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IS PURCHASING MANAGERS' INDEX (PMI) A LEADING INDICATOR FOR STOCK, BOND AND FOREIGN EXCHANGE MARKETS IN TURKEY?

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ABSTRACT

The aim of this paper is to determine whether the PMI (Production Managers' Index) is a leading indicator for the returns of stock, bond and foreign exchange markets in Turkey. Therefore, the causality relationship between PMI and stock, bond and foreign exchange markets are examined. We employ Toda Yamamoto (1995) and Fourier Toda Yamamoto (2016) causality tests covering the period spanning from December 2012 to August 2018. In the absence of structural breaks, it was determined that there was no causality from PMI to all stock sectors. In the case of structural breaks, it is determined that there is one-way causality from PMI to BIST-100 and BIST-Metal Goods Sector index. In addition, when structural breaks are taken into consideration, it is determined that there is one-way causality from PMI to bond and foreign exchange markets. It is concluded that PMI can be a leading indicator for BIST-100 stocks and sub-sector stocks.

Keywords: *PMI (Production Managers' Index), Stock, Bond and Foreign Exchange Markets.*
Jel Codes: *C33, C82, E44*

SATIN ALMA YÖNETİCİLERİ ENDEKSİ TÜRKİYE'DE PAY SENEDİ, TAHVİL VE DÖVİZ PİYASALARI İÇİN ÖNCÜ BİR GÖSTERGE MİDİR?

ÖZ

Çalışmanın amacı, Türkiye' de PMI'nın (Satın Alma Yöneticileri Endeksi) pay senedi, tahvil ve döviz piyasaları getirileri için öncü bir gösterge olup olmadığını belirleyebilmektir. Bu bağlamda, PMI ile pay senedi, bono ve döviz piyasaları arasındaki nedensellik ilişkisi araştırılmaktadır. Toda Yamamoto (1995) ve Fourier Toda Yamamoto (2016) nedensellik testlerinin kullanıldığı çalışma Aralık 2012 - Ağustos 2018 dönemini kapsamaktadır. Yapısal kırılmaların dikkate alınmadığı durumda PMI'den tüm pay senedi sektörlerine doğru nedenselliğin olmadığı tespit edilmiştir. Yapısal kırılmaların dikkate alındığı durumda ise PMI''den BIST-100 ve BIST-Metal Eşya Sektör endeksine doğru tek yönlü nedenselliğin olduğu tespit edilmiştir. Ayrıca yapısal kırılmaların dikkate alındığı durumda PMI'den tahvil ve döviz piyasalarına doğru tek yönlü nedenselliğin olduğu tespit edilmiştir. PMI'nin BIST-100 pay senetleri ve alt sektör pay senetleri için öncü gösterge olabileceği sonucuna varılmıştır.

Anahtar Kelimeler: *PMI (Satin Alma Yöneticileri Endeksi), Pay Senedi, Tahvil ve Döviz Piyasaları.*
JEL Kodları: *C33, C82, E44*

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INTRODUCTION

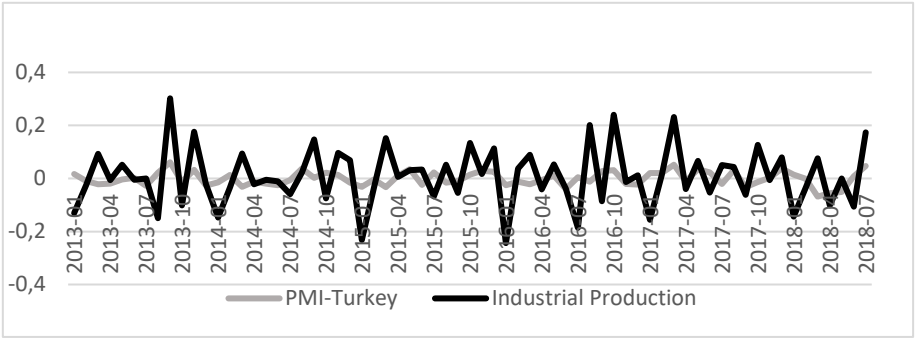
After the global financial crises, the sentiment indicators such as Consumer Confidence Index (CCI), Volatility Index (VIX), Purchasing Managers' Index (PMI) etc. captured the attention of investors and regulators. They have long been regarded leading indicators for they reflect the expectations of consumers, investors and producers about future economic, financial and trading activities in a country. Using these indexes as macroeconomic indicators provides the experts with many advantages for, they are the indicators, which had already been calculated and published in monthly basis in comparison to some quarterly or much higher frequency data series. Additionally, once they are published, statistical data is no longer reviewed, as is the case of many macroeconomic indicators (Lupu, 2018, p.33). The PMI is widely used to measure and forecast the activity of the economy and thus has an impact on financial markets. The aim of this study is to investigate whether there exists a causal relationship between the PMI and the Turkish stock, bond and foreign exchange markets.

