} + \frac{C}{N}\right)\left[\left(\frac{N}{2} + \frac{C}{N}\right)\left(N + \frac{2C}{N} - 4\right) + 1\right] \tag{12'}$$

$$- C\left(A - \frac{C}{N}\right).$$

For simplicity of exposition, let us define three values of W, X and Y as follows:

$$W \equiv \left(A + \frac{N}{2}\right)\left(A - \frac{N}{2} - 1\right) \cdot \frac{N}{2}, \tag{13}$$

$$X \equiv \frac{N(1 + N)(2N + 1)}{12}, \tag{14}$$

$$Y \equiv \frac{1}{2} \cdot \left(\frac{N}{2} + \frac{C}{N}\right)\left[\left(\frac{N}{2} + \frac{C}{N}\right)\left(N + \frac{2C}{N} - 4\right) + 1\right]. \tag{15}$$

Thus, TCS_2 is:

$$TCS_2 = W + X - Y - C\left(A - \frac{C}{N}\right). \tag{16}$$

Comparing TCS_1 to TCS_2 yields (17):

$$TCS_1 = \frac{(NA - C)^2}{2N} \gtreqless W + X - Y - C\left(A + \frac{N}{2}\right) = TCS_2. \qquad (17)$$

From (7′) and (17) we can see that $TCS_1 - C\left(A + \frac{N}{2}\right) > W$.

The other two values at (17) are X and Y that have different signs. We can see very easily that for large population N the value $\frac{C}{N}$ approaching zero, i. e. $\frac{C}{N} \to 0$. Therefore it is most likely that $X > Y$, this is because:

$$\frac{N^3}{4} - N^2 + \frac{N}{2} < 2N^3 + 3N^2 + N. \qquad (18)$$

Therefore, we conclude that since (19) holds

$$A + \frac{N^2}{2} + \frac{N}{2} < \frac{1}{12}\left(\frac{7N^3}{4} + 4N^2 + \frac{N}{2}\right), \qquad (19)$$

$$TCS_1 < TCS_2. \qquad (20)$$

CASE 3

We now extend case 2 assuming the same demand distribution between or among the heterogeneous customers so that only the median customer is satisfied with the public supplied quantity of G_0; however many other customers, $\frac{N}{2}$, are willing to add additional units of private security that might be supplied as supplement in order to increase their consumer surplus. In this case we allow more flexibility in consuming security either by consuming pure public goods shared by all customers or by extra/additional private security, *PS*, provided individually/privately by part of the population ($\frac{N}{2}$ individuals) with high reservation prices. We use several assumptions for the extension of case 3.

- *A* public good and a private good are full substitutes.
- *C*, per unit cost, for the private and public good are the same.
- The burden of a public good is shared equally, but the supply of private security is totally paid by individuals (figure 1; G_0 is optimal pure public good quantity that was determined above at case 2, consumer surplus of median is S_{ABC}, consumer surplus of high demand is S_{DEBC}).

  Since G_0 is determined simultaneously and no private security is supplemented privately *SEBF* is *DWL* to high demand customer. If *C*, the cost of a unit of the private good production is constant then private security can be composed/combined as a supplement of pure
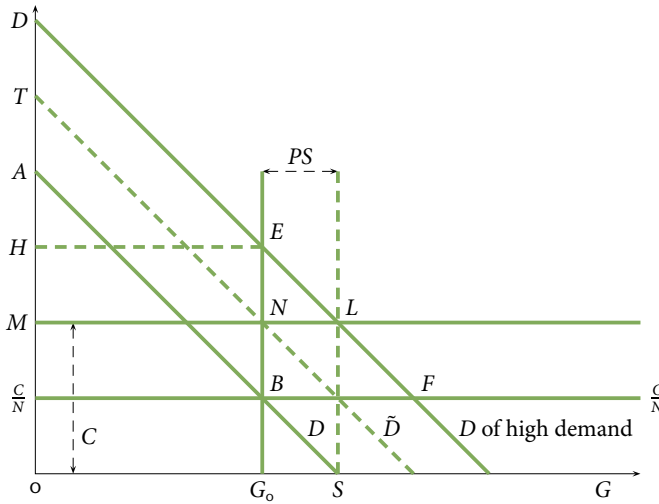
FIGURE 1

public security, G_o, and then the *CS* of the high demand customer increases. If additional *CS* can be obtained by S_{ENL} that can be obtained by G_o of pure public security and that will be added privately by the high demand customer for security.

However, if N is large enough then it is more likely that private security will be added to supplement public police.

- We totally ignore the disutility of customers who pay for too many units of the pure public good and are not compensated.

An extension of case 2 is that the negative utilities of low demand for public security may encourage a policy maker to reduce the quantity of the pure public good, lowering the burden of having it and instead maintain a higher provision of private security by individuals who pay a higher cost per unit of C.

In the figure we plot two extreme demands: The demand of the median customer who has no incentive to add any private security and is satisfied only with G_o units of the pure public good. The second customer has the highest demand for security of any kind and who has, therefore, the highest demand for supplementary units of private security. Since we have a whole distribution of demands in case 2 whose reservation prices are above *OA* but less than *OD* we have to investigate their attitude/behavior towards purchasing privately private security units. Since each of them finances the private security by himself and each unit costs

C, it is possible that they will not buy extra private security. This will happen to the customers whose reservation price is less than the size of $OA = OA + BN = OA + AT$. However the customer with a higher reservation price, i.e., $OD >$ reservation price $> OA + BN$ will benefit from the private security supply which will yield additional consumers surplus. The demand of the 'borderline' customer will not yet purchase private security.

At this stage we want to find the extra net social welfare of all customers who buy the private security, *PS*, in addition to the supply of the public good. For this purpose we introduce first the 'leftover' demand for the private security and extra units to the public good supplied.

For this purpose we introduce first to the leftover demand of the highest demand customer that is as follows:

$$P = \left[A + \frac{N}{2} \right] - \left[A - \frac{C}{N} \right] = \frac{N}{2} + \frac{C}{N}.$$

At equilibrium we can measure the quantity demanded for private security of this customer as follows. His demand is:

$$P = \left(\frac{N}{2} + \frac{C}{N} \right) - PS.$$

Since $P = C$ we find the highest *PS* of this customer as

$$PS = \left(\frac{N}{2} + \frac{C}{N} \right) - C.$$

For each other customer, *I*, the demand for *PS* is

$$P_i = \left[A + \frac{N}{2} - i \right] - \left[A - \frac{C}{N} \right] = \frac{N}{2} + \frac{C}{N} - i - PS. \tag{21}$$

The term in the first left bracket is the highest reservation price of individual *i* for security and the second term in the bracket is G_o the optimal supplied quantity of the pure public good.

For each customer, *i*, the 'leftover' demand for the private security, *PS*, is obtained as follows:

$$P_i = \left[A + \frac{N}{2} \right] - \left[A - \frac{C}{N} \right] - i - PS - C. \tag{22}$$

From (22) we find that PS, the demand for extra private security for each customer i, is:

$$PS = \frac{C}{N} + \frac{N}{2} - i - C. \tag{23}$$

As i is higher, PS purchase of customer i is smaller, and PS is approaching zero when

$$PS = 0 = \frac{C}{N} + \frac{N}{2} - i - C, \tag{24}$$

or

$$i = \frac{C}{N} + \frac{N}{2} - C. \tag{24'}$$

The extra consumer surplus of each customer I, for consumer i ($i = 0, 1, 2, \ldots, \left(\frac{N}{2} + \frac{C}{N} - C\right)$) is:

$$\sum_{i=0}^{\left(\frac{N}{2}+\frac{C}{N}-C\right)} S_{ENL} = \frac{PS^2}{2} = \frac{\left[\frac{N}{2} + \frac{C}{N} - i - C\right]}{2}. \tag{25}$$

Therefore, we get (11') from (12') and (25) the extra/additional welfare resulting purchase of private security as supplement to the optimal public security, G_0 as follows:

$$\Delta W = \sum_{i=0}^{\left(\frac{N}{2}+\frac{C}{N}-C\right)} S_{ENL} = \frac{\left[\frac{N}{2} + \frac{C}{N} - C\right]^2 - 2\left(\frac{N}{2} + \frac{C}{N} - C\right)i + i^2}{2}, \tag{25'}$$

or,

$$\Delta W = \left[\left(\frac{C}{N} + \frac{N}{2} - C\right)^2 - 2\left(\frac{C}{N} + \frac{N}{2} - C + 1\right) \right.$$
$$- \left(\frac{C}{N} + \frac{C}{N} - C\right)^2 - 2\left(\frac{C}{N} + \frac{N}{2} - C + 1\right)$$
$$\left. + \frac{\left(\frac{C}{N} + \frac{C}{N} - C\right)^2 \left(\frac{C}{N} + \frac{N}{2} - C + 1\right)^2}{4} \right] \div 2 \tag{25''}$$

Therefore, the extra welfare obtained by private security supplement is

$$\Delta W = \frac{\left(\frac{C}{N} + \frac{N}{2} - C\right)^2 \left(\frac{C}{N} + \frac{N}{2} - C + 1\right)^2}{8} \approx \frac{\left(\frac{C}{N} + \frac{N}{2} - C\right)^4}{8}. \tag{26}$$

The total extra private security purchase by all customers in addition to the mutual consumption of the pure public good, G_o, is measured as follows:

The *PS* of the highest demand for private security is

$$PS = \left[\frac{C}{N} + \frac{N}{2} - C \right].$$

The next one is

$$\left[\frac{C}{N} + \frac{N}{2} - C - 1 \right].$$

The last customer who prefers only the pure public security with any extra private supplement is customer

$$\left[\frac{C}{N} + \frac{N}{2} - C \right].$$

Thus, the total private security supplement units *TPS*, are

$$TPS = \sum_{i=o}^{\left(\frac{N}{2} + \frac{C}{N} - C \right)} PS = \left[\frac{C}{N} + \frac{N}{2} - C \right] \cdot \left[\frac{C}{N} + \frac{N}{2} - C + 1 \right]$$

$$- \frac{\left[\frac{C}{N} + \frac{N}{2} - C \right] \cdot \left[\frac{C}{N} + \frac{N}{2} - C + 1 \right]}{2}, \qquad (27)$$

or

$$TPS = \frac{\left[\frac{C}{N} + \frac{N}{2} - C \right] \cdot \left[\frac{C}{N} + \frac{N}{2} - C + 1 \right]}{2} \qquad (28')$$

$$\approx \frac{\left[\frac{C}{N} + \frac{N}{2} - C \right]^2}{2}.$$

In the next stage we want to investigate the mixture between total private security purchased unit and the total public security unit.

The ratio 'mixture' between the two kinds of security units are:

$$Mix = \frac{TPS}{G_o} = \frac{\left[\frac{C}{N} + \frac{N}{2} - C \right]^2}{2 \left(A - \frac{C}{N} \right)} \qquad (28)$$

In the next section we examine how in case 3 changes in the independent variables *A*, *C*, and *N* affect the dependent variables, G_o, *TPS*, *Mix*, and ΔW.

Comparative Static Analysis

Since $G = A - \dfrac{C}{N}$ then $\dfrac{dG}{dA} > 0$,

$\dfrac{dG}{dC} = -\dfrac{1}{N} < 0$, and $\dfrac{dG}{dN} = \dfrac{C}{N^2} > 0$.

Since $TPS = \dfrac{\left(\frac{C}{N} + \frac{N}{2} - C\right)^2}{2}$ then, $\dfrac{dTPS}{dA} = 0$,

$\dfrac{dTPS}{dC} = \dfrac{2\left(\frac{C}{N} + \frac{N}{2} - C\right)^2 \cdot \left(\frac{1}{N} - 1\right)}{2}$.

Assuming $N \gg A$, and $N \gg C$ and always $A > C$, we get that $\frac{C}{N} \to 0$. Therefore,

$\dfrac{dTPS}{dC} = \left(\dfrac{N}{2} - C\right)(-1) < 0$,

$\dfrac{dTPS}{dN} = \dfrac{2\left(\frac{C}{N} + \frac{N}{2} - C\right)^2 \cdot \left(-\frac{1}{N^2} + \frac{1}{2}\right)}{2} \Rightarrow \dfrac{dTPS}{dN} = \left(\dfrac{N}{2} - C\right) \cdot \dfrac{1}{2} > 0$.

- $\frac{Mix}{dA} < 0$ More public security relatively to private supplement when reservation price is higher.
- $\frac{dMix}{dC} < 0$ Lower production cost per unit of supplied security increases the mixed supply between private security and public security, i. e., less public security relative to private security (see appendix 1).
- $\frac{dMix}{dN} > 0$ In most cases a larger community necessitates a larger mixture of private security in comparison to public security (see appendix 2).

Taking the derivatives of equation (14) on changes in the *Mix* values with respect to A, C and N yields the following

$\dfrac{dMix}{dA} = \dfrac{(-2)\left[\frac{C}{N} + \frac{N}{2} - C\right]^2}{\left[2\left(A - \frac{C}{N}\right)\right]^2} = -\dfrac{\left[\frac{C}{N} + \frac{N}{2} - C\right]}{2} < 0$.

Assuming $N \gg A$, $N \gg C$ and always $A > C$, we obtain

$\dfrac{dMix}{dC} \approx -\dfrac{A - C}{4A^2} - \dfrac{N}{2} < 0$

TABLE 1

Independent variable	Dependent variable change			
	dMix	*dG*	*dTPS*	*dΔW*
dA	−	+	o	o
dC	−	−	−	−
dN	+	+	+	+

From (26) and (27′) we find that ΔW is equal to $\frac{TPS^2}{2}$. Therefore, the signs of the values $\frac{d\Delta W}{dA}$, $\frac{d\Delta W}{dC}$ and $\frac{d\Delta W}{dN}$ are similar to the signs of the parallel values of $\frac{dTPS}{dA} = 0$, $\frac{dTPS}{dC} =<$, and $\frac{dTPS}{dN} > 0$.

