THE NEXUS BETWEEN STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH

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Abstract

The study investigated the relationship between stock market development and economic growth in Belgium using ARDL approach with annual time series data from 1988 to 2012. Real GDP per capita was used as a proxy for economic growth and stock market capitalization as a ratio of GDP as an approximate measure of stock market development. The relationship between stock market development and economic growth falls into four categories which are (1) stock market-led economic growth, (2) economic growth-led stock market development, (3) feedback effect and (4) neutrality hypothesis where the relationship between the two variables does not exist. Despite the existence of these four views on the relationship between stock market and economic growth, it appears from the literature review done by the author that majority of the empirical evidence support the stock market-led economic growth view. The fact that the topic on the directional causality between stock market and economic growth is still inconclusive is the major motivating factor why the author chose to investigate the relationship between the two variables in Belgium. The study observed that there exist an insignificant long run causality running from stock market development towards economic growth in Belgium. This relationship was not detected in the short run. Moreover, the reverse causality from real GDP per capita to stock market capitalization both in the long and short run was not detected in Belgium. These results are at variance with the majority of the empirical findings reviewed earlier on. It could possibly be that certain conditions that are necessary to enable stock market to significantly positively influence economic growth were not in place in Belgium. Therefore, the study urges the Belgium authorities to put in place the right environment, policies and programmes that enable the stock market to play its role of stimulating economic growth.

Keywords: Stock Market Development, GDP, ARDL, Belgium

1. INTRODUCTION

Several empirical studies that have focused on examining the relationship between stock market and economic growth have arrived at varying conclusions. Even those that have focused on the same case study though different time horizons also reached at different findings. These findings fall into four groups. The first one is the stock market development-led economic growth argument and the second is the economic growth-led stock market development argument. Third one is the feedback effect whilst the fourth is the neutrality argument which is characterized by no causality relationship between stock market development and economic growth.

Using Auto Regressive Distributive Lag (ARDL) and error correction model (ECM) with annual time series data from 1991 to 2007, Petros (2011) showed that stock market development significantly positively affected economic growth both in the short and long run in Zimbabwe. On the other hand, Alajekwu & Achugbu (2012) investigated the impact of stock market development on economic growth in Nigeria using the ordinary least squares with time series data from 1994 to 2008. Their study observed a weak negative correlation running from stock market capitalization and stock market value traded towards economic growth whilst stock turnover had a significant positive impact on economic growth in Nigeria.

Furthermore, Kolapo & Adaramola (2012) studied the influence of capital market on economic growth in Nigeria using time series data from 1990 to 2010. A feedback relationship between value of the stock traded and GDP and a uni-directional causality running from stock market capitalization to GDP without any feedback was detected in Nigeria. Their study also showed that no relationship existed between GDP and new share issues in Nigeria and this was buttressed by Carp (2012) whose studies observed that stock market capitalization and stock traded valued had no influence at all on the economic growth of Central and Eastern Europe.

Using panel data econometric techniques with annual time series data from 1980 to 2010, Ngare et al. (2014) investigated the relationship between stock market development and economic growth in Africa. They found out that stock market had a significant positive impact on economic growth whilst the rate of economic growth for countries characterized by developed stock markets was higher than in those countries whose stock markets were shallow. Other variables which were found to have had a positive influence on economic growth in Africa apart from stock market development included human capital development and trade openness. Rioja & Valev (2014), using the dynamic generalized methods of moments (GMM) found out

that stock market development had no influence on productivity and capital accumulation in low income countries and vice-versa in high income countries during the period under study.

The author is not aware of any empirical work that investigated the linkage between stock market development and economic growth in Belgium using the ARDL approach and that used the most recent data. It is on this backdrop and the contradictions in empirical literature on the topic that prompted the author to examine the causality between stock market development and economic growth in Belgium. The rest of the study is structured as follows: Section 2 discusses the economic growth and stock market development trends, section 3 reviews related literature whilst section 4 focus on the research methodology. Section 5 concludes the study and section 6 list the references.

2. GDP PER CAPITA AND STOCK MARKET DEVELOPMENT IN BELGIUM

Table 1 shows stock market development and GDP data for Belgium during the period from 1988 to 2012.