The PMI is an indicator of economic health for private sector. It is a survey-based measure that asks the senior executives about changes in their perception of several key business variables. The questionnaire aims at learning the extent of improvement or decline in orders, inventory levels, production, supplier deliveries and employment. The PMI number changes from 0 to 100; any PMI score above 50 indicates a looming expansion, and a contraction if it is below 50. If it stands at 50 then it means stability. The higher the difference from 50, the greater the expansion or contraction. The rate of expansion or recession can be acquired by comparing the PMI with that of the previous month data.

Although the PMI furnishes the company decision-makers, analysts and purchasing managers with a critical information about the current business conditions, it is also used by investors and regulators. Since the PMI is used as an indicator of corporate earnings, domestic and international stock market investors are likely to prefer the stocks of the countries or an industry (such as manufacturing, construction, trade or service) having increasing PMI scores. In addition, for the PMI offers information about the growth in supplier deliveries and prices paid therefore it is also used as an indicator of inflation. The investors will reduce their bond investments in countries with increasing PMI scores now that higher inflation is likely to impact bond prices. According to Baumohl (2013) if the economy is in an expansionary phase, an increase in PMI scores would signal rising inflationary pressures, emblematic with higher interest rates and consequently negative bond returns. PMI is a factor potentially influencing the value of domestic currency particularly in case stock and commodity markets give positive reaction to the involved PMI score. Needless to say, those features seem to have convinced many stock, bond, foreign exchange and commodity market investors to follow carefully the PMI scores. One should add that PMI scores are the major indicators relating to some major macroeconomic variables such as GDP, industrial production, unemployment rate, bank credits, etc.

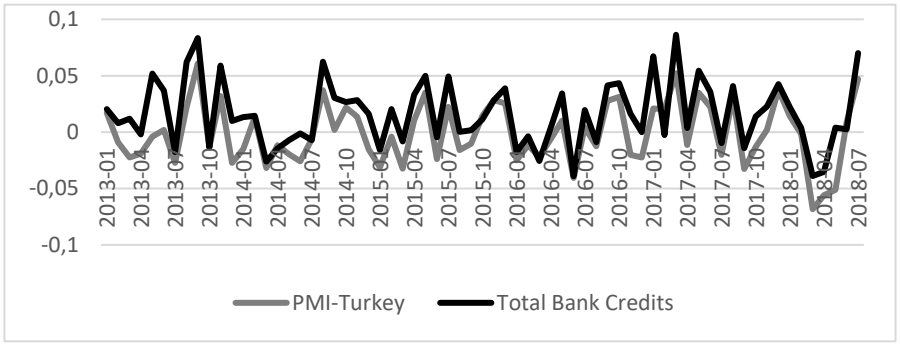
Therefore, they are used by regulators such a Central Banks and other governmental agencies in developing and formulating macro-economic policies. For instance, Central banks of many countries make use of the PMI scores to determine interest rates.

Graphs 1, 2, 3 and 4 show the PMI of Turkey and macroeconomic variables such as Industrial Production, Total Bank Credits, Unemployment Rate and GDP respectively. Among them, we can notice the high related between PMI and Bank Credits. This is inherited in the fact that managers expect the trading activities to increase (or decrease) in the following month, and bank credits to follow the same suit. Since economic activities are mostly carried out with bank credits in Turkey, economic expansion (or constriction) can be forecasted on the basis of increasing (or decreasing) bank credits.



