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THE SPATIAL DISTRIBUTION OF NEW FIRMS: CAN PERIPHERAL AREAS ESCAPE FROM THE CURSE OF REMOTENESS?

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Biographical Note

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Abstract

Among various factors affecting the new firms' location decision local demand and supply based linkages has been widely discussed. Even local centripetal forces are important, locations can also benefit from the possible externalities by being in a close proximity to the economic centers. Originating from such a discussion this paper aims to scrutinize the impact of remoteness on the new firms' location decisions in Turkey. Results obtained from provincial data confirm that remoteness matters: peripheral provinces in Turkey are suffering from low levels of new firm formation unlike the provinces with higher market potential and that are closer to economic centers. These results signal the necessity to consider the physical and non-physical networks between regions and the center throughout the regional policy development in a developing economy on her transition path to the European Union.

Keywords: Distance, Market potential, New firms, Turkey
JEL Classification:O18, R11, R12

1. Introduction

Location choice has already been in the agenda of von Thünen (1826) and Marshall (1920) decades ago. Urban and regional economists question the decision for the right location to start operating by originating from the tradeoff between transportation and rental costs. In the meantime additional factors explaining how industrial districts evolve enters the realm of not only the regional and urban economists but also the recent advances in New Economic Geography (NEG). Krugman (1991) underlines that economic activity tends to concentrate towards certain locations offering various externalities for the firms. While there are different ways to identify location choice, new firm formation is widely used to analyze the geographical dispersion of location preferences. These new comers represents the view of Schumpeter (1912) underlining the innovative and destructive role of entrepreneurial capabilities. Recently Reynolds (1994); Armington and Acs(2002), underline that new comers are crucial for regional economic growth. In deed Storey (1991) underlined that new firms are valuable as they have employment creation probabilities higher than the potential of the incumbents. In addition to this job creation potential, knowledge transmission capability of the new comers is also worth mentioning. Acs and Varga (2002 and 2005) demonstrate that existence of new firms helps understanding the transmission of the gross knowledge into economic knowledge (*"new firms are catalysts").*

The prominent role of new firms shifts the attention towards the factors that are affecting their distribution. Krugman (1991) revisits Marshall (1920) and underlines that local demand, local externalities, development of a pooled labor market and spillover of knowledge are the basic sources for new firms' creation process. There will be a number of demand side and supply side factors that will evolve and act as centripetal and centrifugal factors shaping the decision of the new firms. Even though these mechanisms are frequently questioned, in most cases possible role that could be attributed to geography and remoteness is neglected. It is first Fritsch and Flack (2003), Cheng and Li (2011a), Ghani et al. (2014) to use the concepts of geography and spatial effects in a setting that questions the location choice of new firms. Evidence confirms that both geography and the spatial effects have explanatory power for understanding the location decisions of the new firms. This puts forward the importance of the spillover mechanisms in explaining the diffusion of the centripetal and centrifugal forces through space.

In this sense, this paper seeks to examine whether being close to the market affects the location choice of the new firms' decision in Turkey. This is similar to what Krugman (1991) mentions by the local pull effects, yet will be complementary as it will not only consider the demand and supply based linkages of a region but also takes into account the surrounding. Remoteness to the market is controlled by first looking at the direct distance to economic activity

centers, next by the market potential computed at the regional basis. The inclusion of distance and market potential is an expected contribution to the new firm literature. Moreover a second noteworthy assumed role of the paper is applying such a framework that helps to examine a developing economy Turkey, on her transition path to European Union (EU). Given that current line of negotiations between EU and Turkey works over the Regional Policy and the Coordination of Structural Funds dealing with different dimensions of regional inequalities and policy making in Turkey is worth examining.

This paper is organized as follows: Section two will briefly discuss the theory of new firms. Next, section 3 intends to give information about the regional development of Turkey together with its link with the new firms' location choice. Fourth section is going to explain the way that new firms can be linked with various measures of remoteness. Defining remoteness and geography will be an important aim of this section as well. Once remoteness is defined, an analytical framework will be offered by using a number of different specifications dealing with issues such as; spatial dependence, sectoral differences and endogeneity biases. The paper will end with a conclusion.