All the results above are summarized in table 1.

Based on table 1 we determine several additional results regarding the effects of *A*, *C* and *N* on the optimal values of public and private security expenditures and the welfare effects.

Higher value of *A* that indicates a larger 'necessity' for security leads to higher spending on public security. However, it does not affect the private security supplement expenditures that are spent by each private individual since it is cheaper to finance security publicly. Moreover, higher values of *A* reflect higher social welfare from public security. However, it does not change the values of *TPS*, Total Private Security. To summarize, more requirements for security increase permanently the value added of social welfare, leading to a Pareto improvement. The effects of increase in *C*, the production cost of security, on the decision variables are straightforward. It reduces the attitude to spend money on security of any kind, public or private. However, higher *C* of individually paid private security is more significant than collectively paid public security. Thus, the *Mix* decreases too. The most important results in our comparative static analysis relates to the population size, *N*, and has two contradicting effects. On the one hand, the increase in *N* increases the advantage of cooperation among consumers of sharing the burden of public spending. Moreover, the larger the population, *N*, the greater is the advantage of purchasing of more public security. On the other hand, the increase in *N* leads to groups with different demands for security. Therefore, in the specific rectangular distribution of demand and taste, public security increases by a lower percentage than private security. This leads to a higher mixture, *Mix*, and to a consistent increase in the importance of supplementing public police.

We may predict based on our results that in larger and more diversified communities the supplement of private security is more significant, while

in more homogeneous or small communities the population may rely on collective public security than in other large and non homogeneous communities.

The requirement that $N \gg C$ is crucial since it emphasizes the possibility of sharing the burden of public security before paying privately and individually for private security. A high level of C, may discourage many individuals from buying private security and from consistent increase in welfare.

Supplementing Public Police

The budgeting process of local government addresses the preferences of the 'median voter' which is determined through the political system. Specific preferences could be addressed by group of residents when their number reaches the economic threshold size. When the local political pressure to address the specific growth of services by the locality as a 'public good' is perceived difficult or fails then the group resorts to group effort like (1) private police or (2) volunteer effort like vigilante groups or specifically neighborhood watch. When such group action is difficult or involves high transaction costs by the individuals who wish to supplement public police then individual efforts are employed. Such individual activities include (3) self-protection, (4) property insurance, and (5) protection design. Self-protection includes deterrence, prevention, and detection measures. Individual preferences may motivate others to resort to acquire insurance policies with lower deductibles and greater coverage. The last security measure that is available typically when properties are built is environmental where access through windows and doors is made difficult, and access is controlled.

Private Police

Private police are estimated to be at least three times the combined federal, state, and local law enforcement (Blackstone and Hakim 2013). Some consumers and businesses desire more police protection than they normally can obtain. In particular, high income communities are the probable demanders of private security services. In the Central Business District of Philadelphia, Pennsylvania private security supplemented public police. In 1991 existing businesses in the CBD requested City Council to impose a permanent five percent surtax on their property taxes to fund private security. Between 1993 and 1994 crime decreased by six percent in the center l city business district but increased by 1 percent in the central police district which includes the center city business district. Further, 78

percent of area population believed that the center city business district was less safe prior to the arrival of the private security guards (Blackstone and Hakim 2010, 371). A similar situation occurred in Chicago where residents voted for a special district which involved a supplementary property tax to fund hiring private police. Unlike Philadelphia these officers were armed and acted much like the public police. Indeed 17 percent of their time was spent on serious crime related activities (Blackstone and Hakim 2010, 371).

New Orleans has similar such supplementation by private security. In 2012, e almost 30 districts within New Orleans voted to be taxed in order to procure private security services. The state legislature must approve the neighborhood's voting to create such a district. Each resident property is assessed an annual fee, 'usually hundreds of dollars' (McCarthy 2012). One official noted that people are concerned about their security, and want to see more officers available (McCarthy 2012). Some cities say such security districts are inequitable in that the wealthy receive better security. Further, it could be argued that citizens were already paying for protection and alternatively the entire city could add to its police force.

One New Orleans district, the Upper Audubon Security district, charges each property owner annually $500, has an annual budget of $200,000 and provides private patrol, personal home escorts, and residence checks. A larger security district, the Mid-City Security District, has a budget of $1 million and the district's president views the districts as a gated community (McCarthy 2012). This arrangement like the others discussed allows residents within a large governmental entity to obtain greater security services than normally would be provided them.

Oakland, CA has seen a growth of private security to supplement police services. Wealthy neighborhoods have contracted with private security to patrol their streets. The unusual aspect is the banding together of groups of neighbors to employ private security (Stein 2013).

Gated communities have been characterized as a kind of club good where residents band together to purchase collective services for their exclusive use. Included within those services is security. Physical and environmental barriers along with a cohesive community are employed to achieve such security (Csejalvay 2011, 736–7). Even in the 1990s, 2.5 million American families were already living in such gated communities (Blakely and Snyder 1998, 53). Access control is usually a prominent feature of gated communities which originally began in the West and then spread to the East. They usually exist in metropolitan areas and are rare in New England and the deep South. Surveys indicate that security was a pri-

mary motivation for living in gated communities. One survey found that 70 percent of gated community residents say that security was an important consideration in their decision to live in a gated community (Blakely and Snyder 2011). No surprisingly, income is an important element explaining who lives in such gated communities. The affluent residents are able to obtain more services including security than the less affluent city residents. The gated community allows residents to increase their use of security services.

Gated communities are most prevalent in Mexico where in 2010 an estimated 56 million people live in such gated communities of the total urban population of 88 million (see http://en.wikipedia.org/wiki/gated _community). Income differences and the fear of crime encourage such living arrangements. For example, the average 2008 income of Mexican urban residents was $26,654 while rural residents who often live close to urban areas average $8,403.

Around the world, gated communities are employed to protect residents from crime, clearly indicating that the residents want more security than provided by the public police. As in Mexico, gated communities with substantial private security are most common in nations with great disparity in income distribution. Examples include Brazil, Saudi Arabia, and South Africa.

Volunteer Efforts

This category includes neighborhood watch, safety control committees in apartment complexes, citizens serving as auxiliary unarmed police, and safe haven homes. Bennett, Holloway and Farrington (2006) report that in the early 2000s, six percent of UK homes or 27 percent of the population lived in areas covered by neighborhood watch. They note that there were 155,000 neighborhood watch organizations operating at the time. The US had 41 percent of its population living in neighborhood watch covered areas during the early 2000. These volunteer efforts were the largest supplement to public police, and provided information to the police on suspicious activities. The study also stresses the fact that such security alert groups was shown to deter criminals.

Self-Protection

When public police and local citizen group efforts are insufficient in addressing individual security preferences, self-protection measures are utilized. Residential Self- protection from crime is categorized into deter-

ring, prevention, and detection measures (Hakim and Blackstone 1997, 59–60). Deterring efforts are aimed to create the impression that the residence is occupied even when it is not. These measures are designed to encourage the burglar to dismiss the property from consideration when browsing for a target. It includes lights, active appliances, car always on driveway, the absence of accumulated mail and newspapers, and trimmed bushes near windows and doors. Prevention efforts are aimed to slow down or prevent by physical measures the entry of the intruder into the premises. These measures include bars on windows, deadbolt locks, and sash on windows. Detection measures are aimed to alert the police, private security or any pre-assigned person about a possible intrusion. The only such measure is a burglar alarm where a signal is dispatched. Interestingly, a yard sign which signifies the existence of a burglar alarm appears as a significant deterring measure (Hakim and Blackstone 1997, 66–70). In their empirical study which is based on residents' questionnaires, Hakim and Blackstone (1997, 70) showed that the motive for installing a burglar alarm is mostly for personal security.

Property Insurance

Insurance policy is a supplement for police aimed at recovering mostly monetary losses resulting from crime. Insurance is a normal good which is positively related to income and wealth. A supplement to public police is the acquisition of insurance policy. An insurance policy will be maintained as long as the expected costs of a break-in are higher than the discounted value of the annual premium payments. In a related matter, Hakim, and Blackstone (1997, 59–75) calculated that insurance discounts offered to owners of burglar alarms are beneficial to insurers. The premiums are beneficial to policy holders considering the costs of the associated treatments resulting from the violent crimes and the deductibles incurred on the property loss. Indeed, Loader (1997) notes the discounted insurance premiums for installing security hardware like burglar alarms, CCTV cameras, and deadbolt locks.

Environmental Design

Another personal supplement to public police is to restructure the physical layout of Communities to allow residents to control the area around their home. Newman (1972; 1996) pioneered the research and implementation of the defensible space. In his two books, Newman suggested design of streets, the grounds, and access to residents. He also dealt with the

design of the lobbies and hallways within housing complexes. His premise was to help people preserve those areas in which they can realize their community held values and lifestyles.

The key element in Newman's theory is to create a residential environment where physical characteristics including building layout and site plan function to allow inhabitants to observe their surroundings, and exercise control through effective ownership of their environment. By promoting a sense of 'belonging' for the interior and exterior common space, a criminal stands out and feels vulnerable. Newman also observed that smaller multifamily units create greater sense of belonging, better visibility of the environment, and thus make a long term safer living.

Conclusions

The Tiebout model suggests that a household moving to a metropolitan area chooses among the large number of suburban and urban localities to locate where the mix of public services best reflects its own preferences. The large number of localities provides greater social welfare. The result for a multi-communities region is that demands for public services are likely to be more diverse among than within communities.

This paper extends the traditional Tiebout model by considering security services, and suggesting based upon preferences the permanent mixture of public and private security for each community. The theoretical model shows how private security supplements public security and the magnitude varies among localities or preferences. The supplementing of public police with private security is implanted in the five forms of private police, volunteer efforts, self-protection, insurance, and environmental design. All these five forms result at different magnitudes among localities of varying preferences and without government intervention (the invisible hand). The use of private security exists, could increase, and varies among communities even when such services are perfect substitute to public police.

The paper investigates three models where quantity demanded for security varies within a community. In the case that the population is homogeneous in wealth, income, and preferences, supplementation is not needed. The society coordinates and shares the burden of optimal pure public good expenditures. This was illustrated by the first model. In the second model where population groups are heterogeneous either by location, properties, incomes, or preferences, a rectangular distribution of the demand for security is generated. In that case the solution of a solely pure public good supply according to the median representative consumer and

equally sharing the burden of finance is not the first best solution. By allowing a combination of a pure public good with private types of security, model three may lead under certain conditions to an improvement in social welfare. Several additional implications can be derived from our models. An increase need for security due to objective or subjective factors does not affect the demand for supplemental private security (which can be defined as 'neutrality of private security'), and will be supplied only by additional expenses on pure public security. These demand factors include, among others, changes in property values, income of all population groups, or uncertainty about economic and social conditions.

On the other hand, an increase in the production cost of security increases the demand for the pure public good and reduces private security expenses. The reason is that in relative terms, the public good is cheaper and private security becomes more expensive. Thus, the substitution effect permanently dominates in more public security and less private security. The mixture has changed, and in addition the total security level has unequivocally declined.

The last important finding is the impact of a change in population. An increase in the population has two effects: On the one hand the larger community yields greater demand for either public or private security. However, there is another effect of the increase in population in our model; a larger community also leads to a larger diversification of demands. These two effects lead to the important conclusion that as population increases public security as well as private security both increase. However, the former increases in smaller percentage terms than the latter. Thus, the ratio of private security to public security increases as the population grows.

Appendix 1

$$\frac{dMix}{dC} = \frac{8\left(\frac{1}{N} - 1\right)\left[\frac{C}{N} + \frac{N}{2} - C\right]\left(A - \frac{C}{N}\right) - \frac{4}{N}\left[\frac{C}{N} + \frac{N}{2} - C\right]^2}{\left(4\left(A - \frac{C}{N}\right)\right)^2}$$

$$= 4\left[\frac{C}{N} + \frac{N}{2} - C\right] = \frac{\left[\left(\frac{1}{N} - 1\right)\left(A - \frac{C}{N}\right) - \left(\frac{C}{N} + \frac{N}{2} - C\right)\right]}{\left(4\left(A - \frac{C}{N}\right)\right)^2}$$

$$= 4\left[\frac{C}{N} + \frac{N}{2} - C\right] = \frac{\left[\frac{A}{N} - \frac{C}{N^2} - A - \frac{N}{2} + C\right]}{\left(4\left(A - \frac{C}{N}\right)\right)^2}$$

$$= 4\left[\frac{C}{N} + \frac{N}{2} - C\right] = \frac{\left[-(A - C) - \frac{N}{2} - \frac{C}{N^2} + \frac{A}{N}\right]}{\left(4\left(A - \frac{C}{N}\right)\right)^2} \leq 0$$

Assuming that $N \gg A$ we find that $\frac{A}{N} \to 0$, therefore

$$\frac{\left[-(A-C)-\frac{N}{2}\right]}{4A^2} < 0.$$

Make more sense if the attitude towards C is to join mutual financing by customers of pure public security.

Appendix 2

$$\frac{dMix}{dN} = \frac{-4\left(-\frac{C}{N^2}+\frac{1}{2}\right)\left[\frac{C}{N}+\frac{N}{2}-C\right]\left(A-\frac{C}{N}\right)-\frac{2C}{N^2}\left[\frac{C}{N}+\frac{N}{2}-C\right]^2}{4\left(A-\frac{C}{N}\right)^2}$$

or

$$\frac{dMix}{dN} = \frac{2\left(\frac{C}{N}+\frac{N}{2}-C\right)\left(A-\frac{2AC}{N^2}-\frac{3C}{N}+\frac{C^2}{N^3}+\frac{C^2}{N^2}\right)}{4\left(A-\frac{C}{N}\right)^2}$$

Assuming that $N \gg C$ we find that $\frac{C}{N} \to 0$, therefore

$$\frac{dMix}{dN} = \frac{2\left(\frac{C}{N}-C\right)\cdot A}{4A^2} > 0.$$

Otherwise the sign of $\frac{dMix}{dN}$ is ambiguous.

