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Regional Deindustrialization in Turkey

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Abstract

Historical evolution of industrial economic activity has been central to economic policy in developing economies. An emerging line of literature discussed that, tendency for falling manufacturing based industrial economic activity can signal a problem for developing countries. Evidence shows that developing countries' growth rates fall below their potential growth and unemployment rates strikes to relatively high levels if deindustrialization pattern is premature and early unlike the experiences observed for advanced countries. Given continuous structural change and sizable regional disparities in Turkey, we examine the regional dimension and discuss the influence of regional deindustrialization for convergence of Turkish regions. Our analyses from conditional Markov Chain analyses show that manufacturing employment influences regional income distribution, as chances to move to higher income classes is conditional on the extent of regional manufacturing employment. These results show that geographical distribution of (de)industrialization is non-random in Turkey, rather a historical choice of economic policy.

Keywords: convergence, deindustrialization, Markov Chains, Turkey

JEL Classification: R11, R12, R13

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1. Introduction

Impact of industrial production has been central to economic policy for developing countries. In a Kaldorian setting, industrial production and specifically manufacturing production is an essential element for employment creation and economic performance (Kaldor, 1966). That said, historically industrial development does not have a uniform pattern across the developed and developing countries. In the case of advanced countries, evidence show that there tends to be a structural shift from manufacturing industrial production towards service oriented production after a certain income level. Individual services, ICT based economic activities start to be a dominant element of economic activity among the developed industrial countries. Dasgupta and Singh (2007) underline that, this shift from manufacturing based production towards service based production is an inevitable structural process for developed countries and does not necessarily imply a negative development.

On the contrary, the fall observed in manufacturing production for developing countries does not match with the structural developments observed among advanced countries. One line of discussion underline that, manufacturing industry starts to realize a shrink at a relatively lower income level for developing countries. This process is labeled as premature deindustrialization (early deindustrialization), which is linked with rising global integration and inevitable financialization observed in developing countries (Rodrik, 2016). Dasgupta and Singh (2007) point out that, deindustrialization process observed among the developing countries is different compared to developed world. In general, deindustrialization harms the domestic economy if the observed fall in manufacturing employment and production is associated with fall in economic growth below the potential, rise in unemployment, slow-down in job creation and decrease in the level of economic activity.

While impact of deindustrialization for developing nations receives increasing interest, a neglected dimension is the regional patterns of deindustrialization. However, our knowledge for developing countries remind us that economic activity has a non-uniform spatial pattern within developing economies. Inevitably, regional disparities will have effect on the location choice of the industrial economic activity. For instance, Krugman (1999) discusses that locations have centripetal and centrifugal factors that forms the overall geographical pattern of economic activity. These discussions can be better evaluated by referring to the agglomeration of economic activities. Fujita and Thisse (2002) explore the determinants of location selection and agglomeration of industrial production. Eventually, the supply-demand side factors create an endogenous feedback between formation of industrial regions and regional development.

Originating from these discussions, this study aims to examine the deindustrialization experience of Turkey, by focusing on its influence on regional disparities. It is notable to highlight that influence of deindustrialization pattern on spatial concentration of industrial economic activity is mostly a neglected issue for developing countries. Turkey is not an exception. Therefore, our central objective will be to test the impact of regional deindustrialization on the regional income differences in Turkey. Our central hypothesis is that lower level of manufacturing based activities and decreasing industrial trends will have negative influence on local economies, which could be traced over income mobility of regions.

Section 2 overviews the related literature. Section 3 explores the historical path of industrial economic activity in Turkey by considering the national dimensions. Section 4 introduces the data and the research methodology, Section 5 includes the empirical results and finally Section 6 concludes the paper.

2. Theoretical Background

Debates on the timing of structural change in production left its place to a consensus that industrial production starts to lose its dominance in national economies (Rodrik, 2016). However, existence of the early slowdown in industrialization brings enormous consequences for developing countries. Inevitable mismatch between timing of industrial contraction in developed and developing countries is an important dimension of the so-called nexus between development and structural change in production.

Bluestone (1984) argues that the inevitable deindustrialization of certain industries and regions. In general, even for developed core industrial countries falling manufacturing based economic activities coincides with rising inequalities across different segments of the society. However, literature dominated by developed countries cluster around a consensus that deindustrialization is an integral part of the structural change observed in developed countries.