2. Theory of new firm formation

The presence of new firms is important from a variety of points. Fritsch and Mueller (2004) and Fritsch (2008) underline a number of supply side effects that new firms have on regional development: increasing productivity, acceleration of structural change, increasing innovation and increasing variety of output. This has been well documented in van Stel and Suddle (2008) which underlined that most of these mechanisms work depending on the industrial and regional characteristics. Wennekers and Thurik (1999) and more recently Cheng and Li (2011b) also mentioned that new firms should be regarded as entrepreneurs that raise competitiveness and in turn enhance economic growth. While these properties of new firms are crucial, the knowledge spillover theory focuses on the positive impact of new firms over their unique role on the knowledge transformation. The renovation of the existing knowledge to an economically active one is the central role played by the new comers (Acs and Varga, 2002; Acs et al., 2009a and 2009b). Moreover new comers are also going to influence the incumbent firms; rising competition with entry motivates the existing firms to invest more on research and development, stimulating productivity and economic growth (Audretsch et al., 2006).

Given the importance of the new firms for economic growth, investigating the factors that affect their formation becomes even more prominent. As discussed by Krugman (1991) and Storey (1994), location base properties such as regional demand, human capital development, financial development, local subsidies, public policy, firm size, industrial spillovers, unemployment,

structure of the employment and skill-creativity level of labor force have influence on the new firms' location choice.[1] Motivated form these discussions Audretsch et al. (2010) and Neibuhr (2010) also put forward the importance of diversity and the heterogeneity of the population; both remarking that diversity of the population and knowledge transmission are interrelated. Central argument is that: locations with higher diversity are expected to be more open to new firm formation.

Even though these factors are able to explain the reasons behind new firm formation to some extent, they can also be augmented with the inclusion of the role of geography. Within its own context geography can be defined by using distance and spatial spillovers. Inevitably the role of geography will come from separate channels: supply and demand based. For the supply based channel the mechanism works over knowledge transformation and innovation. For instance Audretsch and Stephan (1996) and Anselin et al. (1997) discuss that geography may play an important role while explaining the regional heterogeneity of the knowledge transmission process. Factors stimulating or repressing knowledge and innovation may have location specific patterns, which calls for the identification of the spatial spillovers. Meanwhile Boschma (2005) documents the relationship between proximity and innovation. Among different proximity measures geographical proximity seems to act as an important barrier against the spillover and transfer of knowledge. While spatial links and distance have explanatory power over the supply based channels, they will also matter from a mixture of supply and demand based channels. As conceptualized by Harris (1954) and later applied by Krugman (1991), Redding and Schott (2003) and Redding and Venables (2004), distance in the form of a melting ice-berg enters to the NEG model for explaining the market potential and factor price dispersion. The proposed mechanism underlines that firms with higher market potential are going to face with lower transportation costs, more access to demand and supply bases and thus will have higher opportunity as to generate profit and distribute to the different factors of production.[2] Within the profit maximization problem of the firms, while income has a positive influence on the revenue and profit levels, distance is going to play a negative role. This is not surprising, thus should be regarded as a motive for the new comers

[1] See Fritsch (1992), Davidson et al. (1994), Keeble and Walker (1994), Hart and Gudgin (1994), Garofoli (1994), Reynolds (1994), Guesnier (1994), Reynolds et al. (1994), Johnson and Parker (1996), Kangasharju (2000), Berglund and Branas (2001), Fritschand Falck (2003), Grilo and Thurik (2004), Lee et al. (2004), Sutaria and Hicks (2004), Bosma et al. (2006), Cheng and Li (2011a) for different case studies.

[2]The so called market potential index is also referred as market access. Redding and Schott (2003) underlined that while it is market access to control for the demand base, supply access will be preferred to evaluate the impact of locating close to the suppliers. Yet given the high correlation between market access and supply access, only market access (or potential) variable is considered. Throughout the study the same reasoning will be followed and the demand and supply based linkages will be controlled by the market potential.

to minimize the distance to the center as much as possible while selecting the first location of the start-up.