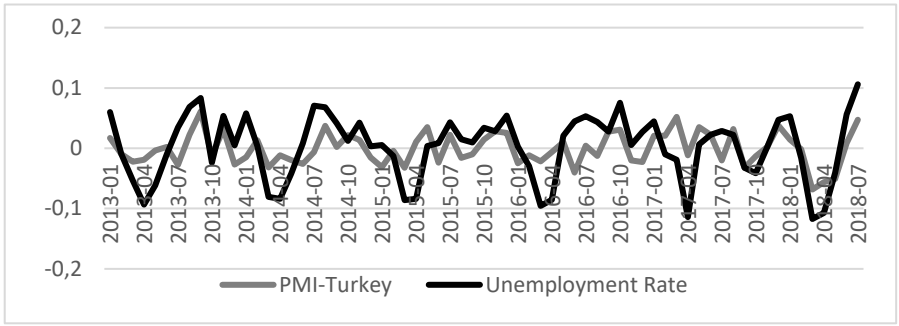
Source: Central Bank of Turkey and Trading Economics Database (2019).

Graph 1: Changes in PMI-Turkey and Industrial Production (January 2013-June 2018)



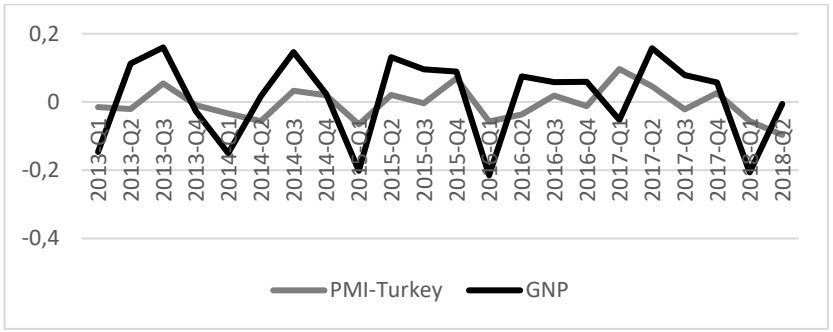
Source: Central Bank of Turkey and Trading Economics Database (2019).

Graph 2: Changes in PMI-Turkey and Total Bank Credits (January 2013-June 2018)



Source: Central Bank of Turkey and Trading Economics Database (2019).

Graph 3: Changes in PMI-Turkey and Unemployment Rate (January 2013-June 2018)



Source: Central Bank of Turkey and Trading Economics Database (2019).

Graph 4: Changes in PMI-Turkey and GNP (January 2013-June 2018)

In their study, Bolaman and Mandacı (2014) examined the relationship between the Consumer Confidence index and stock market return for Turkey. However there available no study examining the relationship between PMI and Turkish stock market. Hence, this study can be taken as the first, which examines the impact of PMI not only on the stock market but also on the bond and foreign exchange market returns. We consider PMI-Manufacturing for Turkey and make use of the BIST-100 Index, BIST-Manufacturing Industry index and its sub-sector indices as representatives for the stock, two-year Treasury bonds as representative for the bond and TL/EURO and TL/USD as representatives for the foreign exchange markets. We employ causality tests namely Toda Yamamoto (1995) and Fourier Toda Yamamoto (2016), which takes into account structural breaks. As for this study, the monthly data is used spanning from December 2012 to October 2018. We do not observe any causality relationship between PMI and stock market however, the structural breaks are taken into consideration, we find one-way causality from PMI to BIST-100 and BIST-Metal Goods Sector index. In addition, we observe one-way causality from PMI to bond and foreign exchange markets. The rest of the paper is structured as follows. Following the Introduction, Section 2 gives the related literature and motivation for the research. Section 3 provides information about methodology. After that, Section 4 provides the data and empirical results and the last section, Section 5 gives conclusion and further.

LITERATURE REVIEW

The PMI is an indicator of economic growth due to its close correlation with the given country's GDP. There exist a few studies (see for instance Klein and Moore, 1991; Dasgupta and Lahiri, 1993; Kauffman, 1999; Afshar, 2007; Lahiri and Monokroussos, 2013 and Bose, 2015) arguing that the 'business sentiment' such as PMI is useful for forecasting GDP.

