ECONOMIC FLUCTUATIONS IN TURKISH TEXTILE AND APPAREL INDUSTRIES, 1992-2011

TÜRK TEKSTİL VE HAZIR GİYİM SANAYİİNDE EKONOMİK DALGALANMALAR, 1992-2011

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ABSTRACT

There exists a large body of literature that deals with socio-economic aspects of textile and apparel industries and their macroeconomic development (such as economic fluctuations). We would like to contribute to the debate by addressing two important questions which adopts a different perspective: First, are textile and apparel industries less stable than other sectors in Turkey? Second, are textile and apparel industries among the leading industries that experience the economic crisis and recoveries before the national economy? Two interesting results emerge from our analysis. First, textile and apparel industries follow a more volatile growth pattern than other industries. Second, textile and apparel industries experience the economic crisis and recoveries approximately 2-9 months earlier than national economy.

Key Words: Economic volatility, Leading industries, Textile and Apparel Sector

ÖZET

Tekstil ve hazır giyim sektörünün sosyal ve ekonomik açıdan incelenmesi alanında birçok akademik çalışmalar yapılmıştır. Bu çalışma iki önemli hususu değişik bir perspektif ile ele almaktadır. Birincisi, bahsi geçen sektörlerin ekonomik dalgalanmalar bakımından diğer sektörlere göre daha istikrarsız olup olmadığıdır. İkincisi ise, tekstil ve hazır giyim sektörünün ülkedeki ekonomik dalgalanmalardan daha önce etkilenen lider ve sürükleyici sektörler arasında olup olmadığıdır. Yaptığımız analizler sonucunda iki önemli bulgu elde edilmiştir. Birincisi, tekstil sektörü diğer sektörlere göre daha istikrarsız olma eğilimindedir. İkincisi, tekstil ve hazır giyim sektörü lider sektörler arasında yer alıp ülkedeki dalgalanmalardan tahmini 2-9 ay önce etkilenmektedir.

Anahtar Kelimeler: Ekonomik istikrarsızlık, Sürükleyici ve lider sektörler, Tekstil ve Hazır Giyim Sektörü

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1. INTRODUCTION

Over the last few decades, textile and apparel industries in Turkey manifest a tendency to cover a large share in total industrial production and employment. Parallel to this tendency, technical advancements in these industries have been thoroughly and heatedly discussed within a growing body of literature. Similarly, much attention has also been devoted to studying the socio-economic aspects of these industries. The studies which have confronted the latter issue have indeed focused on a particular topic which concerns the extent to which textile and apparel industries are competitive in comparison to the other industries and countries. Vast majority of these studies points to the decreasing level of competitiveness of the Turkish textile and apparel industries (1, 2, 9). This is most probably due to the fact that Turkish textile products, although characterized by low price and high quality, tend to compete hardly within the international economic environment due to a strong tendency towards trade and financial liberalization such as the rise of Chinese and Indian economies (1, 2, 9).

Despite growing research interest in the socio-economic aspects of textile and apparel industries and their macroeconomic development (such as economic fluctuations), we would like to contribute to the debate by addressing two important questions which adopts a different perspective:

First, are textile and apparel industries less stable than other industrial sectors in Turkey? In other words, do textile and apparel industries exhibit more volatile economic fluctuations in comparison to the other sectors? If this happens to be the case, it would definitely be an undesirable situation

since volatility creates frequently occurring big economic fluctuations which in turn make suffer majority of the workers and entrepreneurs. In such a case, it would be an appropriate choice for policy makers to devote additional resources (e.g. subsidies, tax exemptions) explicitly targeted to the stabilization of the textile and apparel industries since they are shown to be more volatile than other industries and suffer the crisis more.

Second, are textile and apparel industries among the leading industries that experience the economic crisis and recoveries before the national economy? Although existing literature focused well on this question, less attention has been paid to the following one: How many months earlier do textile industries experience the economic crisis and recoveries before the national economy? This question requires the estimation of business cycles and turning points of these industries that provide useful and precise information on exactly when sectoral crisis and recoveries starts and ends and, hence, how many months textile and apparel industries lead the national economy.

Overall, the aim of this paper is to shed light on these two particular issues. The organization of the paper is as follows: in section 2, we explain our data set and sources. In Section 3, we assess whether textile and apparel industries follow a growth pattern that is more volatile than other industries. Section 4 is devoted to analyzing whether these industries lead the economic fluctuations in Turkish Economy. Finally, in section 5, we conclude our study.