3. Regional inequalities and new firm formation in Turkey

Having its roots from the early ages of the republic, with the start of the liberalization era of 1980s the overall inequality problem turns out to be one of the most remarking social and economic concerns of Turkey. Even though this regional inequality issue enters the agenda of the national development plans conducted before and after the 1980s, implementations are insufficient to improve the conditions of the less developed regions (Doğruel, 2006). Filiztekin (1998), Doğruel and Doğruel (2003), Karaca (2004), Gezici and Hewings (2004 and 2007), Yıldırım and Öcal (2006), Kılıçaslan ve Özatağan (2007) remark limited signs of convergence which is still unsuccessful to close the gap between developed western and the underdeveloped eastern provinces of Turkey. Meanwhile social and economic conditions of regions also suffer from the regional inequalities;Filiztekin (2009) for unemployment, Elveren (2010) for wages, Çelebioğlu ve Dall'erba (2010) for industrial development, Ersoy and Taylor (2012) for employment and unemployment patterns, Yeşilyurt and Elhorst (2014) for prices constructed frameworks for better understanding the imbalances among the territory of the country. Amid these different dimensions of regional inequalities the way that new firms are dispersed enter the realm of Gaygısız and Köksal (2003) as an attempt to consider the regional variation of the new firms and factors influencing the process.[3] In general Gaygısız and Köksal (2003) validate that the new firms' dispersion pattern is much or less the same as the other socio-economic dimensions of Turkey and mostly influenced from the local population density, qualification of the labor force (share of technicians etc.) and unemployment share in the local population. Even though these studies deal with a wide range of areas, it is Mutlu (1988) to apply a system to test the certain aspects of the central place theory in Turkey. Mutlu (1988) identified a number of different hierarchies among the territory of Turkey and a set of determinants explaining the ordering of the system. Mutlu (1988) discussed that income, physical networks (i.e. roads), structure of the economic activity among the rural geographies, extent of spatial mobility, type of economic activity conducted by the labor force are the major items that explains the size and the spillover ability of the centers. Even though Mutlu (1988) underlined that centers not only serve themselves but also their hinterlands, is also skeptic for the strength of the connectivity between locations. However Mutlu (1988) is vital as it is one of the first

[3] See Kaya and Üçdoğruk (2002); Günalp and Cilasun (2006) for other attempts to question the new firm formation from an industrial organizations point of view.

attempts to question the possibility of the spatial spillovers and the factors determining the evolution of the center.

Turkey is included in the Nomenclature of Territorial Units for Statistics (NUTS) and divided into 81 NUTS 3, 26 NUTS 2, 12 NUTS 1 regions.[4] The largest local administrative unit is the NUTS 3 provincial areas. It should also be noted that there is no local autonomy in Turkey, leaving the government sustain the centralized policy making process even there are a number of regional policy agendas in line with the accession process to EU. To assess the development level of the NUTS 3 regions, Provincial and Regional Development Ranking Research of Ministry of Development (MOD, 2013) is plotted in Figure 1. Four development clusters indicate a clear dual structure with developed locations on the west and less developed on the east. It is evident that there is some sort of a development transition from eastern provinces in close proximity to Middle East and Asia towards western provinces closer to Europe.