Most of the studies on forecasting stock market returns consists of the impact of macroeconomic variables such as GDP (for instance Fama, 1990; Schwerd, 1990 Broyer and Savry, 2002; Koenig, 2002 and Cagli et al, 2010); inflation (such as Fama, 1981; Fama and Schwert, 1977; Chen et al., 1986; Gültekin, 1983); interest rates (such as Papapetrou, 2001; Ang and Bekaert, 2001); industrial production (such as Cutler et al, 1989; Shanken and Weinstein, 2006), and unemployment rate (for instance Boyd et al, 2005; Singh et al, 2011). However, there available just a few studies examining the impact of PMI on financial markets. In order not to move away from the basic issue, only studies dealing with the relationship between PMI and financial markets are included here. Among these studies, Johnson and Watson (2011) examined how changes on PMI impact stock returns for the U.S. They employed times series regression analysis and found a positive relationship between them. They argued that changes in the PMI could be used as an explanatory variable in forecasting stock returns. After they controlled the strength of the U.S. dollar, inflation and the current state of the U.S. economy, they found that the results hold. Baum et al. (2015) examined the impact of Chinese macroeconomic announcements such as PMI, Industrial Production and GDP on world stock markets, foreign exchange markets and energy and industrial commodities markets and found that among them, the PMI exerted the strongest influence on all these markets.

On the other hand, Lupu (2018) used event study for 27 European countries for the period from January 2007 to November 2017 and tried to identify European stock markets' reactions to changes in SentiMent index and PMI and showed the existence of immediate reactions with a higher intensity in March 2016 for the PMI. They found that the frequency and amplitude of reactions were different from country to country. Similarly, Qudghiri et al. (2016) investigated the impact of macroeconomic news releases on T-bond returns by implementing event study and found that among many indicators "PMI service" impacted bond returns significantly negatively for Germany. Additionally, Evans and Speight (2010) found that the Chicago PMI caused substantial exchange rate volatility.

Christiansen et al (2014) found that the sentiment variables had considerably better forecasting power for future recessions than classical recession predictors and the PMI was the single best recession indicator among the considered forecasting variables. It should be noted that the recent downsizing in the Turkish economy because of high foreign debts of private sector, increasing inflation and decreasing demand motivate us to determine the impact of the PMI on Turkish financial markets.

Akdag et al (2018) found that the change in the Istanbul Stock Exchange Industry Index causes the change in the PMI and the changes in the PMI also causes the changes in the Industrial Production Index and the Capacity Utilization Rates. It is also determined that the causality towards to PMI from the Istanbul Stock Exchange Industry Index and causality towards Industrial Production Index from PMI is valid in moderate and long term, Whereas the causality towards PMI to Capacity Utilization Rates are valid for short, moderate and long term.

METHODOLOGY

Unit Root Tests

Within the scope of the study, it is necessary to determine the stationary levels of the series belonging to these indices before going on to test the causality relationship between the PMI index and the financial markets including stock, bond and foreign exchange markets in Turkey. Stationary levels were examined using the conventional unit root tests such as Augmented Dickey Fuller (ADF) and Philips Perron (PP), and the unit root test of Zivot-Andrews (ZA) that takes into account structural breaks in the series. However, the methodologies of these well-known tests are not reported in order to conserve space.

Toda Yamamoto (1995) and Fourier Toda Yamamoto (2016) Causality Tests

The causality relationship between the PMI index and these financial markets are examined by employing two different methods namely the Toda Yamamoto (thereafter TY) (1995) and Fourier Toda Yamamoto (thereafter Fourier TY) (2016), which are the extensions of Granger causality test, based on a study by Granger (1969). However, before proceeding with these two methods, it is useful to briefly mention the Granger causality test. The basic model for the Granger causality test is given below in the first equation.

$$yt = \alpha + \beta 1 y\ t-1 + \cdots + \beta p y\ t-p + \varepsilon t \qquad (1)$$

In this sense yt comprises of endogenous variables containing all variables in multivariate estimates while α refers to a vector of intersection terms, b to the coefficient matrices, and finally εt refers to white noise residues. Traditional Granger causality tests present some challenges, such as the necessity of distress parameters. Moreover, if the variables are integrated or cointegrated, the test statistics will not be valid and will not follow their own distribution. Toda and Yamamoto (1995) proposed a test of causality without pretesting cointegration (TY, 1995).