In a cross-country study, Rowthorn and Ramaswamy (1999) highlight that trade and change in consumer demand which matches with changing productivity of manufacturing employment is one cause behind the observed deindustrialization patterns across the geographies. Alderson (1999) investigated the OECD countries and conclude that rising integration and trade is associated with the falling manufacturing based economic activities across the OECD member countries. In a recent study Kucera and Milberg (2003) formulated the same argument by suggesting that North-South trade ends up with falling manufacturing employment for OECD countries. Brady and Denniston (2006) argue that globalization and rising integration has mixed effects for industrial development and welfare gains of a set of selected countries. Interestingly, even developed and developing countries have sizable fundamental differences decreasing manufacturing dominance in developing countries are discussed in the same fashion. The policy oriented deindustrialization in specifically Latin American countries is discussed as a true cause behind the failure of the region. The so-called policy choice of East Asian countries in order to stick with industrial development is the backbone of the miraculous growth sustained among the region countries.

On regional and urban level, prior evidence also suggests that timing of deindustrialization and policy responses to the changing nature of production is regionally dissimilar (Koritz, 1991). Recently Doussard et al. (2009) underline that developed regions which act as old industrial regions of their territory is inevitably influenced from the structural change in production. Resulting income inequalities as well as social distortions are important aspects which are possibly observed after deindustrialization.

Interestingly regional dimension of deindustrialization is not investigated in details. Considering Turkey as a developing country suffering from persistent regional inequalities, there are some attempts to examine how regional path of industrialization can be understood in terms of industrial policies. On the spatial dimension, even we have less knowledge on the path of industrial development, findings mostly point out the contradiction between nationwide economic policies and regional priorities of industrial development. Doğruel and Doğruel (2006, 2011) explored the impact of post 1980 liberalization on industrial production potential of Turkish regions and highlight the negative consequences of openness and rising privatization on manufacturing production. Rise of neo-liberal policies in favor of liberalized

trade and more market oriented production structure in domestic markets play an extractive role in the development of domestic industrial production.

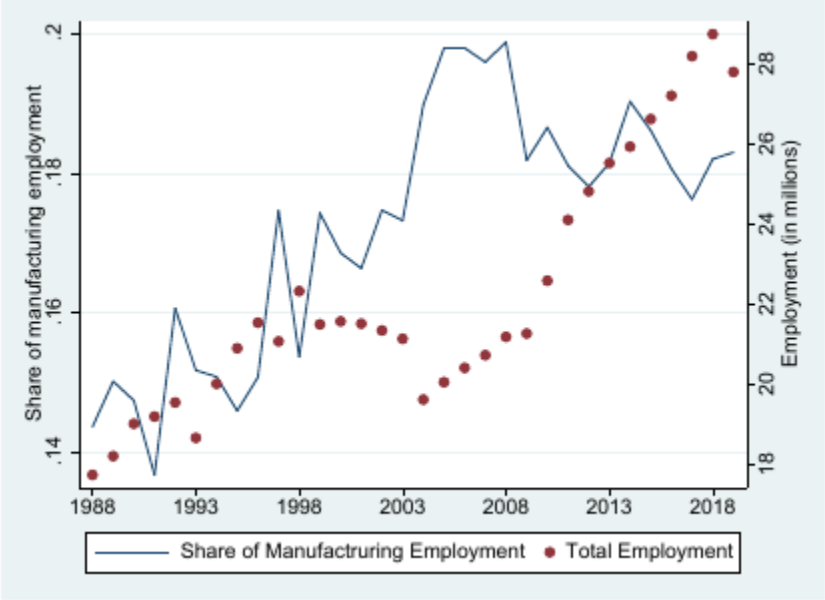
Doğruel (2013) makes a historical discussion on the path of industrial regions and underline the dominance of old industrial areas despite the detected decrease in their industrial production. In recent attempts, Doğruel and Doğruel (2018) discuss that observed historical pattern in some certain old industrial areas is basically a policy choice rather than an inevitable structural change at regional level. On another note, Meçik and Aytun (2018) use individual firm level data and underline that there is spatial reshuffling among the old and new industrial zones after 2000s. An interesting dimension of regional path of industrial development is the persistence of regional duality among the developed west and underdeveloped east geographies. Karahasan (2015) and Karahasan et al. (2016) underline that despite the changing nature of industrial development at country level, regional dimension of industrial development is extremely persistent and geographically dual.