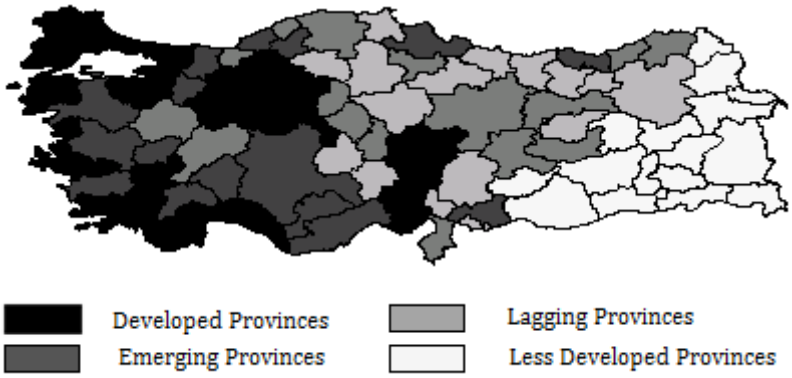

Figure 1. Provincial and regional development ranking

Source: MOD, 2013

To broaden the analysis regarding the regional inequalities, new firms in all industry lines, manufacturing industry, services and trade related activities for 2009 are considered and plotted in Figure 2.[5] As of 2009 over the new firm startups in all industry lines; manufacturing, services and trade represents the 12%, 19% and 41% of the total new firm formation respectively. As discussed in Evans and Jovanovic (1989) number of new firms may be an in adequate measure if the size of the location is not taken into account. Thus standardization of the new firm numbers is essential; ecological and labor market approaches, uses number of existing firms and employment

[4] See appendix for the NUTS classification as well as the geographic dispersion of regions in Turkey.

[5]Turkish Statistics Office (TURKSTAT) gives disaggregated information about new firm start up values at NACE 1.1 level (Statistical Classification of Economic Activities in the European Community). Over given industries three major lines are considered here; manufacturing services and trade. Manufacturing represents to whole manufacturing industry firms, trade represents the whole trade firms and finally services represents the aggregation of service firms in housing and tourism, financial intermediaries, financial security firms, education based firms, health and social work firms.

respectively. However since both indicators are not available at sectoral level for the periods under concern new firm numbers are normalized by using the provincial population.[6] Regardless of the industry under concern findings indicate that there are substantial regional inequalities regarding the new firm formation. Eastern and South Eastern Turkey has relatively low levels of new firm formation. Meanwhile provinces clustered around the Marmara and Aegean District has the highest new firm start up rates. This pattern looks similar to the development ranking given in Figure 1, confirming that similar to the other social and economic concerns of Turkey, regional new firm formation share much or less the same faith.