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Stock Market Consequences of the Suspension of the Central Bank of Nigeria's Governor

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The sudden announcement of the suspension of the Governor of the Central Bank of Nigeria (CBN) on the 20th February 2014 created mixed reactions among analysts and market participants in Nigeria and beyond. The objective of this study is to empirically establish the reaction of listed firms' stock prices to the announcement of the suspension of the Governor of the CBN. Using the standard event study methodology on a sample of 104 out of the 122 listed firms that traded on the floor of the NSE on the fateful day, the study sought to establish the significance of abnormal return and cumulative abnormal return on the announcement day, and fifteen trading days after the announcement became public. The study found the presence of statistically significant abnormal return and cumulative abnormal return of –0.06 percent and –5.95 percent on the announcement day. It also established the presence of statistically significant cumulative abnormal return of approximately –6.91 percent fifteen trading days after the announcement. The study concluded that the sudden announcement of the suspension of the Governor of the CBN gave rise to a negative market reaction by listed firms in Nigeria, and the negative trend persisted for the fifteen trading days after the announcement. It was recommended that subsequently, policy makers should as much as possible avoid sudden announcements of the suspension or removal of the Chief Executive Officers (CEOS) of public institutions that have close links with the stock market. Where the need for such action becomes inevitable, the announcement should be preceded by the release of information that will minimize asymmetry between policy makers and the stock market.

Key Words: stock prices, Governor of the CBN, event studies
JEL Classification: G12, G14, G21

Introduction

The role of the financial system in mobilizing funds from the deficit to the surplus units of any economy cannot be overstressed. The financial sys-

tem ensures that resources are directed from the surplus spending units to the most productive sectors of the economy. At the centre of this important intermediation function is the stock market, which ensures channelling of resources into long-term productive investments. The stock market of any economy therefore sees to the mobilization of funds on long-term basis to stimulate economic growth. Thus, it is therefore not surprising that a number of studies in developed and emerging markets have empirically documented the role of the stock market in fostering economic growth (Atje and Jovanic 1993; Yartey 2007; Aruwa 2009).

A central question to the operation and performance of stock markets all over the world is the extent to which such markets instantaneously and unbiasedly impound new information into stock prices. Thus, a market is considered efficient if it quickly and automatically adjusts to reflect new information. This process of stock prices adjustment to new information is referred to as market efficiency in finance. Fama (1970) identified three forms of efficiency associated with stock markets. According to him, a stock market is said to be weak-form efficient if information on past stock prices is fully reflected in current prices, semi-strong form efficient if all publicly available information is captured in stock prices; and strong-form efficient if all information including the one held by insiders is fully reflected in stock prices. On the other hand, banks complement the functions of the stock market by providing short-term credit and liquidity to the various players within the financial system. Hence, banks also play a very crucial role on the intermediation process by mobilizing resources from the surplus to the deficit spending units albeit on short-term basis. Being profit maximizers, the resource allocation process of banks is highly regulated and often done within the framework provided by the apex bank, which core mandate is to ensure macroeconomic and financial stability. The central bank of any economy therefore plays an indispensable role in promoting the stability of its financial system. Central banks are headed by CEOs who are referred to as governors in some economies and presidents in others.

According to Lassoued and Attia (2013), CEO attitude can have serious effect on the financial, investment and operational decisions of his/her organization. Thus, as the CEO of a corporate organization, the integrity and independence of the CEO of a central bank plays a crucial role in determining the confidence the general public will have in the economic system locally and internationally.

Most of the extant studies on CEO turnover centre exclusively on cor-

porate organizations, thereby ignoring public institutions. Previous studies on CEO changes such as Adelegan (2009a) and Bonnier and Bruner (1989) have argued that since CEOs and boards of organizations have power of influence over the firm's strategy, policy and decision-making, change of CEOs or board members will be a significant event that could have implications for the firm's market value. This implies that the removal or suspension of the CEO of a sensitive public institution such as the central bank will have market consequences. This is especially true for banks that are most of the time the direct target group of the central bank.

Like other value-relevant announcements, stock prices reaction to the announcement of the removal or suspension CEOs are studied using the event study approach because of its ability to accurately capture the impact of an event announcement (Ball and Brown 1968). This methodology involves the thorough analysis of the difference between the return earned as a result of the announcement and the return that would have been earned had the announcement not been made (Brown and Warner 1985). The analysis is usually for a defined time period around the date of announcement (event window). The presence of abnormal return at whatever level is an evidence of semi-strong form inefficiency (Peterson 1989).

In Nigeria, the sudden announcement of the suspension of the Governor of the CBN on the 20th February 2014 has generated controversy and many reactions among observers and market analysts as to the likely consequences of such an action on the market value of listed firms. It was worrisome to many stakeholders that policy makers could take such an abrupt decision without recourse to the likely consequences such action may have on the Nigerian capital market in particular and the financial system in general. While a number of opinions exist on the extent of listed firms' stock prices reaction to the announcement of the suspension, they can at best be considered as mere conjectures and not products of empirical research. The need to conduct an empirical study to establish the extent of this reaction therefore becomes imperative.

Consequently, this study aims at empirically analyzing the reaction of listed firms' stock prices to the announcement of the suspension of the Governor of the CBN. The specific objectives include to:

1. Establish the significance of listed firms' abnormal return on the announcement day of the suspension of the Governor of the CBN.

2. Establish the significance of listed firms' cumulative abnormal return on the announcement day of the suspension of the Governor of the CBN.

3. Establish the significance of listed firms' cumulative abnormal return fifteen trading days after the announcement day of the suspension of the Governor of the CBN.

To achieve this, the paper hypothesized that there exists no significant abnormal and cumulative abnormal return within listed firms' event window on the announcement day of the suspension of the Governor of the CBN. The hypotheses are presented in statement and notational forms as follows:

H1 *There is no significant abnormal return on the announcement day of suspension of the CBN Governor ($AR_{(to)} = 0$).*

H2 *There is no significant cumulative abnormal return from fifteen trading days before the announcement day to the announcement day of suspension of the CBN Governor ($CAR_{(t-15,to)} = 0$).*

H3 *There is no significant cumulative abnormal return from fifteen trading days before the announcement day to fifteen trading days after the announcement day of suspension of the CBN Governor ($CAR_{(t-15,t+15)} = 0$).*

The remainder of the paper is structured as follows: section two provides a review of literature and theoretical postulations on stock prices reaction to CEO/board changes and sudden ouster of corporate boards, section three discusses the methodology, section four presents the results and discusses the findings; and section five concludes, draws policy implications, and recommends the appropriate course of action.

Literature Review

Studies on stock prices reaction to value-relevant announcements are usually conducted by examining the market's response to the disclosure of an event. Identifying previous studies, whether in developed or emerging markets, where the governors (or presidents) of their central banks have been suddenly suspended or sacked becomes very difficult for two reasons. First and foremost, policy makers always avoid such kind of decision because of its likely effect on the economy as a whole, and secondly, the central banks of most economies have clearly established laws and excessive checks regarding the suspension and sack of CEOs of public institutions that are economically and financially sensitive. Thus, the closest

link between previous studies and this paper is the study of stock market reaction to changes in CEOs of corporate organizations.

Despite the sharp contrast between the operations of corporate organizations and important public institutions such as the CBN, the review of such studies could provide useful insights to understanding the context of this study better. This section therefore presents a review of some studies on stock prices reaction to CEO/board changes and sudden ouster of corporate boards in developed and emerging markets.

Adelegan (2009b) investigated the reaction of stock prices of firms listed on the NSE to the announcement of change in top management, with a view to establishing whether or not the Nigerian stock market is informationally efficient in that regard. The study employed the traditional event study methodology on a sample of firms listed on the NSE from 1997 to 2005. The study documented a significant positive pre-announcement, announcement and post-announcement price reactions. Furthermore, negative stock price reaction was recorded for the announcement of resignation of top management; while the concurrent announcement of resignation, retirement and new appointment of top management gave rise to positive market reactions. The study concluded that top management change in Nigeria is perceived by the market as a positive signal in favour of shareholders' interest. However, a proportion of the scope of the study falls within the period when the NSE was not automated, and the study did not to correct for thin trading and volatility effects in the return series.

Furthermore, Lassoued and Attia (2013) examined the market effects of CEO turnover in post-revolution Tunisia, using a sample of 16 turnover announcements by 53 firms listed on the Tunisian stock market. The work employed the standard event study methodology in their analysis and found that the announcement of a CEO turnover is on the average bad news for equity investors. The results showed negative abnormal returns following the announcement of CEO change. They concluded that their results are affected by the bear market. A close look at the analysis conducted by the study revealed the absence of unit root, serial correlation test and the test in ARCH effects as these tests increase the robustness of computed abnormal return.

In Nigeria, Osuala, Nto and Akpan (2013) investigated the reaction of the banking sector to the sudden removal of corporate CEOs of some DMBs. Using a sample of five DMBs whose CEOs were suddenly sacked by the board of the CBN on the 14th August 2009, the study utilized the

event study methodology to report that positive but statistically insignificant abnormal return was observed for the sample banks. The study concluded that the non-significance of the observed positive abnormal return could be explained by the prompt intervention of the CBN through its timely injection of N420 billion in the affected banks. On the contrary, however, the statistical insignificance of abnormal return could be as a result of the violation of the requirement for normality of abnormal return as the evidence of such test was not presented in the work.

In a related study, Pessarossi and Weill (2013) analyzed the consequences of CEO turnover on the stock prices of majority of the state-owned listed firms in China. The work employed the standard event study methodology on a sample of 1155 CEO turnover announcements by 658 listed Chinese firms between 2002 and 2010. The study's findings revealed that CEO turnover announcements are associated with positive market reaction for Chinese listed firms. However, the positive reaction is significantly positive only for firms owned by the central government, and not significant for their state and privately owned counterparts. The study concluded that their results provide evidence that CEO turnover in a central state-owned enterprise is an indication of renewed commitment to the economic performance of the firm. Being a relatively volatile market, the study did not take into account the likely effects of volatility on the estimated return.

Similarly, Suchard, Singh and Barr (2001) employed a sample of 59 CEO change announcements by 89 out of the 150 listed public firms on the Australian Stock Exchange (ASX) between June 1989 and July 1995 to examine the market effects of CEO turnover for Australian firms. Using the standard event study methodology, the study found a negative lagged market reaction on the announcement day of the CEO change. It concluded that the negative market reaction could be explained by two potential effects: the short-term damage from the CEO dominates the potential long-term benefits from a change in CEO, and secondly, the news of change in CEO might trigger the release of previously unknown potential problems or managerial behaviour at the firm. The latter explanation closely resembles the circumstances surrounding the suspension of the Governor of the CBN when shortly after the announcement of his suspension, information about a number of financial allegations against him filtered into public domain. However, the results would have been more robust had the study modelled the effect of serial correlation and heteroskedastic effects.

Finally, Warner, Watts, and Wruck (1988) utilized a sample of 351 top management changes by 269 firms listed on the New York and American Stock Exchanges (NYSE and AMEX) between 1962 and 1978 to examine the reaction of stock prices to changes in top management. Using the standard event study methodology, the study found no average stock price reaction at announcement of a top management change. However, there is an inverse relationship between the probability of management change and a firm's stock performance. Being one of the oldest studies, the work did not model for the effect of serial correlation and ARCH effects.

In summary, evidence from the studies reviewed on CEO change announcements in developed and emerging markets is overwhelmingly in favour of negative stock prices response to such announcements. It was also seen that some of the studies reviewed had methodological challenges such as the absence of correction for thin trading, serial correlation and ARCH effects.

This study adopted the efficient market theory as the bedrock upon which the analysis rests. The efficient market theory developed by Fama (1970; 1991) holds that in an efficient market, stock prices adjust instantaneously to reflect new information such that it becomes difficult for an individual to trade on such information exclusively. New information could negatively or positively impact on stock prices, depending on the market's judgement of the information. According to the work, managers can communicate to the market about the prospects of firms through information releases. This theory adequately explains the study in that the announcement of the suspension of the CBN Governor may be an attempt to convey to the market the information at the disposal of policy makers in Nigeria. Thus, it will not be out of place to say that stock prices of listed firms in Nigeria (particularly DMBS) will definitely react to the announcement, especially considering the role the CBN plays in achieving financial and economic stability.

Methodology

The population of this study consists of the 122 listed firms on the Nigerian Stock Exchange that traded on the 20th February 2014. The study utilized all listed firms in Nigeria that traded on the floor of the NSE on the 20th February 2014, which was the day the news of suspension became public. For a firm to be part of the sample however, the following criteria must be met:

- Data on daily stock prices must be available for the bank at least over

the period of 120 trading days before the announcement and another fifteen trading days after the announcement. This criteria resulted in the elimination of three firms.

- The bank did not undergo technical suspension within the 120 trading days before the announcement day, and fifteen trading days after it. Six firms could not meet this criterion and were therefore dropped.

- No other simultaneous important announcement such as earnings and bonus issues announcement have taken place and contaminated the effect of the event within the event window.

The first criterion resulted in the elimination of three firms, whiles the second and third resulted in dropping six and nine firms respectively. Thus, application of the above criteria resulted in a total observation of 104 listed firms.