Table 1. Stock market and GDP data for Belgium

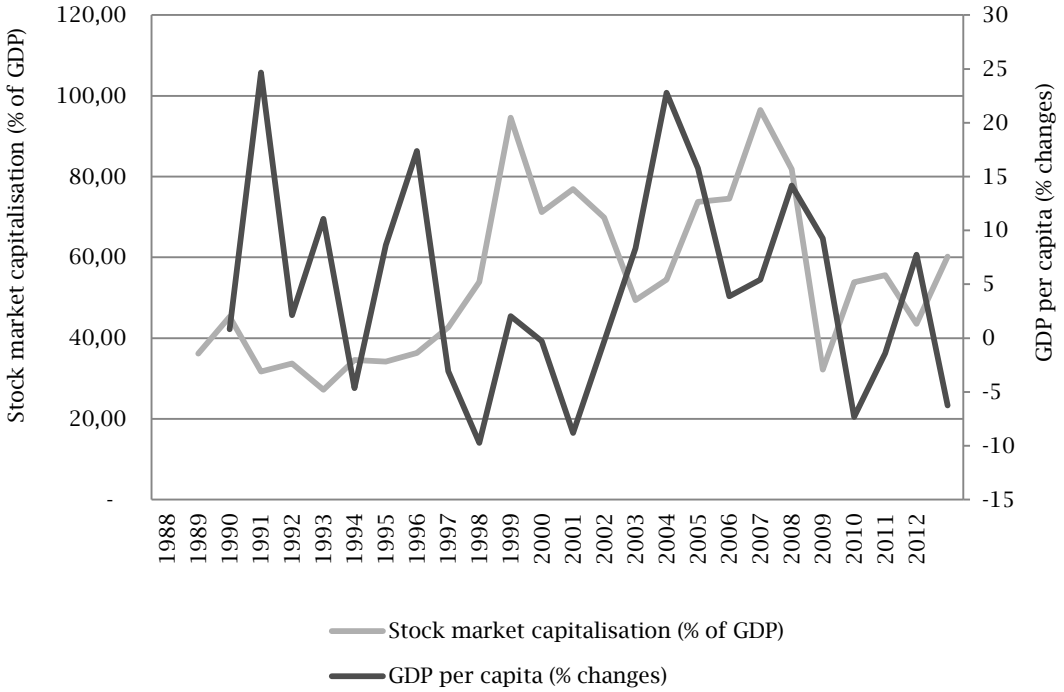
	SCAP (US$ Millions)	SCAP (% of GDP)	Value of stocks traded (US$ Billions)	Value of stocks traded (% of GDP)	GDP (US$	GDP per capita (US$ Thousands)
1988	58,900.00	36.15	8.37	5.14	162.92	16,453.54
1989	74,600.00	45.25	7.71	4.68	164.85	16,588.01
1990	65,400.00	31.73	6.42	3.12	206.11	20,678.85
1991	71,300.00	33.74	6.21	2.94	211.31	21,121.82
1992	64,200.00	27.24	8.03	3.41	235.68	23,461.67
1993	78,067.00	34.61	11.20	4.96	225.58	22,368.83
1994	84,103.00	34.21	12.82	5.22	245.82	24,300.79
1995	104,960.00	36.30	15.25	5.27	289.12	28,522.07
1996	119,831.00	42.68	26.12	9.30	280.79	27,646.05
1997	136,965.00	53.90	29.71	11.69	254.10	24,957.56
1998	245,657.00	94.55	55.36	21.31	259.82	25,465.25
1999	184,941.97	71.22	59.13	22.77	259.67	25,391.74
2000	182,481.00	76.89	38.01	16.02	237.34	23,151.95
2001	165,843.00	69.86	41.11	17.32	237.40	23,078.42
2002	127,556.30	49.37	33.81	13.08	258.39	25,006.79
2003	173,552.62	54.48	42.67	13.39	318.57	30,702.51
2004	273,247.42	73.76	80.06	21.61	370.45	35,547.54
2005	288,515.09	74.56	125.73	32.49	386.95	36,928.00
2006	396,220.18	96.47	165.92	40.40	410.70	38,936.33
2007	386,361.62	81.80	255.69	54.14	472.31	44,449.69
2008	167,446.80	32.20	211.78	40.72	520.09	48,561.36
2009	261,428.77	53.81	127.80	26.30	485.83	44,999.20
2010	269,341.85	55.60	111.46	23.01	484.43	44,360.90
2011	229,895.94	43.53	107.24	20.31	528.10	47,801.60
2012	300,058.18	60.16	103.26	20.70	498.75	44,818.05