To overcome these challenges, TY (1995) proposed an extra lag (k) VAR (p) model, which was determined according to the maximum integration (dmax) sequence of the series. The TY approach predicts the $VAR\ (p + d)$ model according to the levels of the variables and follows the chi-square distribution asymptotically (Çiftçi, 2018,p.57). The first step in the TY approach is to determine the appropriate delay level (p) in the VAR model. In the second step, the integration level (dmax) of the variable with the highest integration is added to the p delay, whereas in the third step, the Least Squares

model is estimated on top of the original values of the series for the p + dmax delay and the final step includes setting a limitation for the variables respectively and testing their significance. TY's (1995) VAR (p + d) model is presented in the second equation below.

$yt = \alpha + \beta 1 y\ t-1+\cdots+\beta p+\mathrm{d} y\ t-(p+\mathrm{d}) + \varepsilon t$ (2)

As can be seen, the TY model is about the addition of the integration level (dmax) to the classical Granger model given in the first equation. In the TY model, yt does not predict the structural breaks. However, Monte Carlo simulations performed by Ventosa-Santaulària and Vera-Valdés (2008) showed that there may be structural shifts in the data generation process and the hypothesis "H0: no causality" can be rejected even if there is no causal link between the two variables. This is also supported by similar findings from a study by Enders and Jones (2016) using Monte Carlo simulations. These findings show that the Granger causality analysis may generate misleading results when structural breaks are ignored or taken into account incorrectly, that structural changes should be taken into account and that the way structural changes are handled is important.

Therefore, within the framework of the study, we have utilized the Fourier TY causality test developed by Nazlıoğlu, Görmüs and Soytas (2016) that take into account gradual structural breaks, as an extension of the Fourier approach within the framework of VAR whereby structural breaks put forward by Enders and Jones (2016) are considered besides the TY causality test which does not take into account structural breaks. The model representing this approach is given below.

$yt = (\mathrm{t}) + \beta 1 y\ t-1+\cdots+\beta p+\mathrm{d} y\ t-(p+\mathrm{d}) + \varepsilon t$ (3)

The terms of intersection indicate that α (t) is time dependent and the structural changes are shown in yt in terms of considering structural changes as a gradual process with an unknown date, number and type of break, the Fourier approach is described as follows:

$$\alpha(t) \cong \alpha_0 + \sum_{k=1}^{n} \gamma_{1k} sin\left(\frac{2nkt}{T}\right) + \sum_{k=1}^{n} \gamma_{2k} Cos\left(\frac{2nkt}{T}\right) \quad (4)$$

In equation (4), n represents the number of frequencies and k an integer frequency. When equation (4) is added to equation (3), the equation (5) emerges. The new equation is as follows:

$$yt = \alpha_0 + \sum_{k=1}^{n} \gamma_{1k} sin\left(\frac{2nkt}{T}\right) + \sum_{k=1}^{n} \gamma_{2k} Cos\left(\frac{2nkt}{T}\right) + \beta_1 y_{t-1} + \ldots\ldots + \beta_{p+d} y_{t-(p+d)} + \varepsilon_t \quad (5)$$

In this study, the Akaike information criterion was used to determine the Fourier frequency and the length of the delays and the k and p values were selected to best fit this criterion. Also, in this study, the Bootstrap distribution of the Wald test statistic was used because the Wald statistics could be dependent on the frequency number and therefore could not follow the asymptotic chi-square distribution.