The study utilized the standard event study methodology advocated by Mackinlay (1997) where abnormal return is computed as the prediction errors of the market model. The methodology have been found over time to be consistent and valid in measuring the impact of important corporate events such as stock splits, bonus issues, mergers and CEO sudden ouster (Bonnier and Bruner 1989; Shaheen 2006). In this study, the event is defined as the announcement of the suspension of Sanusi Lamido Sanusi as the Governor of the CBN. This study treats the announcement of the suspension as technically synonymous to removing the Governor because the two events are likely to have very similar market effects since they both suggest discontinuity in the policies and programmes of the suspended or ousted CEO.

An event window of thirty-one trading days, covering fifteen trading days prior to the announcement day, the announcement day itself, and another fifteen trading days after the announcement day was utilized by the study. Although Panayides and Gong (2002) opined that an event window of 11 trading days covering five days before the announcement and five days after it is sufficient to fully capture the effect of an event, the study utilizes a larger event window because emerging markets like Nigeria are generally known to be less efficient than matured markets and thus tend to be more sluggish in reflecting new information in stock prices (Afego 2010). It is therefore expedient to choose a reasonably large event window to accommodate this speed of adjustment. In line with De Medeiros and Matsumoto (2006), an event window of thirty-two trading

days, covering fifteen trading days before the announcement, the two-day announcement date and another fifteen trading days after the announcement was utilized by the study.

Furthermore, the study also utilized a parameter estimation window of one hundred and twenty trading days (from day –16 to day –135) over which the parameters for normal return were estimated. According to Dyckman, Philbrick and Stephan (1984), Brown and Warner (1985) and Shaheen (2006), a parameter estimation period of 120 days is adequate since daily return data for the 120 days prior to the event can sufficiently formulate a benchmark for normal returns.

This study relied solely on data collected from secondary sources. Specifically, the study utilized secondary data relating to the daily stock prices of sample-listed firms for the period under study. Similarly, the corresponding NSE daily All Share Index (ASI) was collected for the same period. Both the daily series of stock prices of the sample firms and the corresponding NSE ASI were retrieved electronically from the online database of Cashcraft Asset Management Limited.

The daily stock price data collected was then converted to daily continuously compounded stock return. Given that the study utilized an event window and estimation window of less than a year, dividends were constant at zero. The logarithmic transformation of the time series data became necessary in view of the need to keep the effect of outliers under control. The same approach was also applied to the NSE ASI to create daily continuously compounded market return

The log daily returns of sample firms and those of the NSE ASI were the main variables employed to estimate the model for generating individual bank and market returns. Being time series data, the daily stock and market return series were subjected to stationarity test using the Augmented Dickey-Fuller (ADF) test for the presence of unit root.

Although the daily firm and market returns were computed using the market model, they are not free from inherent statistical bias due to the effect of thin or infrequent trading. According to Abuzarour (2005) and Sohawon (2006), emerging markets like Nigeria are typically characterised by low liquidity and thin trading. Furthermore, the study by Tijjani et al. (2009) clearly revealed the presence of significant thin trading in the Nigerian stock market, especially the petroleum and banking sectors. Thus, given that the observed index in thinly traded markets does not represent the true underlying index value, there is always a systematic bias towards rejecting the efficient market hypothesis (EMH).

Against this backdrop, this paper corrected for the effect of thin trading in the data. The study employed the correction procedure introduced by Miller, Muthuswamy, and Whaley (1994). According to them, thin trading correction reduces the negative correlation among returns. The methodology proposed by Miller, Muthuswamy, and Whaley (1994) suggests that a moving average model (MA) that reflects the actual number of non-trading days should be estimated and then returns adjusted accordingly. However, given the difficulty in identifying the actual non-trading days, Miller, Muthuswamy, and Whaley (1994) have shown that it is similar to estimating an AR(1) model from which the trading adjustment can be obtained. The model, as advanced by Miller, Muthuswamy, and Whaley (1994), involves estimating the following equation:

$$R_t = \alpha_1 + \alpha_2 R_{t-1} + \varepsilon_t, \tag{1}$$

where α_1 and α_2 are parameters to be estimated (α_1 is the slope and α_2 is the coefficient of the AR(1) term), R_t is the index return at time t, R_{t-1} is the index return at time $t-1$, and ε_t is a random disturbance term.

Using the residuals from the regression, adjusted returns were estimated as follows:

$$R_t^{adj} = \frac{\varepsilon_t}{1 - \alpha_2}, \tag{2}$$

where R_t^{adj} is the return at time t adjusted for thin trading, and ε_t and α_2 are as defined above.

The model above assumes that the adjustment for non-trading is constant overtime. In order to capture the abnormal returns in the event window, the study utilized the market model pioneered by Ball and Brown (1968), Fama et al. (1969) and Brown and Warner (1985). The single factor market model was employed to estimate the return within the event window and the parameter estimation window. The model is presented as follows:

$$R_{i,t} = \alpha + \beta R_{m,t} + \varepsilon_t, \tag{3}$$

where $R_{i,t}$ is the return on firm i at time t, α and β are parameters to be estimated, $R_{m,t}$ is the return on the market index at time t, and ε_t is the stochastic error term, which is random and follows a normal distribution pattern.

To ensure robustness of the estimated residuals from the model, equation (3) was estimated using the Newey-West's (Newey and West 1987)

Heteroskedasticity and Autocorrelation-Consistent (HAC) estimator, which automatically corrects for autocorrelation and heteroskedastic effects in residuals. However, these were still checked for in the residuals of all the estimated models.

Assuming a constant beta value, the estimated return for firm i's security can be computed by substituting the estimated values of α_i and β_i over the estimation window in equation (3) above as follows:

$$\overline{E}_{i,t} = \widehat{\alpha}_i + \widehat{\beta}_i R_{m,t}, \tag{4}$$

where $\overline{E}_{i,t}$ is the expected return on bank i's security at time t; $\widehat{\alpha}_i$ and $\widehat{\beta}_i$ are the estimated parameters based on the estimation window; and $R_{m,t}$ is the market return at time t. The abnormal return is defined as the difference between equation (3) and equation (4) as follows:

$$\text{AR} = R_{i,t} - \overline{E}_{i,t}. \tag{5}$$

Once the estimated equation has been obtained, the actual return on firm i's security is calculated as follows:

$$R_{i,t} = \widehat{\alpha}_i + \widehat{\beta}_i R_{m,t} + \varepsilon_{i,t}. \tag{6}$$

Since $\overline{E}_{i,t} = \widehat{\alpha}_i + \widehat{\beta}_i R_{m,t}$ equation (6) simplifies to:

$$R_{i,t} = \overline{E}_{m,t} \varepsilon_{i,t}. \tag{7}$$

This implies that abnormal return for firm i at time t is simply given as:

$$\text{AR} = \varepsilon_{i,t} \tag{8}$$

Thus, the abnormal return on the security of a given sample firm is simply the residual of the OLS after regressing the firm's stock return on the market return. For the residuals to be considered as the abnormal return however, the parameters estimated over the estimation window must be integrated into the equation as shown above.

Although Brown and Warner (1985) have concluded that estimates from OLS using the market model are generally well specified and display no significant mean bias, it has been empirically documented that the OLS estimation fails to adequately capture ARCH effects in returns series. According to De Medeiros and Matsumoto (2006) and Brooks (2008), estimating a model that adequately captures ARCH effects is important because their existence renders the coefficient estimates inefficient and thus produces a downward bias in abnormal returns.

Studies by Akgiray (1989), Bollerslev (1986) and Chiang and Doong (2001) have shown that daily stock returns exhibit variable volatility along time, thus tending to show ARCH effects. Similarly, the study by Emenike (2010) concluded that the Nigerian stock market index return exhibits significant volatility and the presence of ARCH innovations. Consequently, this study employed the Engle (1982) test to check for the presence of ARCH effects in the residuals of the market model over the parameter estimation window and the event window.

In the event that significant ARCH effects were detected, the OLS market model estimation for the affected sample firms was re-estimated using ARCH or GARCH models according to their best fits. When a GARCH (1,1) model is considered, equation (6) is replaced with:

$$\sigma_{i,t}^2 = \alpha_{i0} + \alpha_{i1} u_{i,t-1}^2 + \alpha_{i2} \sigma_{i,t-1}^2. \tag{9}$$

Equation (9) becomes an ARCH (1) process if $\alpha_{i2} = 0$. To be sure that there are no traces of other forms of heteroskedasticity in the return series, the White (1980) test for heteroskedasticity was also conducted on the return series. Furthermore, the study also employed the Breusch-Godfrey test for serial correlation (Godfrey 1988) to check for the presence of first order serial correlation in the residuals series. According to Gujarati (2003), serial correlation affects the efficiency of estimated coefficients in a regression model. In the same vein, the Doornik-Hansen (Doornik and Hansen 2008) normality test, the Shapiro-Wilk W test (Shapiro and Wilk 1965) for normality, the Lilliefors test (Lilliefors 1967) for normality, and the Jarque-Bera (Bera and Jarque 1981) test were conducted to ensure the normality of residuals.

The cumulative abnormal return of bank i in the sample for a given period was obtained by summing up the abnormal return in a given period. The procedure is demonstrated by the following formula:

$$\text{CAR}(t_0, t_1) = \sum_{t=0}^{n} \text{AR}_{i,t} = \sum_{t=0}^{n} \varepsilon_{i,t}, \tag{10}$$

where $\text{CAR}_{i(t_0,t_1)}$ is the cumulative abnormal return of firm i from time t_0 to t_1, $\text{AR}_{i,t}$ is the abnormal return of firm i at time t, and $\varepsilon_{i,t}$ is the residual of firm i at time t; n is the number of observations.

The null hypotheses of no significant cumulative abnormal return for bailout announcement on the announcement date and over the entire event window was tested using the t-test for the significance of abnor-

mal returns. According to Brown and Warner (1985), the test statistic is simply the ratio of period t_0 to period t_1 CAR to its estimated standard deviation over the estimation window as shown in the equation below:

$$t(\text{CAR}) = \frac{\text{CAR}(t_0, t_1)}{\text{s}(\text{AAR}_t)}. \tag{11}$$

$t(\text{CAR})$ is the test statistic for cumulative abnormal return, $\text{CAR}(t_0, t_1)$ is as defined above, and $\text{s}(\text{AAR}_t)$ is the standard deviation of average abnormal return over the parameter estimation window.

The t-test for the significance of abnormal return takes the $N-1$ degrees of freedom. For the decision criteria, the null hypothesis of no significant abnormal return is rejected if the computed t value is greater than the critical value at a given a priori alpha level and vice versa.

Results and Discussion

Analysis of the results started with establishing the stationarity of the variables utilized for the study. Thus, the ADF test was employed to establish the stationarity of the stock return series and the corresponding market return series within the event window. Conducting the test became necessary in order to avoid dealing with non-stationary variables that may give rise to spurious results. Results for the unit root test were based on the 104 stock return series and the corresponding 104 market return series for the respective sample listed firms using the ADF test.

Results from the ADF test revealed that 76 out of the 104 stock return series of the sample firms were found to be stationary at levels between one and ten percent levels of significance. This implies that the 76 stock return series are integrated of the order I(0). However, the stock return series of 12 firms were found to be non-stationary at levels. To correct the anomaly, the ADF test was repeated on the first difference of the stock return series for the firms. At the first difference, the stock return series of the 12 firms were found to be stationary at the one and five percent levels. This means that the stock return series of the 12 firms were integrated of the order I(1). The return series of the remaining 16 listed firms did not pass the test even at the first difference, but eventually became stationary after the test was undertaken on the second difference of the return series. This means that 16 series of sample firm returns were integrated of the order I(2). On the other hand, the corresponding 104 market return series are all found to be stationary at levels between the one percent and five percent levels of significance. This means that all the 104 market re-

turn series are integrated of the order I(0) and have no unit root in them.

For the parameter estimation window stock return series, the stock return of 89 firms were found to be stationary at levels between the one and ten percent levels, implying that they are integrated of the order I(0). Furthermore, 13 stock return series were found not be stationary at levels, and thus the test was re-run on the first difference of the variables. Results of the test at the first difference showed that the 13 series were stationary between the one and ten percent levels, and hence integrated of the order I(1). However, the remaining two stock return series could not pass the test at levels and their first difference. Stationarity for these stocks were achieved at the second difference, which made them integrated of the order I(2). Results for ADF tests on the corresponding 104 parameter estimation window market return series revealed that 101 market return series were stationary at levels between the one and ten percent levels, and the remaining three series of market returns were found to be stationary at their first difference.

Analysis of the stationarity of stock and market returns under the event and parameter estimation windows revealed that the series were mostly stationary at their levels, with only a few achieving stationarity at either their first or second difference. This revelation supports the existing evidence that prices of financial assets tend to be non-stationary while their return tend to be stationary (Chiang and Doong 2001; Brooks 2008)

As described under the methodology section, the abnormal return in the event window for each of the sample firms was estimated by substituting parameters estimated over the estimation window into equation (3). Accordingly, the residuals realised from the estimation of equation (6) over the event window for each of the sampled firms were considered as the abnormal return for the firm. Out of the 104 regression models estimated over the event window, 27 models exhibited significant ARCH effects in their residuals, suggesting the presence of volatility. In line with the methodology of the study, the affected models which were estimated using OLS were substituted with ARCH/GARCH models estimated to their best fits using the Akaike Information Criterion, the Schwarz Criterion and the Hannan Quin Criterion. Specifically, 22 out of the 27 re-estimated models fitted better with GARCH (1,1), while the remaining five models were more fitted with ARCH (1). For the parameter estimation window, 12 out of the 104 models exhibited significant volatility and were re-estimated using ARCH/GARCH models. All the 12 models estimated fitted better with GARCH (1,1) model. In addition, results for

the White (1980) test suggested the absence of heteroskedasticity of un-known form in the residuals of the 104 models within the event window and the corresponding 104 within the parameter estimation window.