Source: Author compilation from World Development Indicators

World Bank (2014) statistics shows that stock market capitalisation (STOCK) increased from US$58.9 million in 1988 to US$65.4 million in 1990 before gaining another 60.49% to end the year 1995 at US$104.96 million. On the other hand, gross domestic product (GDP) increased from US$162.92 billion in 1988 to US$206.113 billion in 1990. This was before it went up by 40.27%, from US$206.113 billion in 1990 to US$289.122 billion in 1995 (see Table 1). Furthermore, GDP nosedived by 17.91% during the five year period from 1995 to 2000 whilst STOCK massively increased by 73.86% during the same time frame.

Moreover, STOCK gained 58.11%, from US$182.48 million in 2000 to US$288.52 million in 2005 whilst GDP went up by 63.04%, from US$237.34 billion in 2000 to US$386.95 billion in 2005. STOCK however marginally lost 6.65% during the subsequent five year period to close the year 2010 at US$269.34 million before going up by 11.40%, from US$269.34 million in 2010 to US$300.06 million in 2012.

Figure 1. Stock market capitalisation (% of GDP) and GDP per capita (% changes) for Belgium



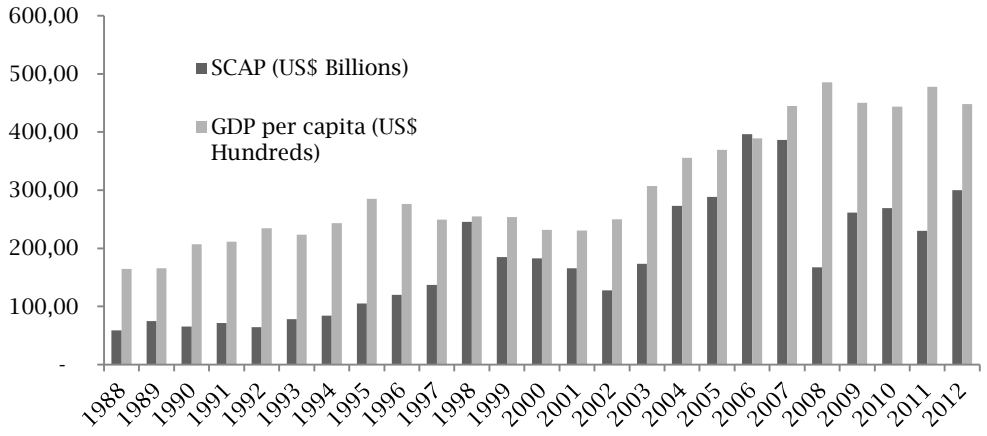
Source: World Bank (2014)

World Bank (2014) statistics showed that GDP rose by 63.04%, from US$237.34 billion in 2000 to US$386.95 billion in 2005 before recording a 25.19% growth during the subsequent five year period to end 2010 at US$484.43 billion. However, the two year period from 2010 to 2012 saw GDP gaining a marginal 2.95%. It actually increased from US$484.43 billion in 2010 to US$498.75 billion in 2012.

STOCK (% of GDP) declined by 4.42 percentage points, from 36.15% in 1988 to 31.73% in 1990 before a 4.57 percentage points rebound during the subsequent five year period to end 1995 at 36.30%.