DATA AND EMPIRICAL RESULTS

Data

This paper aims at testing the causal relationship between the Turkey-PMI index and the Turkish stock, bond and foreign exchange markets. The logarithm of all variables except bond is taken. In this context, in addition to the BIST-100 representing the whole stock market, we use a sector index namely BIST-Manufacturing Industry (BIST-MAN) and its sub-sector indexes such as BIST-Food-Beverage (BIST-FOOD), BIST-Wood-Paper-Printing (BIST-WOOD), BIST-Chemical Petroleum, Plastic, (BIST-CHE), BIST Basic Metal (BIST-BMET), BIST-Metal Products, Machinery (BIST-MET), BIST Non-Metal Mineral Product (BIST-NMET) and BIST-Textile-Leather (BIST-TEX). 2-year Treasury Bond rate (BOND) is used to represent the Turkish bond market and the values of TL in terms of EURO (TL/EUR) and U.S. Dollar (TL/USD) are used to represent the foreign exchange markets in Turkey. PMI data is thrived from trading economics data base and the rest is taken from Finnet and the Electronic Data Delivery System (EDDS) of Central Bank of Turkey. We use monthly data for the period from December 2012 to September 2018. The charts pertaining to the series of our data are given in Fig 5.

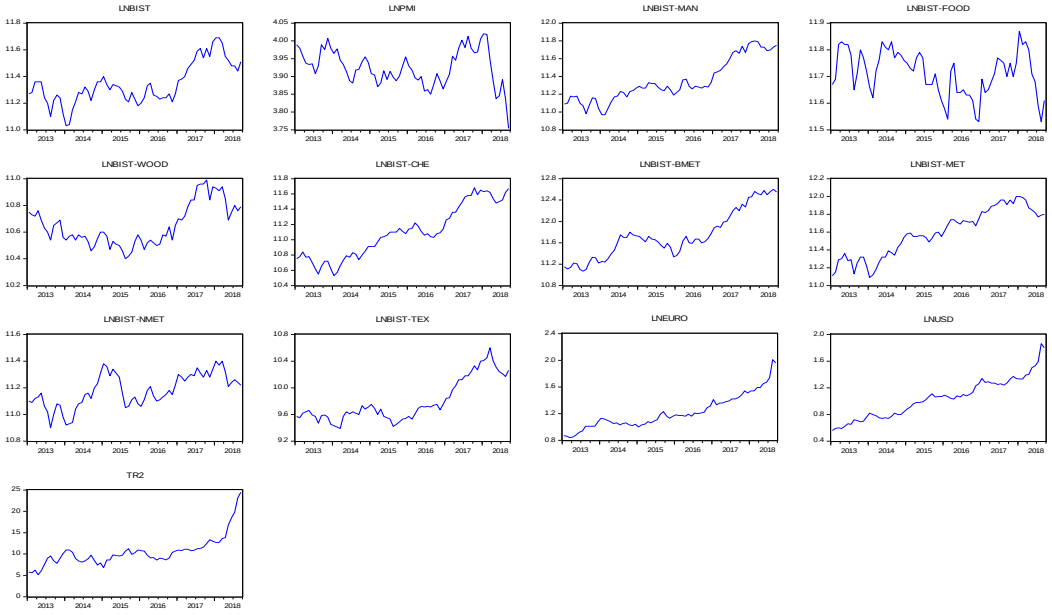


Figure 5. Dynamic of Series

Empirical Results

The results obtained from the ADF, PP and ZA unit root tests are given in Table 1 and Table 2.

Table 1: No Shift Unit Root Tests

	ADF		PP	
	Level	First Difference	Level	
Series	Trend and Intercept	Trend and Intercept	Trend and Intercept	Trend and Intercept
LNPMI	-1.546	-6.392***	-1.546	-6.182***
LNBIST-100	-2.364	-7.000***	-2.356	-6.940***
LNBIST-MAN	-2.190	-7.083***	-2.168	-7.203***
LNBIST-FOOD	-3.357*	-7.774***	-3.357*	-8.180***
LNBIST-WOOD	-2.326	-8.835***	-2.192	-9.016***
LNBIST-CHE	-3.077	-6.673***	-2.664	-6.580***
LNBIST-BMET	-1.615	-7.330***	-1.706272	-7.283***
LNBIST-MET	-2.440	-7.466***	-2.303	-7.687***
LNBIST-NMET	-3.020	-6.665***	-2.594	-6.547***
LNBIST-TEX	-1.826	-8.080***	-1.929	-8.101***
LNEURO	-0.241	-8.988***	0.107	-8.987***
LNUSD	-1.271	-8.310***	-1.482	-8.310***
BOND	1.533	-6.132***	1.533	-6.116***