Even though all these discussions give an overall view on the regional re-shuffling of industrial economic activities, there is lack of detailed analysis of the consequences of industrialization pattern for local labor markets and spatial economies. Within this study, we aim to examine the regional re-shuffling of manufacturing employment and its inevitable impact on the spatial inequalities among Turkish regions. We discuss that more effort is required in order to understand how national and regional trends in structural change influences overall economic performance of Turkish regions. Therefore, we form our central hypothesis as follows: Regions that are historically less industrialized and that are getting through a period of fall in industrialization have lower chances to move upwards within the regional income distribution.

3. Deindustrialization Trends in Turkey

An important aspect of the falling contribution of manufacturing production can be traced over employment patterns. Figure 1 shows the path from 1988 to 2018. There is continuous acceleration in employment creation mainly after 2000s, however this does not coincidence with the contribution of manufacturing employment. In general share of manufacture employment witness some improvement until the beginning of 2000s. However, the path is observed to be relatively flat after 2000s. Note that, we have limited knowledge on the technological composition of manufacturing production. Still our knowledge signals out that expected technological improvement has not been sustained during this period of industrial re-shuffling. Above all these discussions, evidence indicates that manufacturing employment starts to lose their dominance after the 2000s at country level.

Figure 1. Manufacturing Employment in Turkey



Source: TurkStat, Author's own calculations

In order to have a comprehensive view on the path of manufacturing production, an international comparison is useful. This will enable us to compare and contrast the Turkish experience with the other examples. Comparative figures for manufacturing industry at country level can be obtained from World Development Indicators. We focus on the 1960-2018 period. First in Table 1, we follow the historical evolution of manufacturing industry for selected developing countries. While developing countries in Europe and Central Asia realize a relatively flat path throughout the sample period, East Asian & Pacific countries realize substantial increase in the contribution of manufacturing production. Meanwhile, Latin American countries (specifically Argentina and Brazil) realize drastic fall in manufacturing production's contribution to total output. Finally, for the selected MENA countries, figures underline again a relatively flat pattern for the share of manufacturing production in GDP.

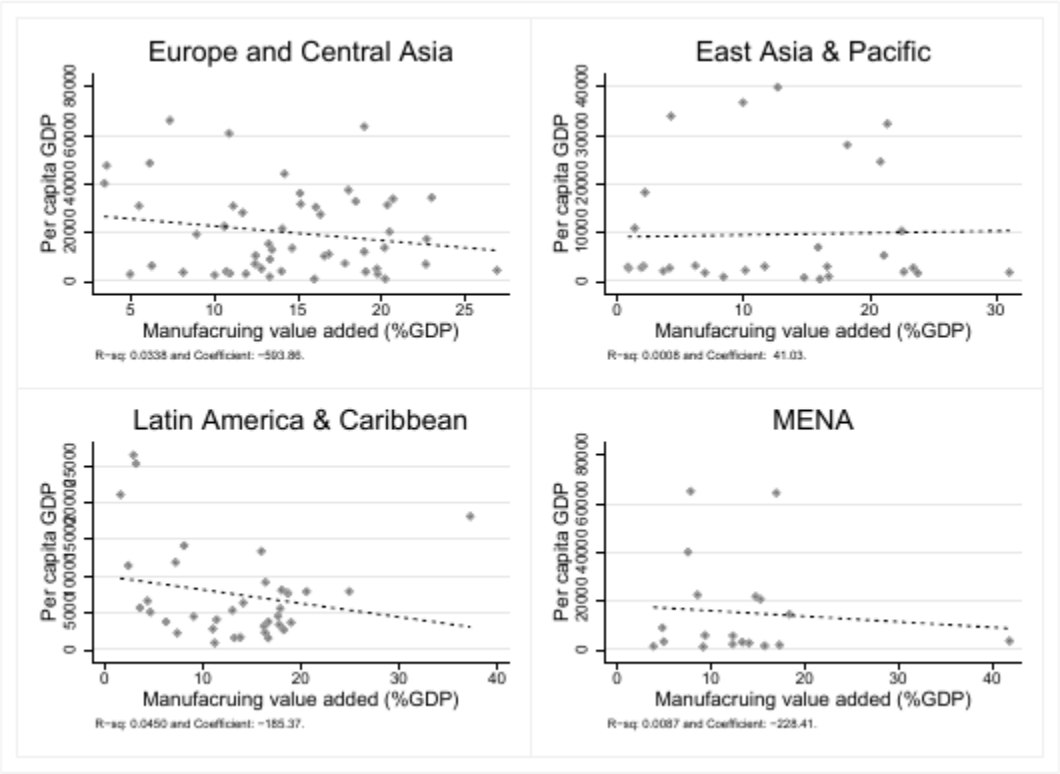
A final exercise of this sub-section, is to compare cross country variation in manufacturing output's contribution with the overall economic output. We first plot the country groups separately (Figure 2). Findings highlight that other than the East Asian & Pacific region there is either a negative association or lack of connection between manufacturing output and GDP. Next, we aggregate all regions and do a global comparison (Figure 3). Once again there tends to be limited link between manufacturing based economic activities and nation based economic prosperity. Within this overall distribution Turkey locates as a semi-industrial country with mid-up per capital income during the 1960-2018 period.