GDP per capita increased by 25.68%, from US$16 453.54 in 1988 to US$20 678.85 in 1990 and further recorded a 37.93% increase to close the year 1995 at US$28 522.07. Furthermore, STOCK (% of GDP) massively increased by 40.58 percentage points, from 36.30% in 1995 to 76.89% in 2000 whilst GDP per capita lost 18.83% during the same time frame to close year 2000 at US$23 151.95. The subsequent five year period was characterized by 2.33 percentage points decline in STOCK (% of GDP) to close off year 2005 at 74.56% whilst GDP per capita massively increased by 59.50%, from US$23 151.95 in 2000 to US$36 928 in 2005.

Figure 2. Stock market capitalisation and GDP per capita trends in Belgium (1988 to 2012)



Source: World Bank (2014)

Furthermore, STOCK (% of GDP) experienced an 18.96 percentage points decrease, from 74.56% in 2005 to 55.60% in 2010 whilst GDP per capita grew by 20.13% during the same time frame to end 2010 at US$44 360.90 from US$36 928 in 2005. Last but not least, GDP per capita marginally gained 1.03% from US$44 360.90 in 2010 to US$44 818.05 in 2012 whereas STOCK as a ratio of GDP grew by 4.56 percentage points during the same time frame (from 55.60% in 2010 to 60.16% in 2012.

3. LITERATURE REVIEW

Cavenaile et al. (2014) investigated the relationship between banking sector, stock market and economic growth using panel co-integrated approach for five developing countries which include Malaysia, Mexico, Nigeria, Philippines and Thailand. Their study showed a uni-directional long run causality relationship running from both stock market and banking sector development to economic growth in all the five developing countries that were under study. On the other hand, no causality from economic growth to stock market and banking sector development was found in all the five developing countries (Cavenaile et al, 2014:38).

Hussain et al (2012) examined the relationship between stock market development and economic growth using descriptive statistics (Pearson's co-efficient correlation) with time series data from 1999 to 2008 in Pakistan. Their study noted that (1) there exists a significant long run relationship between stock market capitalization and economic growth and (2) the stock traded value had no link at all with real GDP growth rate in Pakistan.

Regmi (2012) used vector error correction model (VECM) with annual time series data from 1994 to 2011 to study the causality relationship between stock market development and economic growth in Nepal. The study found out that (1) stock market development significantly influenced the growth of the economy and (2) economic growth had no influence on stock market development in Nepal both in the short and long run.

Using the ARDL framework with annual time series data from 1980 to 2010, Ho & Odhiambo (2012) studied the causality between economic growth and stock market development in Hong Kong. Their findings are threefold: (1) a uni-directional causality relationship running from stock market development to economic growth when stock market capitalisation as a ratio of GDP was used as measure of stock market growth, (2) a distinct causal flow from economic growth to stock market growth in both the short and long run when the stock market turnover ratio was used as a measure for stock market development and (3) causality running from economic growth to stock market development in the short run only when the stock market trade value was used as a proxy for stock market development.

Palamalai & Prakasam (2014) studied the co-integration and causality relationship between stock market development and economic growth in India using time series data ranging from 1991 to 2013. They found out that there was a feedback effect between stock market development and economic growth in the long run and a uni-directional causality relationship running from stock turnover and stock market capitalization ratios to economic growth in the short and long run in India.

Abdelbaki (2013) examined the link between stock market development and macro-economic variables in Bahrain using ARDL approach with annual time series data from 1990 to 2007. "Banking sector, private capital flows, domestic investment and stock market liquidity were found to be part of the vital cog necessary for stock market development in Bahrain", argued Abdelbaki (2013:81). On the other hand, using exponential generalized autoregressive conditional heteroscedasticity (EGARCH), Babatunde (2013) found out that stock market volatility retarded the growth of the Nigerian economy.

Osuala et al. (2013) studied the relationship between stock market performance and economic growth in Nigeria using the ARDL with annual time series data from 1981 to 2011. Their study found out that (1) there exist a short run causality relationship running from total number of deals on the stock exchange ratio to GDP and (2) the relationship between stock market and economic growth did not exist in the long run in Nigeria. Ovat (2012) examined the applicability of the stock market-led growth hypothesis in Nigeria. The study noted that stock market liquidity had a bigger positive impact on economic growth in Nigeria than stock market size (Ovat, 2012:69).