***, ** and * indicate significance level of 1%, 5% and 10%, respectively.

Table 1 presents the results from the commonly used ADF and PP tests, which do not take into account the structural breaks in our data. Accordingly, the test statistics calculated for the series representing these indices indicate that the series contain unit roots at level values. And so, the null hypothesis could not be rejected. Therefore, the first differences of the series were taken, and the test statistics were re-calculated. The obtained test statistics after the first differences were taken, as an absolute value, larger than the critical values and it was determined that the series were stationary.

Table 2: ZA One Break Unit Root Test

Series	Break in level		Break in level and trend	
	Test Statistics	Break Date	Test Statistics	Break Date
LNPMI	-2.978	2016-11	-3.284	2017-06
LNBIST-100	4.127	2017-01	-5.047*	2016-03
LNBIST-MAN	-3.626	2017-02	-4.760*	2016-06
LNBIST-FOOD	-4.882**	2017-02	-4.760*	2017-03
LNBIST-WOOD	-4.328	2016-10	-3.631	2016-10
LNBIST-CHE	-5.099**	2016-02	-5.454**	2016-03
LNBIST-BMET	-3.504	2015-03	-5.017*	2017-04
LNBIST-MET	-3.188	2014-10	-3.651	2017-10
LNBIST-NMET	-4.475	2016-03	-4.704	2015-05
LNBIST-TEX	-3.495	2017-01	-4.929*	2016-08
LNEURO	-1.884	2018-01	-2.858	2017-07
LNUSD	-2.809	2018-02	-4.148	2017-11
BOND	-2.216	2018-02	-5.133**	2017-11

Critical values were obtained from Zivot and Andrews (1992). Critical values for constant breaks are -5,340, -4,800 and -4,580 respectively on a significance level of 1% and 5%. Whereas critical values for constant and trend brakes are -5,570, -5,080 and -4,820, respectively, on significance level of 1% and 5%. Furthermore, the symbols ***, ** and * indicate the presence of structural brakes on a significance level of 1%, 5% and 10%, respectively.

Table 2 shows the results of the ZA single-break unit root tests whereby the structural break date is determined internally. Accordingly, the results obtained indicate the presence of structural breaks in most of the indices. However, it is noteworthy that the breaks concerning the PMI, TL/EURO and TL/USD indices are insignificant. Since the obtained test statistics are larger than the critical values as an absolute value, the hypothesis that the series become stationary due to the breaks are rejected.

Within the scope of the study, it is necessary to determine the number of integrations between variables as the first step of the empirical part, because in the TY model, the maximum level of integration of the unit root must be known. When all unit root tests are examined, it is seen that the evidence for stationary is strongly supported concerning the first differences of the indices. Findings from fixed and trendy models show that the maximum integration level of the variables is equal to 1 and that VAR (p + d) models can be estimated. Table 3 depicts the results of the causality tests.

Table 3: Causality Test Results from PMI to Financial Markets

PMI=>Financial Markets	Toda Yamamoto		Fourier Toda Yamamoto (Cumulative Frequency)	
	F Statistic	Bootstrap p value	F Statistic	Bootstrap p value
LNPMI => LNBIST-100	1.683	0.206	23.590	0.097
LNPMI => LNBIST-MAN	11.505	0.281	23.366	0.109
LNPMI => LNBIST-FOOD	1.189	0.264	14.317	0.436
LNPMI => LNBIST-WOOD	0.233	0.621	12.964	0.473
LNPMI => LNBIST-CHE	0.677	0.457	16.887	0.294
LNPMI => LNBIST-BMET	1.476	0.220	41.078	0.010
LNPMI => LNBIST-MET	7.297	0.606	20.299	0.199
LNPMI => LNBIST-NMET	1.821	0.178	18.554	0.242
LNPMI => LNBIST-TEX	1.015	0.309	15.488	0.357
LNPMI => LNEURO	5.011	0.078	39.543	0.009
LNPMI => LNUSD	7.657	0.028	55.982	0.005
LNPMI => BOND	1.262	0.269	30.179	0.044

The maximum k and p have been set to 3 and 13 respectively and the ideal k and p values are determined through the Akaike information criterion. The p value is based on the bootstrap distribution repeated 1,000 times.