Table 1. Cross Country Comparison of Manufacturing Value Added (% GDP)

	1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	2010-2018
Central and Eastern Europe						
Turkey	14.33	17.18	20.37	21.37	16.80	16.71
Romania	na	na	na	25.11	21.38	21.10
Poland	na	na	na	17.66	15.88	16.59
Hungary	na	na	na	19.10	18.64	19.26
Czech Republic	na	na	na	22.41	22.64	23.05
Bulgaria	na	na	na	11.15	12.96	13.59
East Asia & Pacific						
China	na	na	na	na	32.03	30.40
Indonesia	na	na	16.88	23.50	27.26	20.99
Japan	na	na	na	23.11	21.26	20.20
Korea, Rep.	14.77	19.98	24.01	24.71	25.47	27.65
Malaysia	11.05	18.14	20.99	27.40	27.53	22.75
Philippines	24.25	25.72	25.01	23.71	23.49	20.26
Thailand	14.31	19.21	23.67	27.18	29.73	28.10
Vietnam	na	na	18.45	15.53	18.79	13.93
Latin America & Caribbean						
Argentina	37.40	34.75	29.12	19.40	17.78	14.44
Brazil	24.58	26.50	29.76	16.68	13.72	10.83
Chile	23.78	23.66	19.88	17.92	14.30	10.98
Mexico	19.72	21.23	19.18	19.10	16.58	16.37
Venezuela, RB	16.86	17.79	16.88	15.74	15.11	11.78
MENA						
Egypt, Arab Rep.	na	14.42	14.34	16.59	16.69	16.41
Iran, Islamic Rep.	10.85	9.96	10.37	15.92	14.67	12.90
Israel	na	na	na	16.31	15.22	13.29

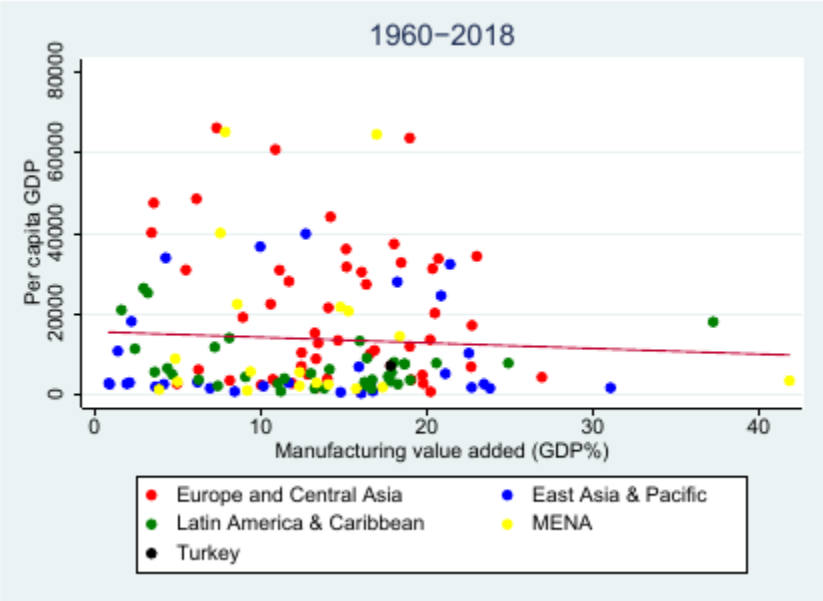
Source: World Bank

Figure 2. Regional Manufacturing Value Added and Per Capita GDP (USD at constant prices)