Marques et al (2013) investigated the impact of stock market on economic growth in Portugal using the Vector Autoregressive (VAR) framework with annual time series data from 1993 to 2011. Their study revealed (1) feedback effect between stock market and economic growth, (2) uni-directional causality relationship running from economic growth to banking sector development and (3) banking sector had no impact on economic growth. On the other hand, Pilinkus & Boguslaukas (2009) noted that GDP and money supply had a positive influence on stock market prices whilst exchange rate, short term interest rates and unemployment rates had a negative impact on stock market prices in Lithuania.

Using Johansen-Juselius co-integration and Granger causality test with annual time series data ranging from 1999 to 2013, Bayar et al (2014) investigated the influence of stock market development on the growth of the economy in Turkey. Their findings are twofold: (1) there exist a long run co-integrating relationship between stock market development and economic growth and (2) the direction of causality runs from stock market development towards economic growth in Turkey. Furthermore, Yu et al (2012) examined the relationship between stock market development, financial development and economic growth across different income and geographic groups using unbalanced panel regressions and variance decompositions. They found out that GDP growth rate significantly Granger caused domestic credit to the private sector, GDP growth rate negatively influenced domestic credit provided by the banking sector. Stock market development and GDP growth rates were negligibly related across all income and geographic regions that formed part of the study (Yu et al, 2012). Table 2 summarizes the literature on the relationship between stock market development and economic growth.

Table 2. Summarized literature on the relationship between stock market development and economic growth

Author	Country/Countries of study	Methodology	Research findings
Ihendinihu (2012)	Nigeria from 1984 to 2011	Time series analysis	Stock market capitalisation and the all share index had a significant positive influence on economic growth.
Osamwonyi & Kasimu (2013)	Ghana, Kenya and Nigeria using data from 1989 to 2009.	Time series analysis	Stock market capitalisation and total number of listed securities were observed to have Granger caused economic growth in all the three countries under study.
Hou & Cheng (2010)	Taiwan using data from 1971 to 2007	Time series analysis	Stock market contributed more than banking sector development towards economic growth in Taiwan. The study also discovered a feedback effect between financial development and economic growth in Taiwan.
Asante et al (2011)	Ghana from 1992 to 2009	Time series analysis	Stock market development and competition in the banking sector was found to have Granger caused economic growth in Ghana.
Yartey (2010)	Emerging economies from 1990 to 2004	Panel data analysis	The study observed that macro-economic variables such as banking sector development, income levels, domestic investment and stock market liquidity significantly positively influenced stock market development.
Ndako (2010)	South Africa from 1983 to 2007	Time series analysis	Using banks' credit to the private sector as a measure of financial development, the study found a feedback relationship between economic growth and financial development. The study observed a uni-directional causality running from economic growth to stock market development when turnover ratio and value of stocks traded are used as proxies of stock market development.
Hossain & Kamal (2010)	Bangladesh from 1976 to 2008	Time series analysis	Stock market development was found to have had a significant causality impact on economic growth without any feedback in Bangladesh.
Nazir et al (2010)	Pakistan using data ranging from 1986 to 2008	Time series analysis	High stock market capitalisation and size were instrumental in stimulating economic growth in Pakistan.
Tachiwou (2010)	West African Monitory Union using data from 1995 to 2006	Time series analysis	Stock market development played a significant role in positively influencing economic growth both in the short and long run. This applied using both stock market capitalisation ratio and volume of shares traded ratio as proxies of stock market development.
El-Nader & Alraimony (2013)	Jordaan from 1990 to 2011	Time series analysis	The long run co-integrating relationship was observed between stock market development and the macro-economic variables in Jordaan.
Adefeso et al (2013)	Nigeria from 1980 to 2010	Time series analysis	Economic growth had a significant positive impact on both stock market development and banking sector activities in the long run in Nigeria.
Boubakari & Jin (2010)	Euronext countries	Time series analysis	Stock market was found to have had a significant positive influence on economic growth only in the Euronext countries which were characterised by active and liquid stock markets.
Choong et al (2010)	Comparison between developing and developed countries (1988-2002)	Panel data analysis	The study revealed that stock market acted as a conduit through which capital flows positively influenced economic growth.
Ake & Ognaligui (2010)	Cameroon from 2006 to 2010	Time series analysis	Stock market capitalisation had a significant impact on GDP in Cameroon.
Athanasis & Antonios (2010)	Italy using data from 1965 to 2007	Time series analysis	The study observed a uni-directional causality relationship running from economic growth to stock market development in Italy.
Ogunmuyiwa (2010)	Nigeria using data from 1984 to 2005	Time series analysis	Stock market liquidity Granger caused economic growth in Nigeria.
Cooray (2010)	Developing economies from 1992 to 2003	Time series analysis	Stock market size, liquidity and activity positively influenced economic growth in developing economies that were part of the study.
Salisu & Ajide (2010)	Nigeria from 1970 to 2004	Time series analysis	Findings are: (1) feedback relationship between stock market turnover ratio and economic growth, (2) uni-directional causality relationship running from stock market capitalisation ratio to economic growth and (3) no causality between stock market value traded ratio and economic growth in Nigeria was detected
Nowbutsing (2009)	Mauritius from 1989 to 2007	Time series analysis	Economic growth was significantly positively affected by stock market development both in the long and short run.
Zivengwa et al (2011)	Zimbabwe using data from 1980 to 2008	Time series analysis	Stock market development had a positive influence on economic growth.
Pradhan (2011)	India from 1983 to 2008	Time series analysis	Stock market development positively affected economic growth in India
Olweny & Kimani (2011)	Kenya using data from 2001 to 2010	Time series analysis	The share index was found to have positively affected GDP in the long run.
Zhang & Wu (2012)	China using quarterly data from 1994 to 2005	Time series analysis	Stock market had an insignificant negative influence on economic growth
Issahaku et al (2013)	Ghana using monthly data from 1995 to 2010	Time series analysis	Significant co-integrating relationship between stock market development and macro-economic variables such as money supply, inflation and interest rates.
Wild & Lebdaoui (2014)	Morocco using data from 2000 to 2013.	Time series analysis	The study found out that (1) there exist a long run causality relationship between economic growth and stock market development, (2) causality running from all share index, traded volume and stock market index to the real GDP per capita and (3) no causality relationship between stock market size (proxied by stock market capitalisation as a ratio of GDP and real GDP.

