The Journal of Economic Asymmetries 12 (2015) 162–172

Contents lists available at ScienceDirect

The Journal of Economic Asymmetries

journal homepage: www.elsevier.com/locate/jeca

Stock markets and industrial production in north and south of Euro-zone: Asymmetric effects via threshold cointegration approach

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ARTICLE INFO

Article history:
Received 7 June 2015
Received in revised form
20 June 2015
Accepted 7 July 2015
Available online 19 November 2015

JEL classifications:
G15
F36

Keywords:
Stock prices
Industrial production
Threshold cointegration approach
North of Euro-zone
South of Euro-zone

ABSTRACT

In this paper, we investigate the relationship between stock prices and industrial production both for South and North of Euro-zone during the period 2004–2013. In contrast to previous studies we identify additional price interaction and dynamics investigating asymmetric adjustment behavior combined with long-run relationship using the Threshold cointegration approach. This method is proper as well because takes into consideration the type of shocks which appears in period 2004–2013. The results demonstrate symmetric adjustment process for the North and asymmetric for the South when stock prices and industrial production adjust to achieve the long-run equilibrium. The main cause of asymmetry is the difference in structural competitiveness which is weakest in South with respect to North. This finding is particularly important because provides the direction of economic policy that should adopt the governments of South of Euro-zone.

1 Introduction

The union of European countries, initially through the institution of the European Economic Community and then by EU, had as main target the maintenance of peace in Europe. This target is achieved by improving the prosperity of people that belong to participating countries through a framework of cooperation in all sectors but mainly in the economic sector resulting to a balanced development. However, the emergence of the economic crisis mainly affected the southern countries (reduction of Gross Domestic Product, increase of unemployment etc.). This proves that the model of economic growth in the Euro-zone, based on production imbalance in favor of the North had not the expected results.

The failure of fiscal policy that came from the production imbalance provides the main motive for investigating the relationship between stock prices (that are represented by stock market index-SMI) and industrial production (that is represented by index of industrial production-IIP) both for South and North of Euro-zone. However, Ritter (2005) notes that capital expenditure that is depicted to stock market performance drives to economic growth. We anticipate from this relationship to obtain a clear solution about the policy that needs to adopt the Euro-zone for eliminating the differences

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http://dx.doi.org/10.1016/j.jeca.2015.07.001
1703-4949/

between South and North.

The study is accomplished in the time interval 2004–2013 that includes both a period of growth (2004–2008) and a period of recession (2009–2013). The demand shocks that imply the growth and recession are the main factor that relaxes the strict hypothesis of endogenous variables (industrial production and stock prices) of modern general equilibrium models. Hence, the variables are not simultaneously determined. The demand shocks are the third factor behind the variables ensuring the correct direction of the studied relationship. For instance if a positive productivity shock (that is coming from the respective positive demand shock) hits the industrial sector, the increase in production leads to higher revenues and profits. This causes an increase in dividends and, therefore, stock prices.

The IIP is a production based macroeconomic measure, proxy of investments that indicates the future economic performance (Fama, 1990). The reason is that a large amount of available capital is placed in industrial production[1]. In addition, Baker and Wurgler (2006) reveal that predictability of stock market returns by market sentiment based variables is more robust than financial market based variables. However, Cooper and Priestley (2013) point out the need of using international (as the IIP) rather than country specific measures of business conditions in order to determine variations in stock returns.

Evidence of significant explanation of stock prices from industrial production is found in certain studies. More precisely, Errunza and Hogan (1998) employing a VAR model conclude that industrial production can explain changes in stock market volatility in European countries during 1959–1993. On the same wavelength is moving the study of Goswami and Jung (1998) that found positive relationship between industrial production and Korean stock prices. Nevertheless, other studies either suggested that macroeconomic factors cannot explain stock price movements (e.g Verma & Ozunab, 2005) or found that stock markets are the deterministic factor of economic performance because stock prices reflect investors' expectations relatively to future economic performance of a country (e.g Choi, Hauser, & Kopecky, 1999). However these studies ignored the IIP as proxy macroeconomic factor.

In order to understand the interaction and dynamics between the used measures we adopt the Threshold cointegration approach (both in a panel and aggregate context) that has received considerable attention in the literature but has not been used in understanding relationship between stock index and macroeconomic factor. This is the main contribution of our study because we investigate asymmetric adjustment behavior in combination with long-run relationship (Shen, Chen, & Chen, 2007). In other words, we test if the adjustment speed of stock prices and industrial production is the same regardless the type of shocks (growth and recession)[2]. The results will provide a convincing response to the main research question about the policy that needs to adopt the Euro-zone in order to eliminate the differences between South and North under the pressure of an ongoing recession. In addition, the investigation of the relationship between stock prices and industrial production in South and North of Euro-zone is performed for first time in relative literature (especially under the above econometric technique and time interval). The asymmetric error correction model had been used by Enders and Granger (1998) for explaining long-run equilibrium relationship between short-term and long-term interest rates in US.

Furthermore, the IIP is a more reliable measure as proxy of industrial production (with respect to other measures adopted from previous studies) because has the advantage of not including market prices. Thereby, it does not suffer from the possibility that predictability arises through mispricing (this is also pointed out by Cooper & Priestley, 2013 in their macroeconomic measure, the world business cycle). Instead, Shen et al. (2007) use stock market indices of China including the above possibility. Moreover, as the world business cycle, the IIP is a production based variable that is not affected by managers' market timing. Thus, the predictability of stock returns by means of IIP is unlikely to reflect stock mispricing.

The rest of this paper proceeds as follows. Section 2 presents the data, the variables and the employed methodology. Section 3 reports the empirical results and section 4 presents the concluding remarks.

2. Data, variables and methodology

The study for the relationship between stock market index (SMI) and index of industrial production (IIP) both for South and North of Euro-zone in aggregate context, is carried between two weighted indices. In particular, the SMI of South is constructed as weighted mean index of the general indices of stock markets of Spain, Portugal, Italy and Greece using weights according to the capitalization of each market. On the other hand, the weighted mean IIP is constructed using weights according to the population of each country. The above countries represent geographically the South of Euro-zone. The SMI of North is similarly constructed from general indices of stock markets of Germany, Belgium, Finland and Austria (The choice of these countries as proxies of the North of Euro-zone is based on their geographical position, on the industrialization of their economies and their total population size that corresponds to that of the South[3]). All the series are seasonally adjusted using a multiplicative seasonality factor. However, in order to obtain more robust estimates we adopt primarily the panel data approach because accounts for the long-run relationship and Granger-causal relationship between

[1] The industrial production is the main form of investments that provides surplus value to investors.

[2] As noted the strong growth and deep recession imply corresponding demand shocks (with opposite directions). The demand shocks are a factor that relaxes the strict hypothesis of endogenous variables (industrial production and stock prices) of modern general equilibrium models. This theoretical view is in contrast to traditional Keynesian view where causality runs from stock prices to industrial production. This because there is not exogenous reason in this period to primarily raises the stock prices.

[3] France is excluded from the analysis because geographically belongs to both regions.