Even though the residuals from the market model were estimated us-ing the HAC estimation, all goodness of fit tests were performed. The Breusch-Godfrey test for the presence of first order serial correlation in the residuals revealed that 11 out of the 104 models estimated within the event window exhibited significant serial dependence among the resid-uals, and to correct the anomaly, an autoregressive model AR(1) was in-troduced after which the observed serial correlation disappeared. For the parameter estimation window models, only eight out of the 104 showed signs of autocorrelation, which was also corrected using the same ap-proach employed for the event window models.

The individual sampled firm abnormal return was then aggregated across firms to arrive at the abnormal return. Furthermore, the abnormal return was aggregated across time to arrive at cumulative abnormal re-turn. Table 1 presents summary descriptive statistics for the abnormal re-turn and cumulative abnormal return for the 104 sampled firms. It can be seen that the mean or average values for the abnormal return and cumu-lative abnormal return are approximately −0.0022 (or −0.22 percent) and −0.0477 (or −4.77 percent) respectively. Furthermore, the standard devi-ation, which measures the dispersion around the mean, stood at 0.00087 for abnormal return and 0.0232 for cumulative abnormal return.

Table 1 also revealed minimum abnormal return and cumulative ab-normal return values of −0.0204 (or −2.04. percent) and −0.0725 (or −7.25 percent) respectively. On the other hand, the maximum value recorded for abnormal return was 0.0180 (or 1.8 percent), while that of cumulative abnormal return was 0.0041 (or 0.41 percent). The relative gap between the minimum and maximum values of abnormal return and cumulative abnormal return is indicative of the rate of variability among the return series.

The table also shows the skewness of the distribution of abnormal re-turn and cumulative abnormal return. Skewness measures the length of the tail of the distribution. The skewness value of −0.06748 indicates that the distribution of abnormal return is negatively skewed, and thus has a longer left tail. However, the distribution of cumulative abnormal return has a skewness value of 1.0941, which is evidence that the distribution is positively skewed and thus has a longer right tail.

The descriptive statistics table also indicated a kurtosis of approxi-

TABLE 1   Descriptive Statistics

Statistics	AR	CAR	AAR
Mean	−0.0022	−0.0477	0.0000
Maximum	0.0180	0.0041	0.0202
Minimum	−0.0204	−0.0725	−0.0346
Stdandard deviation	0.0009	0.0232	0.0092
Skewness	−0.0675	1.0941	−0.0649
Kurtosis	0.0931	−0.1459	1.1914
Doornik-Hansen Probability	0.8659	0.1317	0.2316
Shapiro-Wilk W Probability	0.9700	0.3786	0.5689
Lilliefors Test Probability	0.5123	0.1029	0.3218
Jarque-Bera Probability	0.6316	0.4281	0.4570
Observations	31	31	120

NOTES   AR – event window abnormal return, CAR – event window cumulative abnormal return, AAR – parameter estimation window average abnormal return.

mately 0.0931 for abnormal return, implying that the distribution exhibits flatness at the surface and is therefore platykurtic. For the cumulative abnormal return series, the approximate kurtosis value of −0.1459 also suggests platykurtosis or flatness of the distribution at the surface, since the value is less than the threshold of three.

According to Ball and Brown (1968) and Brown and Warner (1985), the normality of abnormal return and cumulative abnormal return is a precondition for the t-test for the significance of cumulative abnormal return. Given the importance of normality to the test of hypothesis, the paper reports four variants of normality test for abnormal return and cumulative abnormal return. For the abnormal return series, the table shows an approximate Doornik-Hansen test probability of 0.8659, Shapiro-Wilk W test probability of 0.970009, Lilliefors test probability of 0.5123, and a Jarque-Bera probability of 0.63156, all of which are statistically not significant. This results in the failure to reject the null hypothesis which states that the abnormal return series is normally distributed. Thus, results from the various normality tests revealed that the abnormal return series is normally distributed.

For the cumulative abnormal return series, Doornik-Hansen test probability of 0.131741, Shapiro-Wilk W test probability of 0.378613, Lilliefors test probability of 0.102892, and Jarque-Bera probability of 0.428109 were all statistically not significant at the one and five percent levels, resulting

in the failure to reject the null hypothesis. This implies that the cumulative abnormal return series is also normally distributed. In a nutshell, it can be said the descriptive statistics showed that the abnormal return and cumulative abnormal return series are normally distributed and can conveniently be used for the *t*-test.

For the parameter estimation window, the summary statistics is important because the standard deviation of the AAR is important for the test of hypotheses using *t*-test. The descriptive statistics of AAR over the parameter estimation window is provided in table 1. It can be seen that the mean or average value for the average abnormal return is approximately 0.0000 (or 0.00 percent), and the standard deviation, which measures the dispersion around the mean, stood at 0.0092. The table also revealed minimum average abnormal return of −0.0346 (or −3.46. percent). On the other hand, the maximum value recorded was 0.0202 (or 2.02 percent. The relative gap between the minimum and maximum values of average abnormal return suggests the rate of variability among the return series.

The table also shows the skewness of the distribution of average abnormal return which stood at −0.06487 indicating that the distribution of average abnormal return is negatively skewed, and thus has a longer left tail. The descriptive statistics table also indicated a kurtosis of approximately 1.1914, implying that the distribution exhibits flatness at the surface and is therefore platykurtic.

In terms of normality, the table shows an approximate Doornik-Hansen test probability of 0.2316, Shapiro-Wilk W test probability of 0.5689, Lilliefors test probability of 0.3218, and a Jarque-Bera probability of 0.4570, all of which are statistically not significant. This results in the failure to reject the null hypothesis which states that the average abnormal return series is normally distributed. Thus, results from the various normality tests revealed that the average abnormal return series is normally distributed.

Accordingly, the non-parametric *t*-test was employed to test for the significance of abnormal return on the announcement day, significance of cumulative abnormal return on the announcement day, and the significance of cumulative abnormal return fifteen trading days after the announcement became public. Table 2 shows abnormal return and cumulative abnormal return (in percentages) over the thirty-one days' event window.

The hypotheses of the study were tested using the *t*-test for the signif-

TABLE 2   Event Window Abnormal Return and Cumulative Abnormal Return

Day	AR	CAR	Day	AR	CAR
−15	0.0000	0.0000	1	−0.0062	−0.0657
−14	0.0027	0.0027	2	−0.0069	−0.0725
−13	0.0014	0.0041	3	0.0062	−0.0664
−12	−0.0124	−0.0083	4	0.0021	−0.0643
−11	−0.0162	−0.0245	5	0.0012	−0.0631
−10	0.0004	−0.0241	6	−0.0016	−0.0647
−9	−0.0156	−0.0397	7	0.0065	−0.0583
−8	0.0180	−0.0217	8	−0.0019	−0.0601
−7	−0.0076	−0.0293	9	0.0002	−0.0600
−6	−0.0150	−0.0442	10	−0.0025	−0.0624
−5	−0.0204	−0.0647	11	0.0034	−0.0590
−4	0.0042	−0.0604	12	−0.0066	−0.0657
−3	0.0148	−0.0456	13	0.0023	−0.0634
−2	0.0004	−0.0453	14	−0.0009	−0.0643
−1	−0.0148	−0.0601	15	−0.0048	−0.0691***
0	−0.0006**	−0.0595***			

NOTES   AR – event window abnormal return, CAR – event window cumulative abnormal return. *, ** and *** imply significance at the 10%, 5% and 1% levels respectively.

icance of abnormal return over three periods. In each of the cases, the *t*-statistic sought to establish whether the abnormal return or cumulative abnormal return over the period of interest is significantly different from zero. Thus, the three points at which the significance of abnormal return and cumulative abnormal return were tested include announcement day abnormal return, announcement day cumulative abnormal return, and post-announcement day cumulative abnormal return.

For the first hypothesis, the null hypothesis of no significant abnormal return on the announcement day was tested using the abnormal return observed on day zero. The abnormal return of −0.0006 or −0.06 percent observed on day zero, as shown in table 3, was tested for statistical significance using the standard deviation of 0.0092 obtained over the parameter estimation window and a degree of freedom of 15. The result revealed a test statistic of −2.0031, which was statistically significant at the one percent level. The result therefore, suggested the rejection of the null hypothesis which stated that the abnormal return exhibited by stock prices of DMBs in Nigeria on the announcement day of the suspension of the CBN Governor is not significantly different from zero.

The second hypothesis of no significant cumulative announcement day abnormal return was tested using the observed cumulative abnormal return of −0.0595 or −5.95 percent over the event window of sixteen trading days, running from day −15 to day zero. The parameter estimation window standard deviation still remained 0.0092, with 15 degrees of freedom. The *t*-statistics value of −3.00829, was also found to be statistically significant at the one percent level, and this implies the rejection of the second null hypothesis. The result therefore, suggests that the cumulative abnormal return of −0.0595 percent is significantly different from zero at the one percent level.

The third hypothesis tested sought to establish the statistical significance of cumulative abnormal return fifteen trading days after the announcement of the suspension of the CBN Governor became public. The cumulative abnormal return on the fifteenth day is approximately −0.0691 or −6.91 percent. Similarly, the estimation window standard deviation of average abnormal return still remained at 0.0092, while the degrees of freedom under the *t*-distribution for the window is 30. The result revealed a *t*-value of −3.9387 over the thirty days event window period, which is statistically significant at the one percent level. Hence, the null hypothesis which states that stock prices of listed firms in Nigeria did not exhibit significant cumulative abnormal return fifteen trading days after the announcement day of the suspension of the CBN Governor could not be rejected. This therefore implies that the cumulative abnormal return of approximately −0.0691 or −6.91 percent for the period is significantly different from zero at the one percent level.

Results from the test of the first hypothesis revealed the presence of negative and statistically significant abnormal return of −0.0006 or −0.06 percent on the day the announcement of the suspension became public. This implies that the stock prices of listed firms that traded on the fateful day reacted negatively to the announcement of the suspension, and investors of these firms lost −0.06 percent in the value of their investments. Although studies on the sudden ouster of CEOs holding strategic positions such as the Governor of a central bank are not common because of the sensitive nature of such action, the finding of significant negative abnormal return on the announcement day is consistent with the findings of existing studies on change of CEO such as Lassoued and Attia (2013), and Suchard, Singh, and Barr (2001), and negates the findings of Osuala, Nto and Akpan (2013) and Adelegan (2009b).

Furthermore, the study established the presence of negative and statistically significant cumulative abnormal return of −0.0595 or −5.95 percent

for the firms on the day the announcement of the sudden suspension of the CBN Governor became public information. This means that an investor who held stock in the Nigerian stock market from fifteen trading days prior to the announcement up to the announcement day has experienced a –5.95 percent decline in the market value of his/her investment. The evidence of statistically significant announcement day cumulative abnormal return is consistent with previous studies on change of CEO such as Lassoued and Attia (2013), and Suchard, Singh, and Barr (2001), but negates the findings of Adelegan (2009b).

The study also found evidence of the persistence of negative cumulative abnormal return for the fifteen trading days after the announcement day. A statistically significant cumulative abnormal return of approximately –0.0691 or –6.91 percent was observed over the period after the announcement day. This finding is a pointer towards the persistence of negative market trend in the Nigerian stock market even after the information became public. Previous studies on change of CEO such as Lassoued and Attia (2013), and Suchard, Singh, and Barr (2001) have also established evidence of the persistence of negative cumulative abnormal return for the period after the announcement day. On the other hand, the finding is inconsistent with those of Osuala, Nto, and Akpan (2013) and Warner, Watts, and Wruck (1988).

Conclusion, Recommendations and Policy Implications

Following from the foregoing, it can be concluded that the evidence of negative abnormal return and cumulative abnormal return on the announcement day indicate that market participants in the Nigerian stock market adjudged the sudden announcement of the suspension of the Governor of the CBN as bad news. Fear of the sustainability of policies and programmes initiated by the suspended Governor may have accounted for the sharp negative reaction on the announcement day. By whatever name it was called, the market interpreted the news of suspension as synonymous with removal.

Furthermore, the fact that negative cumulative abnormal return persisted for days after the announcement date confirms that even subsequent efforts by policy makers to provide more information on the circumstances surrounding the suspension of the Governor of the CBN did not help reverse the initial downward trend of stock prices in the Nigerian stock market. This means that investors in listed firms continued to suffer losses up to fifteen days after the announcement became public.

This study has shown that there exist high economic and social costs associated with the sudden ouster of CEOs occupying sensitive public offices like that of the CBN Governor as such offices may be either directly or indirectly linked to delicate institutions like the stock market. It is obvious that the most manifest managerial implication of the sudden removal of the Governor of the CBN on the Nigerian stock market is that investors in the sector have suffered losses on the announcement day and several trading days beyond it.

In line with the revelations of this study, certain recommendations are pertinent to policy makers. First and foremost, there is the need for policy makers to refrain from sudden and unjustifiable suspension/removal of CEOs of sensitive institutions, especially if the inter-dependence between such institutions and the stock market is glaring.

Secondly, where the need to suspend/remove the CEO is inevitable, the announcement of such action should be preceded by the release of information that adequately justifies such action by policy makers. The release of such information is expedient as it will help the stock market to correctly interpret the philosophy underlying the suspension/removal of the CEO by policy makers.