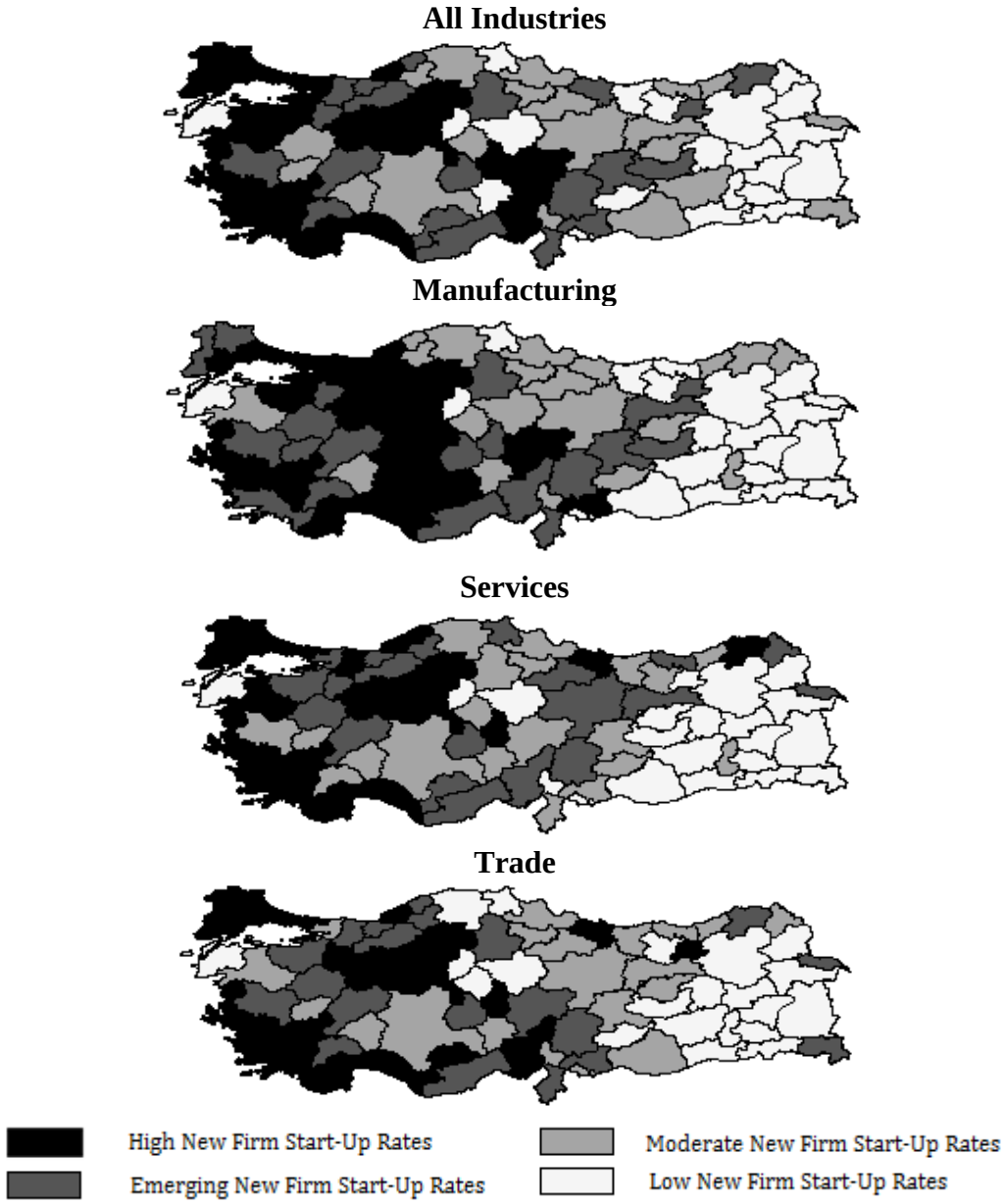

Figure 2. Spatial distribution of new firm formation-2009

Source: TURKSTAT

[6]Provincial population comes from Address Based Population Registration System of TURKSTAT

4. Remoteness and new firm formation in Turkey

4.1 Defining remoteness and geographical proximity

Following the NEG framework, computation of regional market potential is a way to see how each location is able to get access to the markets. This will not only increase the awareness on the differences in regional market potential but also will show how each locations benefits or suffers from its geographic location. Equation 1 is the market potential computation of Harris (1954) where *y* represents the population of each province and *d* represents the motorway distance between each pair of provinces (see Ottoviano and Pinelli, 2006; Brakman et al., 2006, Karahasan and Lopez-Bazo, 2013).[7] Internal distance of provinces is also computed as $D_{ii} = 0.66/\sqrt{Area_i/\pi}$ (Head and Mayer, 2006).There are also other ways to compute the market potential index that originates from an auxiliary gravity equation (see Boulhol and Serres, 2010; Head and Mayer, 2011) and also from a distance decay function (see Mion, 2004, Hanson, 2005; Nieburh, 2006; Kosfeld and Eckey, 2010) that allows for the estimation of the parameters to distinguish the different dimensions of the provincial market potential. However the reason for using the traditional Harris (1954) index within the study is two-fold. The necessary information to use in the computation of the gravity equation is not available for Turkey at NUTS 3. For the distance decay function on the other hand; focusing on the parameter estimates of the market potential function is going to divert the attention towards a different question that is we believe out of the scope of the ongoing research; which basically to understand the impact of remoteness on regional firm formation differences.[8]

$$MP_i = \frac{y_j}{d_{ij}} \tag{1}$$

Figure 3 gives insight about the distribution of the market potential for 2009. Provinces in the western Turkey have a market potential higher than the Turkish average. There is some sort of a spillover among Marmara, Aegean and West Anatolia districts creating the highest market potential

[7] NEG models and the other empirical attempts, which measures the market potential uses the regional income levels; yet since the per capita income of provinces in Turkey is not announced after 2001 here the study prefers to use the population values to compute the market potential. Here other than the representation power of population, we checked whether there is close link between the market potential indices computed by income and population for the pre 2001 period: results which are available upon request pin points the similarity. Population level of provinces comes from Turkish Statistics Office (TURKSTAT), motorways distance comes from the Ministry of Transportation.

