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## Examining the Relationship between the Balance Sheet Accounts of US Biotechnology, Telecommunications and Transportation Sectors

Kaya TOKMAKCIOGLU<sup>a\*</sup>, Oguzhan OZCELEBI<sup>b</sup>, Umut UGURLU<sup>c</sup>

<sup>a</sup>Kaya TOKMAKCIOGLU, Istanbul, 34367, Turkey

<sup>b</sup>Oguzhan OZCELEBI, Istanbul, 34542, Turkey

<sup>c</sup>Umut UGURLU, Istanbul, 34367, Turkey

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### Abstract

After the period of financial liberalization, the activities of firms can create signals for financial and macroeconomic environment and the relationship between financial and macroeconomic variables can be captured by firm-based empirical evidence. From this point of, we employ panel least squares method to investigate the interactions between the balance sheets accounts of US firms in biotechnology, telecommunications and transportation sectors. Our results expose that the technology level is not sufficient to promote the activity of firms and their liquidity. It is also revealed that the number of employee positively affects the cash account whereas the property account does not have a significant impact on cash. According to our estimations, we suggest that an optimal empirical framework should be derived to capture the microeconomic origins of macroeconomic developments in terms of effects of total productivity shocks in those sectors.

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### 1. Introduction

With respect to the financial markets, USA displays an important example, which has developed money and capital markets. Accordingly, it can be asserted that interactions between stock market indices not only reflect the relationship between the sectors of the economy but also their consequences on economic performance in the USA. In this respect, NASDAQ biotechnology, telecommunications and transportation indices are three of the most developing sector indices in the last decade due to globalization and increasing accessibility to the technology.

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\* Kaya TOKMAKCIOGLU Tel.: +90-532-491-40-09; fax: +90-212-240-72-60.  
E-mail address: [tokmakcioglu@itu.edu.tr](mailto:tokmakcioglu@itu.edu.tr)

Moreover, biotechnology, telecommunications and transportation sectors are important cases to be examined since it is recognized that they are both essential in terms of maintaining the well-functioning of the market economy and promote the volume of domestic and foreign trade.

In the USA, the level of economic interactions among telecommunications and transportation sectors is also high like other developed economies; thence the main aim of this research is to analyze the relationships between the balance sheets accounts of the firms in these sectors. Since the stocks in NASDAQ biotechnology, telecommunications and transportation indices are major examples also reflecting the industrial activity, our study indirectly attempts to expose the interaction between industrial companies and analyze the dynamics of industrial activity. Within biotechnology, telecommunications and transportation sectors; we used a sample consisting of 10 firms with the highest assets, whereupon we investigated the financial and economic consequences in a plausible econometric methodology. In this study, we used panel least squares modeling since balance sheets accounts of firms in biotechnology, telecommunications and transportation sectors can be treated as simultaneous, that is, one or more of the explanatory variables can be jointly determined with the dependent variable. The main hypothesis of this research is to test whether balance sheets accounts of firms in biotechnology, telecommunications and transportation sectors have significant effects on each other.

The rest of the paper is organized as follows. Section 2 reviews the previous literature analyzing the dynamics of financial variables. In Section 3, the empirical data and methodology is presented. Section 4 shows empirical results. Finally, Section 5 concludes and discusses some implications for further researches.

## 2. Literature Review

Gries et al. (2009) work on the linkages between financial deepening, trade openness and economic development by using unit root and cointegration tests and then by implying a Hsiao-Granger causality method. The paper also involves vector error correction models (VECMs) and vector autoregressive (VAR). The application of these methods on 16 sub-Saharan African countries shows that there is only limited support for the hypothesis of finance-driven growth. Financial deepening and economic development has a very small effect and the investigated sub-Saharan countries could not take the advantage of financial deepening. In conclusion, the theory that development strategies can be prioritized by financial or trade sector development can not be supported.

Christopoulos and Tsionas (2004) analyze the long-run relationship between financial depth and economic growth by using panel unit root tests and panel cointegration analysis. Additionally, they use threshold cointegration tests and dynamic panel data analysis for a panel-based vector error correction model. A fully modified OLS model was used to estimate the long run relationship between the factors. The results state that for 10 developing countries there is a single equilibrium relation between growth, financial depth and auxiliary variables; however the only cointegration relation is a unidirectional causality from financial depth to growth.

Panel cointegration is a widely used method in many papers from different fields. Bhattacharya and Narayan (2015) utilize panel cointegration for finding the relationship between output and labour productivity in organized manufacturing of India. The paper investigates the long-run relationship between output, labour productivity and real wages by using panel data from seventeen manufacturing industries over a period of nearly thirty years. Panel unit root and cointegration tests are employed for cross-sectional dependence to incorporate heterogeneity across industries. According to the results, long-run elasticities are low for labour productivity compared to real wages. Another outcome is that the effects of labour market on the manufacturing market differ across industries.

Apergis and Payne (2013) propose a panel threshold cointegration model to analyse the impact of the firm size effect on stock returns for the panel of G7 countries over the period from 1991 to 2012. The model is based on the nonlinear cointegration framework using the asymmetric ARDL cointegration methodology. Its main advantage is the flexibility of the dynamic adjustment process toward equilibrium compared to the classical linear modal. The

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