Source: Author compilation

4. METHODOLOGY

This section describes the data and variables used in the study, unit roots (stationarity tests) tests, F-Bounds tests and Granger causality tests using the Auto Regressive Distributive Lag (ARDL) approach.

4.1. Data description

The study used annual time series data from 1988 to 2012 obtained from World Development Indicators. Real GDP per capita was used as a proxy for economic growth whilst stock market capitalization

as a ratio of GDP was used as a measure for stock market development. The data for both variables was tested for stationarity before being used for the purposes of this study (see section 4.2).

4.2. Stationarity Tests

Both stock market capitalization and real per capita GDP variables were tested for stationarity before any co-integration and causality tests were done in a bid to ensure that the data being used is stable and not volatile (see Table 3 & 4).

Table 3. Stationarity Tests of Variables in Levels

Variable	TREND	NO TREND	Stationarity Status
ADF Test			
Ly/GDP	-3.674528	2.225190	Non stationary
LSTOCK	-2.564944	0.122072	Non stationary
Philip-Perron (PP) Test			
Variable	**TREND**	**NO TREND**	**Stationarity Status**
Ly/GDP	-1.942419	2.225190	Non stationary
LSTOCK	-2.564944	0.504184	Non stationary
DF-GLS Tests			
Variable	**TREND**	**NO TREND**	**Stationarity Status**
Ly/GDP	-3.607497	-0.707813	Non stationary
LSTOCK	-2.692254	-2.225931	Non stationary