[8] As discussed by Fingelton (2008); Head and Mayer (2011) incorporating the role of the foreign markets can also be a way to measure the market potential. Since the level of openness of Turkey to EU in specific is limited within only the Customs Union for goods and services but not for the mobility of the individuals, here results are reported for only the domestic market potential. A similar understanding can be replicated by focusing on the core EU 15 countries and their impact on the 81 provinces in Turkey. Market potential index for 2009 is also computed by taking into account the foreign markets, giving much or less a similar spatial pattern. That is to say inclusion of the foreign markets does not cause a deviation from the domestic market potential index. The results of the models estimated with foreign market potential are not reported here, yet available from the author upon request.

areas. On the other hand market potential of provinces tends to decline as we move towards eastern provinces. East Black Sea, Middle East Anatolia, some parts of South East Anatolia consists of a cluster of provinces with the lowest market potential. This pattern together with the geographical pattern observed in the development ranking of MOD (see Figure 1) give clues about the regional inequality pattern in Turkey. In addition to that it is noteworthy to remark that the market potential index has a pattern very similar to the one observed in the regional distribution of the new firm as given in figure 2. Highest firm formation rates are observed in mostly the western areas benefiting from high market potential. Similarly provinces in the east with low levels of market potential are realizing very low levels of new firm formation.

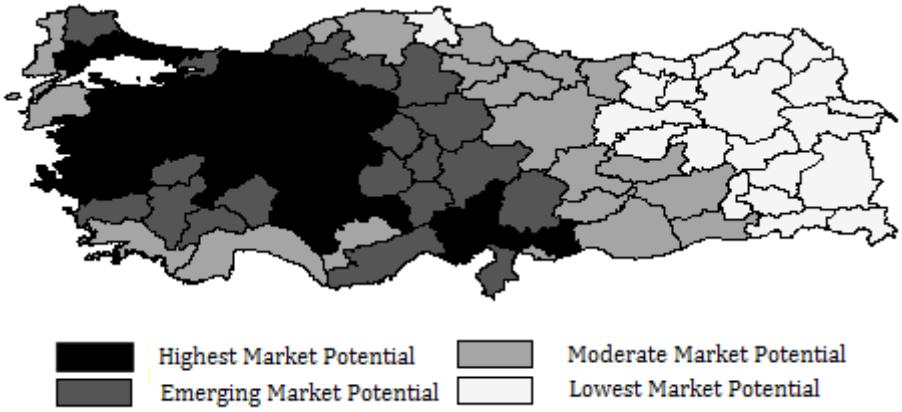

Figure 3. Market potential index-2009

Source: TURKSTAT, own calculations

While the market potential index explains the impact of remoteness by weighting the local demand/supply with the distance between each pair of provinces; another alternative can be the direct distance to economic activity centers (see López et al., 2007). Two economic activity centers are considered for the case of Turkey. Istanbul as the economically active center of the Turkish economy with almost 15 million of growing population and on a location that acts as a transition for Turkey towards Europe, second Ankara as the capital city of Turkey that contains most of the political, administrative and institutional body of the country. Figure 4 observes the correlation between remoteness and regional firm formation in Turkey. Figures clearly indicate the significant positive association between the new firm start-up rates and the market potential as well as a negative relationship with the direct distance to economic centers.