2. DATA SOURCES

Before starting our analysis, it is indeed useful to spent few words on the description of our dataset. We employ Industrial Production Index (IP) (in logs) for the period between 1992:1 and 2011:4 and for the following sectors summarized in Table 1:

The data set has been obtained from TUIK (Turkish Statistical Institute) website. All the time series are created by chaining to each other since TUIK provides data separately before and after 2005. All series are corrected for the seasonality using a multiplicative to ratio moving average technique. All the analysis carried out in this paper has

been implemented using R, EVIEWS 4 and BUSY software packages. The labels written in the parenthesis in Table 1 denote the abbreviations of the corresponding sectors.

Table 1. Classification of the textile and apparel sectors

A) Aggregate Industrial Production
B) Manufacture of Textiles (Textiles) (Classification codes before 2005: 17; after 2005: 13)
C) Spinning, weaving and finishing (Weaving) (Classification codes before 2005: 171; after 2005: 131,132,133)
D) Knitted and crocheted fabrics and articles and manufacture of other textiles (Knitting) (Classification codes before 2005: 172,173; after 2005: 139)
E) Manufacture of wearing apparel, dressing and dyeing for fur (Apparel) (Classification codes before 2005: 18; after 2005: 14)

3. ECONOMIC INSTABILITY IN TEXTILE AND APPAREL INDUSTRIES

This section is devoted to investigating the extent of the economic volatility (instability) in textile and apparel industries compared to the volatility of the aggregate industrial production which represents the weighted average of all industries in Turkey. In order to do so, we adopt two types of methodologies.

First, we graphically demonstrate the growth rates of industrial production indexes for different sectors. Growth pattern of each sector has been compared to the growth rates of the aggregate industrial production index. Figure 1 summarizes the results.

At a glance, we observe that the production in Knitting, Weaving and Apparel sectors follow a growth pattern which is clearly more volatile than the growth pattern of aggregate industrial production. Hence, one may argue that these industries have been characterized by bigger and more frequent economic fluctuations than the aggregate industrial production. The volatility seems to be most pronounced (highest) in knitting sector which is followed respectively by apparel and weaving industries.

Second methodology aims at quantifying the degree of economic volatility in textile and apparel

industries. Following what is commonly done in the literature, we calculate the standard deviation of all series in Figure 1 which in turn give us the degree of the economic volatility in different sectors. Table 2 summarizes the results.
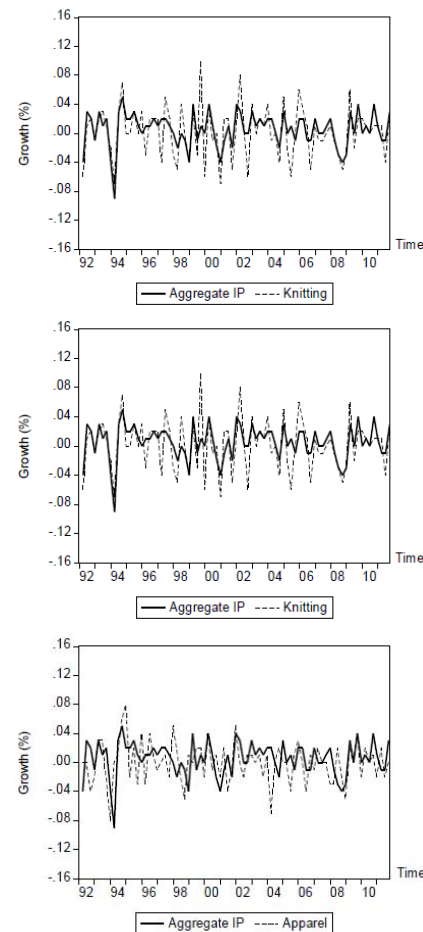

Figure 1. Volatility in textile and apparel industries compared to aggregate IP

We can easily observe that the picture drawn in Table 2 is quite similar to the one drawn in the graphical analysis**.** In both types of analysis, over the entire period, the level of volatility in Knitting (0.05), Apparel (0.04) and Weaving (0.04) industries is clearly more than the level of volatility in the aggregate industrial production (0.02). In order to deepen our analysis, we investigate also the evolution of the volatilities over time and, therefore, divide the period of analysis into two sub-periods stretching from 1992 to 2001 and from 2001 to 2001. In the first period, average level of volatility in textile and apparel industries is 0.06 where it is 0.03 for the aggregate industrial production. In the second period, average level of volatility in textile and

apparel industries becomes 0.03 while it is 0.02 for the aggregate industrial production. Overall an interesting feature appears to emerge from our analysis: textile and apparel industries, in particular knitting sector, are shown to be more volatile than the aggregate industrial production in Turkey. Indeed, the gap in the volatilities increases considerably during the 1990s while it tends to fade away recently.