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Investment and Profits: Causality Analysis in Selected EU Countries

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The purpose of the paper is to present the theoretical and empirical analysis of the causal relationship between company's investment and profits. Following the previous research findings that are not unanimous, we examined the causal relation between profits and investment both at the aggregate and at the industry level. The theory on the field allows us to define three basic theses: profits determine investment on the aggregate level or industry sectors level in a national economy, investment determines profits, and profits determine investment and investment determine profits. We used the Granger definition of causality and the Toda-Yamamoto procedure. Based on the results of the analysis, we can claim that investment determines profits in a national economy. At the industry sectors level there is the greatest support for a cause-and-effect relation in the direction from profits to investment. The results of our empirical analysis and contextual interpretation can help in identifying potential factors and barriers that hinder the effective functioning of the economic system. It is undisputed that investment and profits is extraordinarily important for the economic system and that the investment and profits relation is undeniably strong.

Key Words: investment, profits, causality, industry
JEL Classification: E22, G31

Introduction and Theoretical Basis

Classical economists as Smith (1805) and Ricardo (1817) emphasize the importance of investment in economic growth. Keynes (1936) built a new paradigm on investment, connected with other economic categories. For Keynes investment is a prevailing factor and an important determinant of national product. For the Keynesian economists investment depends on profit expectations that, beside demand and institutional factors, are based upon 'animal spirits' (Stockhammer 2006). Asimakopulos (1971) explained the Keynes investment model. He presents his point of view, showing a two-way direction of causality between investment and profits. Profit expectations play a crucial role in firms' investment decisions and

these expectations are strongly affected by current investment level since this is an important determinant of current profits.

Jorgenson and his collaborators (Hall and Jorgenson 1967) contributed to neoclassical theory with the development of the neoclassical investment model. The neoclassical investment model starting point is the solution of dynamic problem that determines the companies' capital needs trough time. Neoclassical theory somehow shows the causal link from profits to investment (Gupta 1988).

For Post-Keynesians, investment is a very important determinant of the economic system. The argument is that the exploitation of new technologies is possible only through investment. What Kalecki (1942; 1971) wanted to point out was that the most important prerequisite to become an entrepreneur is the capital. With this statement, Kalecki suggests that the investment determines profits. The focus is on companies' physical capital investment. The importance that Post-Keynesians assigned to investment raises a key question that reads as follows: what determines the investment level? Joan Robinson (1962) has developed a model starting from Kaldor's (1955) model with an investment within the model. Companies choose investments based on expected profit margins. The expected profit margins explain to a large extent the actual profit margins. Robinson set a two-way relationship between investment and profits with his formula. Her theory states that investments depend on profits and profits on investments. Post-Keynesian research in the field of investment has continued on the importance of internal financing. This was in contrast with Modigliani and Miller (1958) theorem that under certain conditions emphasized the irrelevance of financing policy and financial structure for the companies' investment and made a theoretical framework for the research of the importance of financial factors for the companies' investment (Stockhammer 2006).

Empirical Evidence

Notwithstanding the key role of companies' sustainable investment for the expected cash flows and companies' value, sectors and the whole economy, just a few important researches examined the causal link between investment and profits and showed that the investment is vital for the expected profits. The results of empirical studies are unclear; from the research results, it is difficult to unequivocally conclude the direction of a causal link between profits and investment or cash flows. Studies carried out by Baumol et al. (1970), Little (1962), Friend and Husić (1973) do not support the hypothesis that profits results from past investment. In

their studies Bar-Yosef et al. (1987) found that investment does not create profits, but profits raise investment, defined in terms of Granger causal effect relationship. They also found that the profits are a determinant of companies' business investment. Shapiro, Sims, and Hughes (1983) and McFetridge (1978) surveys support the hypothesis that cash flows result from past investment. In the analysis of Mahdavi, Sohrabian, and Kholdy (1994) about the causal effect relationship, employing the ECM (Error Correction Model), which takes into account the cointegration between real cash flows and real investment of companies, they found that there is evidence of the one-way causal effect relationship of real companies investment to real cash flows. This is in contrast to some of the previous studies that demonstrated that the profit or cash flows at the level of companies or industries determine investment. Lee and Nohel (1997) have concluded that there is a two-way link between investment and profits. Gupta (1988), who based on two different methodologies, comes to different conclusions about the direction of causality. Akyüz and Gore (1996), and Inci, Lee, and Suh (2009) have concluded that there is a link in the direction earnings to investment.

As seen, the empirical studies do not give a single answer to the problem about the direction of the causal link between investment and profits. The reasons for the different findings may lie in a variety of used methodological approaches, information restrictions and limitations of the studies. Previous researches are based on different samples of data, both in terms of time-scale and different economic backgrounds (most US based). Different economic and regulatory environment can play a crucial influence on the decision making of managers and thus the link between investment and profits. Different economic environments may involve a variety of conditions that are necessary for efficient investment, which of course affects the ambitious problem of causality.

On the basis of previous research we can conclude that the findings of studies in which data were used at the aggregate level, for the most part support the causal effect relationship in the direction of investment to profits or two-way link. Research based on data at the firm level is largely supported by causal effect relationship in the direction of the profits to investments or two-way link.

Theses and Hypotheses for Empirical Testing

If we realize a synthesis of theoretical concepts framed in micro-and macroeconomic theory, the theory of finance and entrepreneurship, we may justify a correlation link between investment and profits. This the-

oretical framework also allows us to define the causal link between the exposed variables, which runs from profits to investment, from investment to profits or in both directions.

The three basic theses are: profits determine investment on the aggregate and industry sectors level in a national economy, investment determines profits, and profits determine investment and investment determine profits. The thesis of the causal link, running from profits to investment, has a limited explanatory power because it is only valid in the special case when the primary companies' objective in the economy is to maximize profits. This means that companies should only invest in the current and expected most profitable activities. However, if the maximization assumption is not true, then investment is induced also by other motives, which are independent of the profit motive. The doubt of the validity of assumptions about the profit motive is offered paradoxically in the economic theory. In particular the part of economic theory which refers to the business sciences, clearly explains that the company also follows other goals, such as revenue maximization, maximization of the market share, customer satisfaction, production optimization … (Janeš and Dolinšek 2010; Novak and Žižmond 2012; Odar, Kavcic, and Jerman 2012; Radosavljević et al. 2011). Through these objectives, managers and equity holders can achieve the purpose of the company, which is to increase the value of a company's equity and thus shareholder value. Crotty (1992; 1996) wrote that companies develop and adopt rules to help them to cope with uncertainty. Gordon (1992) argued that the primary objective of companies is a long-term survival. Many authors from the last Post-Keynesian period argue that the goal of modern corporations is not profit maximization but a long-term survival and growth (Stockhammer 2006).

This means that investment is primarily not dependent on profits. On contrary, investment determines profits. These arguments allow us to claim that profits depend on investment and not vice versa. By confirming the thesis that profits result from investment on the level of the entire economy, we may imply that profitability does not determine and allocate investment but the allocation of investment determines profitability.

Imperfections of financial markets that increase the difference between internal and external financial resources act in contrary to the theory-based interpretation, which defines the direction of causality from profits to investment. This means that the failure of financial markets affect the allocation of capital. On the one hand, the limited financial resources and the disparity between the external and internal sources of capital af-

fect the level of investment and work in favour of the profit motive of investment. Companies must achieve higher profitability, investing in more risky and profitable activities. On the other hand transaction costs, the information asymmetry problem and the risk all limits the migration of capital and go contrary to the gainful motive. Companies invest the created in-house resources in them well known available and less risky investments at the cost of lower profitability. In this way, companies pursue a goal of long-term survival. Given these implications and the results of research, it is difficult to define the impact that the incompleteness of financial markets have on the direction of causality between investment and profits.

In order to confirm the theses we set the following hypotheses at the aggregate and industry sector level in a national economy:

H1 *Profits determine investment.*

H2 *Investment determines profits.*

H3 *Investment determines profits and profits determine investment.*

Data and Methodology

We gathered the data for investment and profits from the European Commission, Eurostat statistic database. For the representation of investment (*I*) we use the Gross fixed capital formation (ESA 95, 3.102) which according to Eurostat definition consists of resident producers' acquisitions, less disposals, of fixed assets during a given period plus certain additions to the value of non-produced assets realized by the productive activity of producer or institutional units. For the representation of profits (*P*), we use Net operating surplus and net mixed income. Net operating surplus is interpreted as the return to capital or the effect of time passing on the net present value. For unincorporated enterprises, owned by households, this component is called 'mixed income.'

We were able to obtain the data on the national economy level for Austria, Denmark, Italy, Finland and Netherlands. We gathered the industry level data for Austria, Italy, Finland and Netherlands. For these countries, it is possible to get a long time series of data from 1977 to 2007 to perform the tests of causality. We used the NACE 31 industry classification. We end up with 88 time series (22 industries for each country) for each of both variables. Data for some industries was not available and we left out of our analysis aggregates of industry groups. To obtain data in real terms we deflated the variable net operating surplus and net mixed income. All

the data are in value levels in Millions of euro, chain-linked volumes, reference year 2000 (at 2000 exchange rates).

We can define the causal relationship between two variables, investment and profits in our case, with the Granger definition of causality. It should be noted that the assertion that X causes Y in Granger sense does not imply that the variable Y is the result of the variable X. Granger causality means anteriority of data fluctuations and does not imply causality in the general sense of the word and in terms of content.

The implementation of Granger causality tests is connected with the problems of stationarity and cointegration properties of the considered time series of data. Granger causality tests are sensitive to non-stationary time series. The first step in the analysis of causality is the check for stationarity and the integration degree of variables. The second step is identifying the possible cointegration of variables (Bekő 2003).

Only in the third step, we apply the analysis of causality. Standard Granger tests of causal effect relationship are valid only if the original time series are not cointegrated and must be applied on stationary variables. When this is not the case, we must differentiate the variables to reach stationarity and, in case of cointegration, we must perform the test with error correction models.

We can apply the test developed by Toda and Yamamoto (1995) and avoid the procedure of testing for cointegration. Testing for cointegration and a possible need for differentiation to reach stationarity could be problematic, as we lose some information with the differentiation. The inference of cointegration could be unreliable. Both problems may affect the conclusions of the causality tests. The Toda and Yamamoto procedure consists in testing the vector auto regression – VAR system equations:

$$P_t = \sum_{i=1}^{m} a_i P_{t-1} + \sum_{j=m+1}^{m+el} b_j P_{t-j} + \sum_{i=1}^{m} c_i I_{t-i} + \sum_{j=m+1}^{m+el} d_j I_{t-j} + \varepsilon_t \qquad (1)$$

$$I_t = \sum_{i=1}^{m} e_i I_{t-1} + \sum_{j=m+1}^{m+el} f_j I_{t-j} + \sum_{i=1}^{m} g_i P_{t-i} + \sum_{j=m+1}^{m+el} h_j P_{t-j} + \eta_t, \qquad (2)$$

where I_t is investment for period t represented with Gross fixed capital formation, P_t is profits for period t, represented with net operating surplus and net mixed income, letters from a to h are independent variables coefficients, m is period lags, ε_t and η_t are regression errors, el are extra period lags. To apply the test we must define the number of lags and

TABLE 1 The Results of the Causality Analysis at the National Level for Austria, Denmark, Finland, Italy and Netherlands

Country	$P \to I$	Significance	$I \to P$	Significance
Austria	No	0.5549	No	0.9319
Denmark	No	0.2348	Yes	0.0229
Finland	Yes	0.0107	Yes	0.0000
Italy	Yes	0.0071	Yes	0.0001
Netherlands	No	0.6741	Yes	0.0002

the number of extra lags. I Granger cause P if any of the c_i coefficients is statistically different from 0. P Granger causes I if any of the g_i coefficients is statistically different from 0. For the test of the null hypothesis that every $c_i = 0$ or every $g_i = 0$ we perform a Wald statistic test. To avoid the problem of arbitrary decided lags we define the optimal number of lags with the following tests for VAR: sequential modified LR test statistic, final prediction error, Akaike information criterion, Schwarz information criterion, Hannan-Quinn information criterion. The problem of such tests is that we must determine the number of maximum lags for testing which influence the results. We select the optimum lags in base of the most frequent optimal lag, resulting from all the tests performed from 1 up to 6 lags. We use the Augmented Dickey-Fuller unit root test equation to define the order of integration of the variables. The extra lags equal to the order of integration.

Results and Discussion

We present the results of the analysis of causality in tables 1, 2 and 3. We examined the hypotheses at the aggregate level. Based on the results, we cannot confirm the first hypothesis with the criterion of more than 50%. We found the causal link from profits to investment just in two of five countries. The causal link from investment to profits is stronger as we found it in four of five analyzed countries. We can confirm the second hypothesis that investment determines profits at the aggregate level in a national economy. We cannot confirm the third hypothesis that investment determines profits and profits determine investment at the aggregate level in a national economy. Based on the results of the analysis on the aggregate level of a national economy, we can say that investment determines profits in a national economy.

The results at the aggregate level are in line with the empirical findings

in the researches carried out by Gupta (1988) and Mahdavi, Sohrabian, and Kholdy (1994). The results are also in line with the findings of the researches done by Akyüz and Gore (1996), Lee and Nohel (1997) and Heshmati and Lööf (2006) where authors found out the causal link between investment and profits in both directions in a part which shows the causal link from investment to profits.

Based on the results, we examined the hypotheses at the industry sector level. In 28% of industries, we found a causal link from profits to investment. Based on the criterion of more than 50% industries, in which causality runs from profits to investment, we cannot confirm the first hypothesis, saying that profits in industry sectors determine investment in industry sectors. In 14% of industries, we found the causal link from investment to profits. Based on the criterion of more than 50% industries, in which causality runs from investment to profits, we cannot confirm the second hypothesis, saying that investments in industry sectors determine profits in industry sectors. In 19% of industries, we found a causal link, running in both directions. Based on the criterion of more than 50% industries, in which causality runs in both directions, we cannot confirm the third hypothesis, saying that investment in industry sectors determine profits in industry sectors and profits in industry sectors determine investment in industry sectors.