Table 4. Stationarity Tests of Variables in first Difference

ADF Test			
Variable	**TREND**	**NO TREND**	**Stationarity Status**
DLy/GDP	-1.631052*	-1.760440*	Stationary
DLSTOCK	-3.777367**	-5.990438***	Stationary
Philip-Perron (PP) Test			
Variable	**TREND**	**NO TREND**	**Stationarity Status**
DLy/GDP	-3.820296**	-3.313208***	Stationary
DLSTOCK	-5.810053***	-6.112620***	Stationary
DF-GLS Tests			
Variable	**TREND**	**NO TREND**	**Stationarity Status**
DLy/GDP	-1.731798*	-1.899850*	Stationary
DLSTOCK	-5.940788***	-5.563548***	Stationary

*Note: 1) The truncation lag for the PP tests is based on Newey and West (1987) bandwidth. 2) *, ** and *** denote significance at 10%, 5% and 1% respectively. 3) Critical values for Dickey-Fuller GLS test are based on Elliot-Rothenberg-Stock (1996, Table 1).*

The results of the unit root tests reported in Tables 3 and 4 shows that both real GDP per capita and stock market capitalization are integrated of order 1.

4.3. Co-integration Tests

Before the ARDL-bounds test is done, the author examined the order of lags on the first differenced variables in equations (a) and (b) – using the Akaike Information Criterion (AIC) and the Schwartz-Bayesian Criterion (SC). The results of the AIC and SC tests (see Table 5) indicate that the optimal lag of both data variables is lag 1.

Table 5. Determination of the lag length

Lag	AIC	SC
4	-1.75254	-1.353105
3	-1.64614	-1.198483
2	-1.72935	-1.382203
1	-1.76534	-1.518494

The shorter optimum lag length (1 in this case) means that the two ARDL bounds test equations shown in (1) and (2) below are more robust.

After ascertaining that real GDP per capita and stock market capitalization are integrated of order 1 and that their optimal lag length is 1, the author went on to investigate the existence of a co-integrating vector using the ARDL-bounds testing approach that is represented by equations (1) and (2) below.

The author then applied the bounds F-test to equations (a) and (b), in order to investigate the existence of any long-run relationship between the two variables under study. The F-bounds test for co-integration results are shown in Table 6, 7 & 8.

Table 6. Bounds F-test – No Intercept and no trend

Dependent variable	Function		F-test statistic			
y/N	y/N(STOCK)		156 186***			
STOCK	STOCK(y/N)		2 222***			
Asymptotic Critical Values						
	1 %		5%		10%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
Pesaran et al. (2001), p. 300, Table CI(i) Case I	4.81	6.02	3.15	4.11	2.44	3.28

*Note: *** denotes statistical significance at the 1% level.*

$$\Delta Iny/N_t = a_0 + \sum_{i=1}^{n} a_{1i}\Delta Iny/N_{t-i} + \sum_{i=0}^{n} a_{2i}\Delta InSTOCK_{t-i} + a_3 Iny/N_{t-1} + a_4 InSTOCK_{t-1} + \mu_t \quad (1)$$

$$\Delta InSTOCK_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i}\Delta InSTOCK_{t-i} + \sum_{i=0}^{n} \beta_{2i} Iny/N_{t-i} + \beta_3 Iny/N_{t-1} + \beta_{4l} InSTOCK_{t-1} + \mu_t \quad (2)$$

where,

In STOCK = Log of stock market development variable

y/N = Real GDP per capita and

Δ = first difference operator.

Table 6 shows that there is a long run long-run relationship between real GDP per capita and stock market capitalization in both the y/N and STOCK equations. This is evidenced by the F-statistic values which are higher than the asymptotic critical values at 1%, 5% and 10% significance levels in both the y/N and STOCK equations.

Table 7. Bounds F-test – Unrestricted Intercept and no trend

Dependent variable	Function		F-test statistic			
y/N	y/N(STOCK)		132.00***			
STOCK	STOCK(y/N)		7.72**			
Asymptotic Critical Values						
	1 %		5%		10%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
Pesaran et al. (2001), p. 300, Table CI(iii) Case III	6.84	7.84	4.94	5.73	4.04	4.78

*Note: ** and *** denotes statistical significance at the 5% and 1% significance levels respectively.*

According to Table 7 (unrestricted intercept and no trend), there is a unique co-integrating vector between y/N and STOCK as confirmed by the F-statistic value which is (1) greater than the upper bound asymptotic critical values at 1%, 5% and 10% significance levels in the y/N equation and (2) greater than the upper bound asymptotic critical values at 5% and 10% significance levels in the STOCK equation.