Table 2. Economic volatility in textile and apparel industries

	Volatility		
Sectors	1992-2011	1992-2001	2001-2011
Aggregate Industrial Production	0.02	0.03	0.02
Knitting	0.05	0.06	0.03
Weaving	0.04	0.05	0.02
Apparel	0.04	0.06	0.02
Average of Textile Industry	0.04	0.06	0.03

4. DO TEXTILE AND APPAREL INDUSTRIES LEAD THE ECONOMIC FLUCTUATIONS?

In this section, we aim at analyzing whether textile and apparel industries (next to other leading industries) lead the economic fluctuations in Turkish economy. In order to do so, we first need to estimate the business cycles for each industry and the turning points within these cycles.

Following what is commonly done in the literature, we adopt a Hodrick-Prescott (HP) filtering in order to estimate the business cycles and long-term trends of each sector (8). Denoting industrial production index at time t with y_t, the HP filter minimizes in τ_t the following expression

$$\min \sum_{t=1}^{T}(y_t - \tau_t)^2 + \lambda \sum_{t=2}^{T-1}\left[(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1})\right]^2 \quad (1)$$

λ is a penalty parameter which indicates the smoothness of the trend, τ_t. The first component of equation (1) represents the deviations of industrial production from the trend while the second component is the product of λ and the sum of the squares of the second differences of the trend component which penalizes variations in the growth rate of the trend. Penalty increases with λ which results in smoother estimates of the trend. We set $\lambda=1600$, as it is recommended by Hodrick and Prescott (1997).

Additional to the estimated business cycles and long-term trends, we should detect the turning points within these cycles. There are two types of turning points: peaks and troughs. Peaks are the dates in which an economic crisis starts and trough is a date in which crisis ends and recovery starts. In order to estimate the turning points within the cycles of each sector, we employ Bry-Boschan (4) algorithm which is designed to detect initially the local minima and maxima in the series and, then, impose restrictions to ensure the duration of the cycles (4). For instance, equations below show an example of local minimum and maximum given a 5-year window length:

$$local\,maximum = \left\{(bc_{t-2}, bc_{t-1}) < bc_t > (bc_{t+2}, bc_{t+1})\right\} \quad (2)$$
$$local\,minimum = \left\{(bc_{t-2}, bc_{t-1}) > bc_t < (bc_{t+2}, bc_{t+1})\right\}$$

where $bc_t = (y_t - \tau_t)$ represents the business cycle. Once local minima and maxima have been estimated, restrictions on the minimum duration are imposed that each cycle, from peak to peak (from trough to trough), has a length of at least 5 quarters and every phase, from peak to trough (from trough to peak) has a length of at least 2 quarters.

As a result, the business cycles for each sector together with the estimated turning points have been depicted in Figure 2 in which the triangles represent the peak/troughs in a specific textile/apparel industry where circles denote the turning points in the aggregate industrial production.

It is clearly observed that in Figures 2.a, 2.b and 2.c textile production, weaving and knitting sectors experience (most of the time) the peaks and troughs no later than the national industrial production. Therefore, one may argue that these industries are among the sectors that manifest a tendency to lead the economic fluctuations, namely economic crisis and recoveries, in Turkish economy. Furthermore, referring to Figure 2.d, we observe that apparel industry also exhibit a leading pattern with respect to the national industrial production.

In the light of these results, it should be emphasized that textile and apparel industries are among the leading sectors in Turkey that might be used as an early warning indicator since