Source: World Bank

Figure 3. Global Manufacturing Value Added and Per Capita GDP (USD at constant Prices): 1960-2018



Source: World Bank

4. Data and Methodology

Based on data availabilities, we consider NUTS II level regions for NUTS (Nomenclature of Territorial Units for Statistics) classification for Turkey. In order to understand the extent of deindustrialization we focus on manufacturing employment. Even though manufacturing value added is supplied for the pre 2000s, we lack in reliable value added data for manufacturing production at any regional disaggregation level after 2000s. Data set covers 1980-2015 period. For the 1980-2000 we use the Annual Manufacturing Survey conducted at NUTS III level. For 2004 to 2015 we use Household Labor Statistics that covers major lines of economic activities (Manufacturing, Services, Agriculture) at NUTS II level. For comparability issues, we aggregate the NUTS III regions into NUTS II level for the former data set. Information on manufacturing industry (employment etc.) is not supplied for the years 2002 and 2005. Note that, there is also a change in coverage of manufacturing industry. Results should be evaluated under these limitations.

In order to examine how regions perform during a period of deindustrialization at national level as well as rising disparities at local level, we consider regional distribution of per capita GDP. Considering per capita GDP, it is possible to obtain data at NUTS III level. However historical data for regional GDP comes from different sources (For 1975-1987 from Özötün (1980, 1988), for 1987-2001 and for 2004-2017 from different data sets of TurkStat.) Major concern is the use of different base years and different GDP methodologies throughout the sample period. Within this study we follow the harmonization methodology offered in Karahasan and Bilgel (2018) and construct a historical harmonized regional GDP series for the 1980-2015 period. Note that, it is possible to have data for 1975-2017. However, in order to make historical GDP series comparable with manufacturing employment data we need to change to time

intervals. Since, manufacturing employment is only available at NUTS II level (for 1980-2015 as a whole), we aggregate our NUTS III regions and obtain regional per capita GDP at NUTS II level.

We aim to examine whether analytically industrial policies have any influence on the regional dimension of disparities. We consider the distributional dynamics approach as offered by Quah (1996). Applying the traditional Markov Chain Analysis, it is possible to observe the evolution of disparities from a historical and temporal perspective. The idea is to construct a transition probability matrix, which measures the chances to move towards different development states within an overall distribution.

Consider distribution of a variable across a set of cross-sections at time *t*. This pattern will evolve by the law of moment where evolution of the income distribution is explained by a transition matrix that embeds information on the mobility within the regional income distribution. In other words, the transition probability matrix maps one distribution to the other. This process is a first order auto regression where values are represented by numerous distributions. This income distribution should be used to predict the future long run ergodic income distribution. Observed in sample properties of the distribution are used to predict the evolution of the steady state distribution. Quah (1996) reveals that steady state distribution can present bimodality rather than a homogeneous pattern.

While the traditional Markov Chain analyses are informative in order to understand the mobility and transition within a distribution, they can be developed further. Among different alternatives, applying condition(s) to Markov Chain analyses is informative both in methodology as well as policy terms. In our empirical analyses we aim at considering a unique conditioning procedure, which we believe enables us to examine the historical well-being path of regions which is conditioned by the level of their industrial economic activities. This method uses deindustrialization as a condition for moving within the regional distribution of the certain development measures. The conditioning procedures is handled by defining a threshold at the beginning of the sample. This threshold is the median of the distribution. Additional transition probability analyses are carried out for those regions that are below and above the threshold manufacturing employment. This conditioning procedure aims at understanding whether memory of the industrial production within a region has any sort of influence on the transition probability of the regions within the regional income distribution.

5. Findings

In order to assess the impact of manufacturing employment on regional development we first apply the traditional Markov Chain Analysis. Note that for per capita GDP, transition classes are based on fixed thresholds that leave equal share of regions in each class at the beginning of the sample period.