However, the results give stronger support to a causal relation from profits to investment. This is consistent with the findings of the research carried out by Bar-Yosef et al. (1987) and Inci et al. (2009), in which the authors found that profits cause investment in Granger sense, or that the causal link in the direction from investment to profits is weak. Our research findings are in line with empirical research, carried out by Akyüz and Gore (1996), Lee and Nohel (1997) and Heshmati and Lööf (2006), in which the authors found a two-way causal link between the resulting investments and profits in the part for the causal relationship, resulting in the direction from profits to investment.

The results of our empirical analysis gave us just the causal link between the resulting investment and profit in a Granger sense. This did not mean that investments lead to profits, profits lead to investment, or both in a common sense or in a sense of content. Granger sense causality does not imply that the investment or profits result from profits or investment, or both. Granger causality simply measures the anteriority of data fluctuations. It is an unstructured model of evidence that has no substantive interpretation. The alternative is a structured model that explains the

TABLE 2 The Results of the Analysis of Causality in Industries for Austria, Finland, Italy and Netherlands

Industry	A	FI	IT	NL
Agriculture, hunting and forestry	$P \leftrightarrow I$	$P \leftrightarrow I$	$I \neq P$	$I \to P$
Mining and quarrying	$P \leftrightarrow I$	$I \neq P$	$I \neq P$	$I \to P$
Manufacture of food products; beverages and tobacco	$I \neq P$	$P \to I$	$I \neq P$	$I \to P$
Manufacture of textiles and textile products	$I \neq P$	$P \to I$	$I \neq P$	$I \neq P$
Manufacture of pulp, paper and paper products; publishing and printing	$P \to I$	$P \leftrightarrow I$	$I \to P$	$P \to I$
Manufacture of coke, refined petroleum products and nuclear fuel	$P \to I$	$P \to I$	$I \neq P$	$I \neq P$
Manufacture of chemicals, chemical products and man-made fibres	$P \leftrightarrow I$	$P \to I$	$P \to I$	$I \neq P$
Manufacture of rubber and plastic products	$I \neq P$	$P \leftrightarrow I$	$P \leftrightarrow I$	$I \neq P$
Manufacture of basic metals and fabricated metal products	$I \neq P$	$P \to I$	$I \neq P$	$I \to P$
Manufacture of machinery and equipment	$P \to I$	$P \leftrightarrow I$	$I \neq P$	$P \to I$
Manufacture of electrical and optical equipment	$P \leftrightarrow I$	$P \leftrightarrow I$	$I \to P$	$I \neq P$
Manufacture of transport equipment	$I \neq P$	$I \neq P$	$I \to P$	$I \to P$
Manufacturing	$I \neq P$	$P \leftrightarrow I$	$I \neq P$	$P \to I$
Electricity, gas and water supply	$P \to I$	$I \neq P$	$P \to I$	$I \to P$
Construction	$I \neq P$	$I \to P$	$I \neq P$	$I \neq P$
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	$I \neq P$	$P \leftrightarrow I$	$I \neq P$	$P \to I$
Hotels and restaurants	$I \neq P$	$P \leftrightarrow I$	$P \leftrightarrow I$	$I \neq P$
Transport, storage and communication	$P \leftrightarrow I$	$P \to I$	$P \to I$	$P \leftrightarrow I$
Financial intermediation	$P \to I$	$P \to I$	$P \to I$	$I \neq P$
Real estate, renting and business activities	$P \to I$	$I \neq P$	$I \neq P$	$P \to I$
Health and social work	$I \neq P$	$P \to I$	$I \to P$	$P \to I$
Other community, social, personal service activities	$I \neq P$	$P \leftrightarrow I$	$P \to I$	$I \to P$

NOTES A – Austria, FI – Finland, IT – Italy, NL – Netherlands. $P \leftrightarrow I$ – two sided causality between investment and profits, $P \to I$ – causality running from profits to investment, $I \to P$ – causality running from investment to profits, $I \neq P$ – no causality.

mechanisms and factors through which one variable influences another. The advantage of the structured model is that we make a conceptual explanation of a phenomenon. There is a risk that the model is not correctly

TABLE 3   Assembled Results of Causality between Investment and Profits for
Industries in the Analyzed Countries

Country	$P \leftrightarrow I$	$P \rightarrow I$	$I \rightarrow P$	$I \neq P$
Austria	5	6	0	11
Finland	9	8	1	4
Italy	2	5	4	11
Netherlands	1	6	7	8
Share	0.19	0.28	0.14	0.39

specified and leaves out important relevant factors. The methodology allows us to analyze Granger causality through the unstructured model. The advantage of unstructured model is that it does not place restrictions on how and why one variable affects another. The disadvantage is that the relationship between variables does not have any content value. Thus, it remains a challenging task to rightly interpret the analysis results of the causal link in Granger sense. We linked the results of the unstructured model with the theoretical basis and the results of previous empirical research on this field. We describe the logic behind the analyzed results and the implications of the results for the investment policy.

The results that investment determines profits at the national level have several implications. From the financial theory point of view we could assume that the analyzed countries have a well-developed financial system and the innovations of financial instruments diminish the problem of obtaining external financial resources. Financing problems, described in works of Keynes (1936), Kalecki (1971), and Minsky (1975), do not play a crucial role. Even in the case of financial constraints of companies, other companies that are not financially limited can take on interesting investment, and thus generate profits that support the causal relationship in the direction of investment to profits. For the support of such thinking see Furlong and Weiss (1990). Transaction costs are not an important limitation to capital reallocation.

Mukherjee and Henderson (1987) have considered whether, in practice, the expected and required returns are true key factors of investment decision of companies, or some other factors are more important. They found that in practice many projects are rejected for reasons other than economic ones. Guidelines and decision rules should lead to investment decisions that enable to fulfil the primary objective of the company, that is, to increase the value of a company's equity. Despite this, in practice

many projects are rejected for reasons other than economic ones. Our findings support the fact that managers choose projects that are in line with the primary objective of the company. Projects that add value increase profits and the equity value of companies.

The finding that a cause and effect association takes place in the direction of investment to profits is in accordance with the theory of corporate investment in the part, referring to the entrepreneurs' motivation to invest. Given the personal characteristics and influence on the entrepreneur's motivation to entrepreneurial activity and investment, we cannot define entrepreneurs' motivation just with the profit motive.

From the perspective of economic theory the findings that investment cause profits are in accordance with the Kalecki Post-Keynesian theory in the case of the bi-directional link interpretation between investment and profits, given by Asimakopulos (1971). The findings are also in accordance with Gupta (1988) interpretation of the Keynesian investment view, which explained the causal link from investment to profits.

The findings are also in line with the implications of researches by Ball and Watts (1972), Watts and Leftish (1977), Albrecht et al. (1969) which showed that the previous reduction in investment activities of the us non-financial corporations caused a drop in cash flows.

At industry sectors level results give stronger support to a causal relation from profits to investment. On the basis of the empirical evidence on the importance of internal financial sources and on non interchangeability between internal and external financial sources we can interpret why profits cause investment and determine it. The interpretation also arises from the financial theory on financial markets imperfection. Imperfect financial markets limit company's acquisition of external funding sources that can influence companies' investment policy and limit their investment. In such case, information on past profits is a good predictor of investment.

Past profits may also be information to investors to judge the ability of management. Stable and high profits in the past may represent a signal to investors that companies' management rationally use capital resources which lowers the perceived risk and consequently required return of investors. This increases the range of investments with expected return higher than required one. On this basis, companies can obtain financial resources needed for investment and may invest more. In financial terms the causality from profits to investment may also mean that companies in certain sectors have major problems in obtaining external

funding sources for investment. Transaction costs and tax effects raise the cost of relocation of capital resources and the threshold-required rate of return. In this case it is more rational to reinvest the capital in the same company. This may mean that the management of company retains profits and holds capital resources in the company, even in cases where interesting investment is not available. They invest these capital resources in low profitability investment, or use the capital for purposes not in accordance with business objectives. This lowers the support to investment to profits causality because such investments do not give a positive contribution to the expected level of profits.

Minsky (1975; 1986) highlighted the important role that financing has on the investment activity and instability of the economic system. The increase in debt financing of investment increases the risk for lenders. The volatility of investment activity and variations in the economic system depend on the method of financing that companies use to finance investments. On the other hand, Modigliani and Miller (1958) in their important work of neoclassical school, based on strong assumptions, argue that the investment and financial decisions are independent. Keynes (1936) highlighted the financial aspect of investment. Higher proportion of debt in investment financing increases the risk of lending which increases the required return on debt. This increases the average cost of capital and required return on investment that reduces the range of potential investment with added value and thus reduces the investment activity of companies.

Kalecki (1971) introduced the following aspects through which financial decisions affect the investment of companies. If a company wants to implement a relatively big investment compared to the size of their business, potential volatility of cash flows from investment increases the risk of failure to fulfil the financial obligations of external financial sources. This increases the required rate of return and lowers the investment. In this case, the amount of internal resources is of decisive importance for the reduction of risk. The availability of internal resources also increases the borrowing capacity of companies and reduces the problem of obtaining the necessary resources to implement the investment.

In terms of economic theories the causality from profits to investment implicate that pricing mechanisms are well functioning and the capital is allocated into the most profitable industries. The findings are in accordance with the Keynesian economic paradigm. Keynes (1936) argued that the profit rate and interest rate are the main determinants of investment.

Results may also support the neoclassical model of investment. In equilibrium where investment equals savings at full employment technological conditions determine the distribution of income between wages and profits. Given the technical conditions at full employment and the propensity to save of the owners of capital, profits determine investment.

From the view of investment policy on the enterprise level and entrepreneurial perspective, the findings support the profit motive of investment. This means that the profit motive is stronger than other personal entrepreneurs' motives, defined by psychological factors, among which the most frequently identified are a desire for independence, need for achievement, a sense of control and risk based on which entrepreneurs invest and develop their business.

Based on the results of the empirical analysis on industry sectors level, we also cannot say that capital allocates in business that offers the best conditions for growth. Of course, this factor cannot be excluded, but other factors, including the profit motive, have greater impact.

Nevertheless, the founded prevailing causality from profits to investment at the industry sectors level could mean that the change of current profits, the fall in profits, in an industry sector for example, will cause lower investment activity in the next period in that industry sector. This is a serious signal for the providers of economic policies in EU that might interfere in the factors that affect the investment policy and thus encourage investment activity. The reduction in investment activity may have serious negative consequences on overall economic activity and economic growth.

The results of the analysis of causality in individual industry sectors vary. We cannot find certain parallels between same industry sectors in different countries. This may imply that the conditions, affecting the investment policy of the analyzed countries, differ. Factors, affecting the investment policy in different countries and industry sectors, have different weight. The very nature of the business may have smaller effect, since the results in the same sectors in different countries did not show any links.

Based on the results of the empirical analysis, we cannot exclude any of the factors that influence the direction of cause-and-effect relationship between investment and profits. The results can only indicate which factors have a greater impact. The results of the empirical analysis are not sufficient in order to give a definitive judgment about the direction of cause-and-effect relationships and clearly explain the implications for in-

vestment policy. We cannot give a uniform answer to the providers of economic and financial policy. In line with previous researches, which are not unanimous, we can assume that the problem is not uniquely solvable, but is multidimensional. When implementing economic and financial policy in order to influence the investment policy we need to consider all given aspects.

Post-Keynesians emphasize the importance of the so-called investment funds for the interpretation of price movements in oligopolistic economies. Oligopolistic firms finance investment with retained earnings, which are obtained by adding the necessary margin to the normal cost required for manufacturing products. According to them, the price trends depend on the companies' requirements for the creation of the so-called investment funds and the movement of normal production costs. Due to the expected but uncertain demand growth, in the future companies want to increase their capacity and thus their market shares. Companies do this with investment planning. Based on the plans, companies determine a premium to costs that will bring enough profit needed for investment. We assume that companies operate in oligopolistic economies. Companies set prices based on mark-up on costs in order to achieve the expected profit for the implementation of expected investments. In this case, the current profits are the effect of planned investments and investment determines profit.

With the empirical analysis of cause-and-effect relationship, based on Granger causality, we cannot prove this. On the contrary, it can lead us to false conclusions, based on the founded direction of cause-and-effect relationships in Granger sense. In such case the Granger analysis will reveal the causal relationship from profits to investment. This represents a limitation on conclusions about the direction of cause-and-effect relationship between investment and profits with an empirical analysis based on the Granger causality.

Conclusion

In this study we made a theoretical and empirical analysis of the cause-and-effect relationship between companies' investment and profits. We explored the causal link between profits and investment at the aggregate national level in five EU countries and at the industry sectors level in four EU countries. The theory on the field allowed us to define three basic theses: profits determine investment at the level of industry sectors in a national economy, investment determines profits, and profits determine in-

vestment and investment determines profits. In the empirical analysis we used the Granger (1986) definition of causality and the Toda-Yamamoto (1995) procedure.

The conclusions of previous empirical research on the causal effect relationship between investment and profits are different and do not give a clear answer to the problem. Relevant older researches mostly support the belief that profits determine investment. Unresolved and unclear problem of the cause-and-effect relationship between profits and investment can be a serious problem for providers of economic policies that rely on these theories.

The contribution of this study is the research of the cause-and-effect relationship between investment and profits and the direction of this relationship. In our study we identified the causal effect relationship and tried to explain it with the theory of finance, economics and entrepreneurship and to include all factors that can explain the founded causal link and are relevant to the investment policy. Most of the already existing small number of studies in the field addresses the problem only in terms of economic or financial theories. From a methodological point of view, to our knowledge to date there has not been a research to address the causal link between profits and investment on data from EU countries at the industry sectors level. Due to limited availability of long time series data, the study is limited to some EU countries. This limits the conclusions to the surveyed countries.