these industries experience earlier the economic shocks which are spilled over to the other industries as a wave that sweeps along the nation. However, we should bear in mind that among other factors textile industry might be understood as only one of the factors that lead the economic fluctuations in Turkish economy.
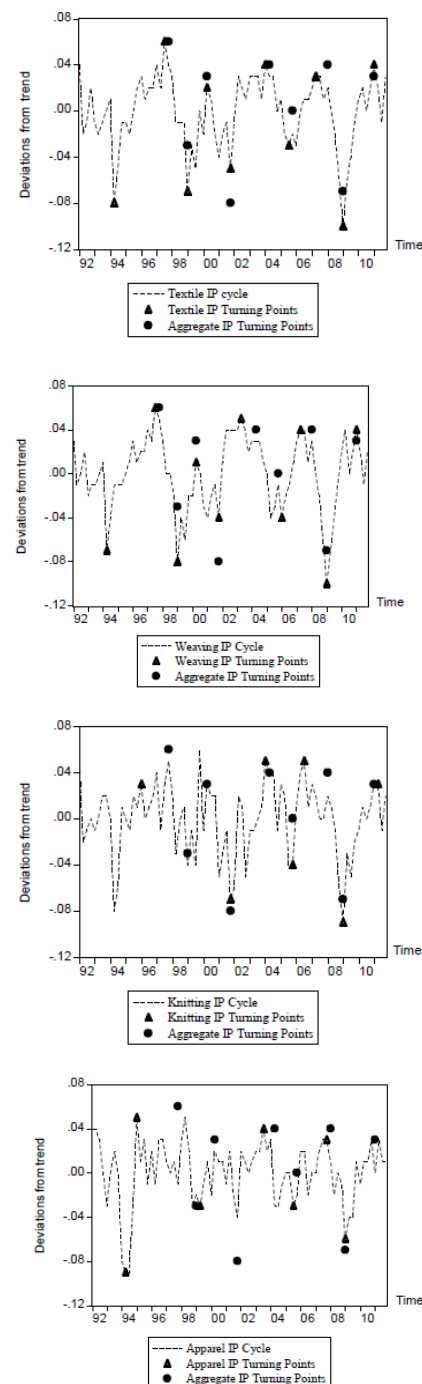

Figure 2. Estimated Turning points and business cycles

In order to quantify the number of months that weaving, knitting and apparel industries lead the aggregate

industrial production, we compute the magnitude of these leads/lags and summarize the results in Table 3 from which it is immediate to note that weaving industry leads the national industrial production by 0.78 quarters which corresponds approximately to 2 months, knitting industry leads by 1.86 quarters (5 months) and apparel industry leads by 2.5 quarters (8-9 months). In other words, these industries experience the economic crisis and recoveries some months earlier than lagging sectors in Turkish industrial production.

Table 3. Leads/lags of textile and apparel industries with respect to the aggregate IP

	Peak Q4-1997	Trough Q1-1999	Peak Q2-2000	Trough Q4-2001	Peak Q2-2004	Trough Q4-2005	Peak Q1-2008	Trough Q1-2009	Peak Q1-2011	Average Lead/Lag
Textile	-1	0	0	0	-1	-1	-3	0	0	-0,67
Weaving	-1	0	0	0	-4	1	-3	0	0	-0,78
Knitting	-7	-	-	0	-1	0	-6	0	1	-1,86
Apparel	-11	1	-	-	-3	-1	-1	0	-	-2,50

Note: Negative (positive) values indicate a lead (lag) with respect to the aggregate IP.

Finally, the economic reasons why textile and apparel industries should lead the economic fluctuations might be explained by few economic facts put forward in the literature. Among others, one of the most plausible explanations is the sensitivity of these industries to the changes in monetary policy, namely the interest rate, and to the changes in technological developments and innovations (3, 5-7, 10, 11). Consequently, as any change occurs in monetary policy or technological developments, textile industries react quickly and start experiencing the economic recoveries or crisis earlier than national economy.

Another important explanation is that during 2000s, we frequently observe global shocks (rather than local shocks) which are spilled over to Turkey via international trade and financial linkages. Since textile and apparel industries are two of the most internationally open sectors in Turkey which export approximately 55-60 % of its products, the result that these industries are affected earlier in the country from global shocks is not a surprising result.

5. CONCLUSIONS

In this paper, we investigated the economic fluctuations in Turkish textile and apparel industries. Initially, we had an attempt to analyze the extent to which textile and apparel industries exhibit a more volatile (instable) growth pattern in comparison to the other industries. Then we analyzed whether textile and apparel industries tend to lead the economic fluctuations in the aggregate industrial production. Our results can be summarized in two groups.

First, regarding the volatility of the sectors, Turkish textile and apparel industries, in particular "knitted and crocheted fabrics and articles" are shown to follow a growth pattern which is clearly more volatile than other industries. Second, textile and apparel industries are among the leading industries that experience the economic crisis and recoveries before the national economy. So that textile industry might be understood as one of the factors that lead the economic fluctuations in Turkish economy.

The reasons why we get these results could be explained in two parts. First, textile industries are sensitive to the changes in monetary policy and technological developments, second, since these industries are internationally more open, both via trade and financial linkages, it is not surprising that these industries are affected earlier from global shocks which are frequently observed during 2000s.

With regard to the economic policies, two important implications appear to emerge from our analysis. First, it would clearly be an appropriate choice for policy makers to devote more resources explicitly targeted to stabilization of the textile and apparel industries since they are shown to be more volatile than other sectors. Second, policy makers may consider the fluctuations in textile and apparel industries as an early warning system (also other leading industries), since these industries tend to experience economic shocks earlier than other industries.

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