Results from unconditional analyses conducted for per capita GDP (Table 2) show sizable stability which is visible from the diagonal element of the transition probability matrix. Polarization is high for regions that cluster in the poorest (1-1) and richest (5-5) income groups. For mid income groups there tends to be higher mobility chances. That said, chances of mobility to a higher income level is only visible for the second income group (16 percent upward and 8 percent downward mobility chances). For the remaining groups (3 and 4) net mobility is downward, indicating that mid and mid-high income regions have higher tendency to move to a lower income class during the sample period.

Table 2. Baseline Markov Chain Analysis

	Panel A: Per capita GDP (unconditional)				
	1	2	3	4	5
1	0.92	0.07	0.01	0.00	0.00
2	0.08	0.75	0.16	0.00	0.00
3	0.00	0.08	0.89	0.03	0.00
4	0.00	0.01	0.06	0.88	0.06
5	0.00	0.00	0.01	0.08	0.92

Once conditional analyses are considered we realize that manufacturing employment memory (having higher manufacturing employment in 1980) increases the chances to move upwards within the income distribution (Table 3). While the first and second income groups have upward probabilities of 6 and 14 percent for low manufacturing memory, same probabilities jump to 57 and 19 percent respectively if those regions have higher manufacturing employment in 1980. Similarly, these regions with lower manufacturing employment memory fail to catch up with wealthier ones, rather have more tendency to move towards lower income groups during the whole sample period.

Table 3. Conditional Markov Chain Analysis (A)

	Panel A: Per capita GDP (condtional: low manufactruing)						Panel B: Per capita GDP (condtional: high manufactruing)				
	1	2	3	4	5		1	2	3	4	5
1	0.95	0.05	0.01	0.00	0.00	1	0.43	0.57	0.00	0.00	0.00
2	0.10	0.76	0.14	0.00	0.00	2	0.06	0.75	0.19	0.00	0.00
3	0.00	0.07	0.91	0.02	0.00	3	0.00	0.10	0.85	0.04	0.00
4	0.00	0.01	0.04	0.91	0.04	4	0.00	0.00	0.08	0.84	0.08
5	0.00	0.00	0.03	0.10	0.87	5	0.00	0.00	0.00	0.07	0.93

While memory of manufacturing employment acts a sound battery in order to understand the production fundamentals of a region, change in the manufacturing employment can also be considered as a tool to asses the extent of deindustrialization. We simply calculate the difference between manufacturing employment share for the beginning and ending years of our sample. We re-run the conditional Markov Chain analyses and supply the results in Table 4. Results show that for those set of regions with lower increase (or falling) in manufacturing employment (stagnant manufacturing) chances to move upwards within the regional income distribution is lower on average. On the contrary, those regions with accelerating manufacturing employment chances to move upwards within the distribution is higher on average.

Table 4. Conditional Markov Chain Analysis (B)

Panel A: Per capita GDP											
	Conditional: stagnant manufacturing						Conditional: accelerating manufacturing				
	1	2	3	4	5		1	2	3	4	5
1	0.96	0.04	0.00	0.00	0.00	1	0.29	0.57	0.14	0.00	0.00
2	0.04	0.74	0.22	0.00	0.00	2	0.09	0.79	0.11	0.00	0.00
3	0.00	0.11	0.88	0.01	0.00	3	0.00	0.05	0.90	0.06	0.00
4	0.00	0.02	0.03	0.94	0.02	4	0.00	0.00	0.07	0.85	0.08
5	0.00	0.00	0.01	0.04	0.94	5	0.00	0.00	0.00	0.10	0.90

6. Conclusion

Based on transition probability within the regional income distribution our results underline sizable stability remarking the inertia of regional development. This matches with our existing findings on the roots and path of regional income convergence in Turkey. Our second attempt is to use deindustrialization or in another way path of industrial development as a condition for understanding regional disparities. Findings highlight that regional path of industrialization is a vital socio-economic concern for the Turkish regions. Those regions with low manufacturing employment as well as declining manufacturing potential are the ones that are trapped in underdevelopment and poverty struggle in Turkey. A careful interpretation highlights that; restructuring waves of the 1980s and 2000s have sizable influence on the regional dimension of industrial development and inevitably on the so-called link between industrial and regional development.

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