According to Table 3, as a result of the TY causality test, a unidirectional causality can be seen from Turkey-PMI index to the foreign currencies such as TL/EUR and TL/USD and the bond market; however, no causality relationship is extrapolated in respect to the indices representing the stock market and sub-sectors. According to the Fourier TY causality test results, which structural breaks are handled, a unidirectional causality seems to have appeared from the PMI index towards BIST-100 and BIST-Metal Products, Machinery sub-sector. The reason might be Metal Products consumption is directly related to the economic expansion. The reason might be that both the food and chemistry consumption is not directly related to the economic expansion and recession since they are the vital needs of individuals. So that their stocks might be less sensitive to the changes in PMI numbers.

Table 4: Causality Test Results from Financial Markets to PMI

Financial Markets => PMI	Toda Yamamoto		Fourier Toda Yamamoto (Cumulative Frequency)	
	WALD	Bootstrap p value	WALD	Bootstrap p value
LNBIST-100 => LNPMI	0.033	0.825	10.894	0.620
LNBIST-MAN => LNPMI	4.684	0.845	18.071	0.247
LNBIST-FOOD => LNPMI	0.462	0.478	13.398	0.444
LNBIST-WOOD => LNPMI	1.642	0.240	41.142	0.007
LNBIST-CHE => LNPMI	0.320	0.580	23.958	0.116
LNBIST-BMET => LNPMI	0.045	0.834	16.289	0.302
LNBIST-MET => LNPMI	10.427	0.331	22.605	0.129
LNBIST-NMET => LNPMI	0.217	0.652	5.101	0.959
LNBIST-TEX => LNPMI	0.337	0.544	3.024	0.997
LNEURO => LNPMI	0.305	0.834	20.846	0.169
LNUSD => LNPMI	0.498	0.761	19.797	0.187
BOND => LNPMI	0.447	0.523	31.624	0.037

The maximum k and p have been set to 3 and 13 respectively and the ideal k and p values are determined through the Akaike information criterion. The p value is based on the bootstrap distribution repeated 1,000 times.

The study has also examined whether there is any unidirectional causality this time from the Turkish markets to the PMI. However, the findings are not enough to reach a meaningful conclusion. On the other hand, when we employ the Fourier TY causality test, which takes into account structural breaks, we find out that a unidirectional causality from indices representing wood sub-sectors and the Bond market to the PMI index can be diagnosed.

CONCLUSION

This paper examines the bidirectional causal relationship between the PMI-Manufacturing and financial markets in Turkey including stock, bond and foreign exchange markets to investigate whether the PMI index is a major indicator of the returns in these markets. Our data consists of BIST-100 and BIST-Manufacturing Industry and its sub-sector indices, two-year T-Bond rate, TL/EURO and TL/USD exchange rates for the period from December 2012 to August 2018.

We suppose that the PMI is an important leading indicator, which can be used by investors and regulators in major financial markets. We employ Toda Yamamoto (1995) and Fourier Toda Yamamoto (2016) causality tests and find the existence of unidirectional causality from the PMI to both TL/EURO and TL/ USD. In addition, our findings confirm the existence of a unidirectional causality from PMI to BIST-100 and BIST-Metal Products, Machinery sub-sector, provided that the method, which takes into consideration structural breaks, is used. As a result, we conclude that the PMI is a major leading indicator of foreign exchange, bond and BIST-100 and BIST-Metal Products,

Machinery sub-sector. This paper contributes to the literature for it is the first paper on this issue. Further study might be on testing the spillover effect from the Chinese or the U.S. PMI indexes particularly to the emerging markets, for these two countries hold the highest share of the world trade. The recent trade-war between the U.S. and China may affect Chinese-PMI negatively, which, in return, may cause to negative impact on the whole financial markets throughout the world.

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