Considering the results of causality analysis in view of the country and industry sectors of the economy it can be stated that some results vary but some are aligned. Taking into account the two-way links, a cause-and-effect connection in the direction of investment to profits is mostly supported at the national level. At the industry sectors level has the greatest support a cause-and-effect connection in the direction from profits to investment. The results are not sufficiently unanimous to give a definitive answer on the direction of cause-and-effect relationship between investment and profits and clearly explain the implications for investment policy. We cannot give a uniform answer to the providers of economic policy that need to consider all discussed aspects.

What should be the economic policy that influences the effective investment allocation? In any case, it is necessary to consider all factors that may affect the allocation of investment. The question is whether to influence the allocation of investment or to let the allocation of investment to market factors. In any case, it is necessary to work towards enabling the

efficient allocation by removing all possible barriers. The base is a well-developed financial system that reduces the difference between external and internal sources of finance, information asymmetries and transaction costs and allows companies to finance potentially successful projects.

Accumulation of capital by allowing the creation of above-average gains in the rapidly growing East Asian economies shows a positive effect on the activation and promotion of the link between investments and profits and thus on economic activity and above-average economic growth. This effect was demonstrated by Akyüz and Gore (1996). In their study they found that in the fast-growing East Asian economies economic policy played a crucial role that allowed the accumulation of capital, rapid development of production and increased revenues. It also increased the ability of companies in emerging East Asian economies to successfully compete in the more and more demanding global market.

It is natural to assume that investment causes profits, as there is no basis to make profits without investment. If on the other hand profits cause investment, we could assume the following. Logical reasoning results from the definition of Granger causality that measures anteriority of data fluctuations (higher profits mean higher expected investment and increased investment higher expected profits). At the level of the national economy this means that capital determines the allocation of investment. Higher profits will be followed by higher investment. At the enterprise level this could mean that companies are limited in obtaining funds and market incompleteness is an obstacle to capital allocation. This confirms the implications of Kalecki who wrote, 'Ownership of capital is a prerequisite for becoming an entrepreneur' which supports the thesis that investments determine profits. Profits would be a determinant of investment only if the current profits are a good predictor of expected profits. This is not true, but in some cases it actually led to investment.

There is also the question about the relevance of the level of data analysis. Previous studies are based on data at the national level and on data at the enterprise level. Based on previous relevant research we can see that the results of studies in which data were used at the national level for the most part support the causal relationship in the direction resulting from investment to profits or two-way causality. Studies based on data at the enterprise level mostly support the causal relationship in the direction from profits to investment or a two-way causality. Assuming the relevance of previous studies, we may ask why there is this difference. We can find the answer in the fact that the aggregate level may not be the

most suitable for the analysis of this problem. Investment decisions relate to the problems on the micro-level of companies that also depend on factors at the macro level. The difference between our study and previous studies is also in the economic environment. Our study was based on a sample from EU countries; most previous researches were based on samples from US.

The results of our empirical analysis and contextual interpretation can help in identifying potential factors and barriers that hinder the effective functioning of the economic system. It is undisputed that investment and profits is extraordinarily important for the economic system and that the investment and profits relation is undeniably strong.

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Nelinearna sointegracija med brezposelnostjo in gospodarsko rastjo v Južni Afriki

Andrew Phiri

V članku je uporabljen avtoregresivni model praga zagona za ocenitev nelinearnega povratnega ravnovesja med brezposelnostjo in gospodarsko rastjo, in sicer po podatkih za Južno Afriko v obdobju 2000–2013. Da bi to dosegli, smo ocenili različice modela prve razlike in modela vrzeli specifikacij Okunovega zakona. Za različico slednjega modela smo uporabili tri metode spreminjanja smeri razvoja, da bi pridobili ustrezne podatke »vrzeli«; in sicer filter Hodrick-Prescott (нр), filter Baxter-King (вк) in digitalni filter Butterworth (вw). Skupna ugotovitev naše empirične analize je, da Okunov zakon drži konkretno za podatke o Južni Afriki, ne glede na specifikacije modela ali tehniko spreminjanja smeri razvoja, ki se uporablja. Poleg tega naša analiza dokazuje, da brezposelnost Granger povzroča dolgoročno gospodarsko rast, kar lahko pojasni naraščanje brezposelnosti v Južni Afriki v zadnjem desetletju.

Ključne besede: brezposelnost, gospodarska rast, Okunov zakon, Južna Afrika, model мтар, nelinearni »unit-root« testi, nelinearna povezava, nelinearni Grangerjevi testi, filter Hodrick-Prescott, filter Baxter-King, visokofrekvenčni filter Butterworth

Uspeh izvoznikov: analiza uspešnih madžarskih izvoznih podjetij s strateškega vidika

Annamaria Kazai Onodi in Krisztina Pecze

Namen študije je zagotoviti pregled izvozne uspešnosti z vidika strateškega upravljanja. Članek je empirično testiral razmerja med izvozno uspešnostjo podjetja, strateškim razmišljanjem, prilagajanjem na spreminjajoče se okolje in zmogljivostjo podjetij. Raziskava temelji na podatkovni zbirki raziskave madžarske konkurenčnost iz leta 2013, ki sestoji iz 300 podjetij. Analiza skupin razlikuje med uspešnimi in stagnirajočimi izvozno usmerjenimi podjetji. Vsa so imela veliko izvozno intenzivnost (več kot 75 %), vendar je mogoče opaziti velike razlike v obsegu izvoza in donosnosti. Več kot 90 % skupnih prihodkov iz izvoza je pripadlo uspešni, izvozno usmerjeni skupini. Ta podjetja so se namreč izkazala za bolj proaktivna in inovativna od stagnirajočih, s čimer so se bila

bolj sposobna prilagoditi spreminjajočemu se okolju. Študija poudarja, da lahko ustrezno strateško razmišljanje igra pomembno vlogo pri izboljšanju uspeha izvoza. Implicira tudi, da morajo stagnirajoča podjetja razviti svoje sposobnosti napovedovanja, prožnost prilagajanja na spreminjajoče se okolje in operativno učinkovitost. Stagnirajoča podjetja so zaostajala za uspešnimi izvozniki na področju industrijske napovedi, stopnje proizvodnje, števila inovacij, konkurenčnih cen in usposobljenosti zaposlenih.

Ključne besede: internacionalizacija, izvoz, uspešnost, pregled raziskave madžarske konkurenčnosti, strategija
Klasifikacija JEL: C38, L21, M16
Managing Global Transitions 11 (4): 325–346

Razlikovanje policijskih služb
Uriel Spiegel, Tachai Tavor, Simon Hakim in Erwin A. Blackstone

Potreba po varovanju je odvisna od številnih socialno-ekonomskih značilnosti, kot so dohodki, premoženje in velikost družine, ki bi lahko vplivale na potrebo po popolnem javnem ali zasebnem varovanju. V primeru homogene populacije, enake zahteve privedejo do enake uporabe skupnega javnega dobrega, skupaj z enako delitvijo plačil. Pri heterogeni populaciji s pravokotno porazdelitvijo zahtev bo varovanje sestavljeno tako iz popolnega, enako deljenega javnega varovanja, kot tudi iz zasebnega varovanja, ki je individualno plačano in kupljeno v različnih količinah kot dodatek k popolnem javnem varovanju. Tovrstna kombinacija bi lahko ostala v stalni rabi, da bi dosegli izboljšanje socialnega varstva v primerjavi s samim javnim varovanjem, ki je predvideno za heterogeno populacijo.

Ključne besede: lokalno javno dobro, policijske storitve, heterogeni kupci
Klasifikacija JEL: H3, H42, D6
Managing Global Transitions 11 (4): 347–369

Borzne posledice odstavitve guvernerja Centralne banke Nigerije
Ibrahim Mohammed in Chioma Nwafor

Predhodne študije so pokazale, da so novice o razrešitvi glavnih izvršnih direktorjev povezane z znatnimi borznimi reakcijami. Nenadno obvestilo o odstavitvi guvernerja Centralne banke Nigerije (CBN), 20. februarja 2014, je ustvarilo mešane odzive med tržnimi analitiki in ostalimi tržnimi udeleženci v Nigeriji in drugod. Vendar pa lahko v najboljšem

primeru dostopne podatke o odzivu cen delnic podjetij, ki kotirajo na nigerijski borzi (nse), na to pomembno objavo, opišemo zgolj kot domneve. Tako je cilj pričujoče raziskave empirično ugotoviti odzive cen delnic podjetij, ki kotirajo na borzi, na razglasitev o odstavitvi guvernerja cbn. Z uporabo standardne metodologije obravnave dogodka na vzorcu 104 od 122 kotirajočih podjetij, ki so na usodni dan trgovala na nigerijski borzi, je študija poskušala ugotoviti pomen nenormalnega donosa (abnormal return) in kumulativno nenormalnega donosa (cumulative abnormal return) na dan objave in po petnajstih trgovalnih dneh po njeni javni razglasitvi. Študija je ugotovila prisotnost statistično značilnega nenormalnega donosa in kumulativno nenormalnega donosa, in sicer −0,06 odstotka in −5,95 odstotka na dan objave. Zabeležena je tudi prisotnost statistično značilnega kumulativnega nenormalnega donosa, in sicer približno −6,91 odstotka po petnajstih trgovalnih dneh po javni razglasitvi. Študija je ugotovila, da je nenadna razglasitev suspenzije guvernerja cbn privedla do negativnega odziva trga s strani kotirajočih podjetij v Nigeriji, in da je negativni trend trajal naslednjih petnajst trgovalnih dni po razglasitvi. Priporočeno je bilo, da naj se v prihodnje oblikovalci politike poskušajo izogniti nenadnim objavam o razrešitvi ali odstranitvi generalnih izvršnih direktorjev javnih zavodov, ki so tesno povezani z borzo. V primeru, da je takšen ukrep neizogiben, naj bodo pred tovrstno novico objavljene informacije, ki bodo karseda zmanjšale asimetrijo med oblikovalci politike in borzo.

Ključne besede: cene delnic, guverner cbn, študije dogodkov
Klasifikacija jel: G12, G14, G21
Managing Global Transitions 11 (4): 371–394

Naložbe in dobički: analiza vzročnosti v izbranih državah Evropske unije
Igor Stubelj

Namen prispevka je teoretična in empirična analiza vzročno posledične zveze med naložbami in dobički podjetij. Ugotovitve dosedanjih raziskav ne dajo enotnega odgovora na vprašanje, zato smo raziskali vzročno posledično zvezo med naložbami in dobički na agregati ravni in na sektorski ravni gospodarstva. Na podlagi teorije na področju smo določili tri temeljne teze: dobički določajo naložbe na ravni sektorja ali agregatni ravni nacionalnega gospodarstva, naložbe določajo dobički in dobički določajo naložbe. Uporabili smo Grangerjevo opredelitev vzročnosti in Toda-Yamamotov postopek preverjanja vzročnosti. Na podlagi rezultatov analize lahko rečemo, da naložbe določajo dobičke v nacionalnem gospodarstvu. Na sektorski ravni je največja podpora

vzročno posledični zvezi v smeri od dobičkov do naložb. Rezultati naše empirične analize in interpretacija rezultatov lahko pomagajo pri identifikaciji morebitnih ovir, ki znižujejo učinkovitost delovanja gospodarskega sistema.

Ključne besede: naložbe, dobički, vzročnost, sektor gospodarstva
Klasifikacija jel: E22, G31
Managing Global Transitions 11 (4): 395–413

AIMS AND SCOPE

The journal *Managing Global Transitions* is aimed at providing a forum for disseminating scholarship focused on transitions. The journal seeks to publish ground breaking work in management research that will provide integrated and diverse perspectives on the processes of change and evolution in a broad range of disparate fields, including systems theory, leadership development, economics, education, industrial relations, law, sociology, informatics, technology, decision-making theory, and action learning. To further the understanding of transition environments internationally the journal aspires to enhance the availability of case studies and analysis of data from different cultural environments in public, non-profit, and corporate contexts.

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Manuscripts are accepted on the understanding that they are original and not under simultaneous consideration by any other publication. All manuscripts are double-blind peer reviewed.

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- Manuscripts should be submitted electronically via e-mail. We accept files created with all major word processing packages, but prefer MS Word and LATEX.
- The editors reserve to right to return to authors, without peer review, improperly formatted manuscripts.
- Papers should be between 5000 and 6000 words in length, accompanied by a 100–150-word abstract, and no more than five key words and two areas of JEL classification on a separate sheet.
- The title page must list full title, author(s) address, and e-mail.

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- Footnotes are not permitted. Endnotes are permissible but should be kept to a minimum.

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The author-date system of citation for references should be used in the text, followed by page number if a direct quotation is given, e.g., (Jackson 1979, 181). The alphabetized reference list should be titled 'References' with entries in the following format:

Beech, M. H. 1982. 'The Domestic Realm in the Lives of Hindu Women in Calcutta.' In *Separate Worlds: Studies of Purdah in South Asia,* edited by H. Papanek and G. Minault, 110–38. Delhi: Chanakya.

Kim, J., S. J. Lee, and G. Marschke. 2005. 'The Influence of University Research on Industrial Innovation.' NBER Working Paper Series 11447, National Bureau of Economic Research, Cambridge, MA.

Jackson, R. 1979. 'Running Down the Up-Escalator: Regional Inequality in Papua New Guinea.' *Australian Geographer* 14 (5): 175–84.

Lynd, R., and H. Lynd. 1929. *Middletown: A study in American Culture.* New York: Harcourt, Brace and World.

University of Chicago Press. 2010. *The Chicago Manual of Style.* 16th ed. Chicago: University of Chicago Press.