Table 8 (unrestricted intercept and unrestricted trend) reports that there exist a long run relationship between real GDP per capita and stock market capitalization only in the y/N equation. In summary, Table 6, 7 & 8 shows that there is a long run relationship between real GDP per capita and stock market capitalization in Belgium.

Table 8. Bounds F-test - Unrestricted Intercept and unrestricted trend

Dependent variable	Function		F-test statistic			
y/N	y/N(STOCK)		11.79***			
STOCK	STOCK(y/N)		3.79			
Asymptotic Critical Values						
	1 %		5%		10%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
Pesaran et al. (2001), p. 300, Table CI(v) Case V	8.74	9.63	6.56	7.30	5.59	6.26

*Note: *** denotes statistical significance at the 1% level.*

4.4 Causality Tests

The next stage is to investigate the causality between real GDP per capita and stock market capitalization since the two variables have been found to have a long run relationship. The Granger causality test between the two variables follows a model that was used by Narayan & Smyth (2008) and Odhiambo (2010).

$$\Delta Iny/N_t = \phi_0 + \sum_{i=1}^{n} \phi_{1i} \Delta Iny/N_{t-i} + \sum_{i=0}^{n} \phi_{2i} \Delta InSTOCKi_{t-i} + ECM_{t-1} + \mu_t \quad (3)$$

$$\Delta InSTOCK_t = \delta_0 + \sum_{i=1}^{n} \delta_{1i} \Delta InSTOCK_{t-i} + \sum_{i=0}^{n} \delta_{2i} \Delta Iny/N_{t-i} + ECM_{t-1} + \mu_t \quad (4)$$

where, ECM_{t-1} = the lagged error-correction term from long-run equilibrium relationship. The ECM co-efficient shows the number of times errors are corrected within a year.

According to Narayan & Smyth (2006), the lagged error-correction term stands for the long-run causality whilst the F-statistic shows the short-run causality based on the equations (3) and (4) – see Table 9.

Table 9. Granger Causality Tests

Dependent Variable	Causal Flow	Co-efficient of ECM	F-statistic
(y/N)	STOCK→ (y/N)	-0.100970 (0.1480)	0.744725 (0.3989)
STOCK	(y/N) → STOCK	0.199528 (0.4362)	0.307205 (0.5859)

Source: Author compilation

The co-efficient of the error correction term (ECM) is negative but not significant as p is greater than 5% in the y/N equations. This shows that there exists an insignificant long run uni-directional causality relationship running from stock market capitalization towards economic growth. The study also shows that there is no causality running from real GDP per capita to stock market capitalization both in the long and short run in Belgium.

5. CONCLUSION

The study investigated the relationship between stock market development and economic growth in Belgium using ARDL approach with annual time series data from 1988 to 2012. Real GDP per capita was used as a proxy for economic growth and stock market capitalization as a ratio of GDP as an approximate measure of stock market development. The relationship between stock market development and economic growth falls into four categories which are (1) stock market-led economic growth, (2) economic growth-led stock market development, (3) feedback effect and (4) neutrality hypothesis where there is no relationship between the two variables. Despite the existence of these four views on the relationship between stock market and economic growth, it appears from the literature review done by the author that majority of the empirical evidence support the stock market-led economic growth view.

The fact that the topic on the directional causality between stock market and economic growth is still inconclusive is the major motivating factor why the author chose to investigate the relationship between the two variables in Belgium.

The study observed that there exist an insignificant long run causality running from stock market development towards economic growth in Belgium. This relationship was not detected in the short run. Moreover, the reverse causality from real GDP per capita to stock market capitalization both in the long and short run was not detected in Belgium. These results are at variance with the majority of the empirical findings reviewed earlier on. Possibly, certain conditions that enable or allow stock market to significantly positively influence economic growth were not in place in Belgium. Therefore, the study urges the Belgium authorities to put in place the right environment, policies and programmes that enable the stock market to play its role of stimulating economic growth.

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