Figure 4 (a) **Figure 4 (b)** **Figure 4 (c)**

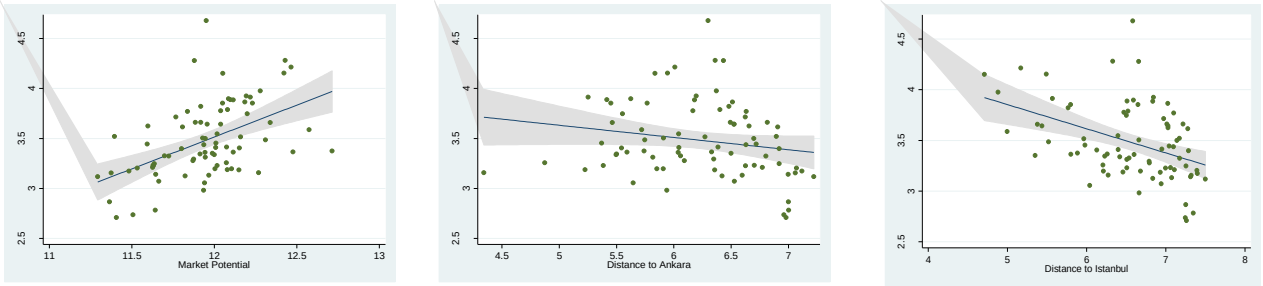

Figure 4. Remoteness and new firm formation-2009

Source: TURKSTAT, own calculations

Notes: y-axis is the new firms start-up rates in all industries, x-axis is the remoteness indicator respectively

4.2 Defining spatial spillovers

While the early findings indicate the link between new firms' formation and remoteness, they do not explain the possible spatial interdependencies which may explain some further dimensions of remoteness on the new firms' dispersion (see Anselin, 1996).

Equation 2 and 3 are two different spatial autocorrelation statistics: Morans' *I* and Geary's *C*. In both equations *w* is the weight matrix defining the spatial links, *n* is the number of cross sections, *s* is the summation of the all elements of the weight matrix.

$$I = \frac{n}{s}\frac{\sum_i \sum_j w_{ij}(x_i - \bar{x})(x_j - \bar{x})}{\sum_i (x_i - \bar{x})^2} \tag{2}$$

$$C = \frac{(n-1)(\sum_i \sum_j w_{ij}(x_i - x_j)}{2(\sum_i \sum_j w_{ij}(x_i - x_j)^2)} \tag{3}$$

To define the spatial links among provinces three different weight matrices are considered. First a contiguity weight matrix (equation 4), then an inverse distance weight matrix (equation 5) is used to measure the spatial autocorrelation. While the contiguity type of matrix shows the spatial links working over the first order adjacency, the inverse weight matrix gives weight to each location by constructing an inverse relationship based on the distance between each pair of locations. Finally a k-nearest neighbor weight matrix is constructed as in equation 6. d_{ij} is the great circle distance between centroids of regions i and j and$D_i(k)$ is the fourth and sixth order smallest

distance between regions i and j such that each regions is going to have 4 and 6 neighbors respectively.

$$w_{i,j} = \begin{cases} w = 0 & \text{if } i = j \\ w = 0 & \text{if } i, j \text{ are non - neighbor} \\ w = 1 & \text{if } i, j \text{ are neighbor} \end{cases} \quad (4)$$

$$w_{i,j} = \frac{1}{d_{i,j}^2} \quad (5)$$

$$w_{i,j} = \begin{cases} w = 0 & \text{if } i = j \\ w = 0 & \text{if } d_{i,j} \le D_i(k) \\ w = 1 & \text{if } d_{i,j} > D_i(k) \end{cases} \quad (6)$$

Results of the spatial autocorrelation tests are reported in table 1, both with the null-hypothesis of spatial randomness. For Morans' *I*, negative, positive and zero values represents –, + spatial autocorrelation and spatial randomness respectively.

On the other hand a value of 1 represents spatial randomness for Geary's *C*. For values between 0 to 1 and 1 to 2 Geary's *C* represents positive and negative spatial autocorrelation respectively. Results given in table 1 indicate that new firm formation in Turkey is spatially auto correlated regardless of the chosen weight matrix, indicating the presence of spatial links.

Table 1. Spatial autocorrelation test results

	Morans' I Test Results				Geary's C Test Results			
	Contiguity	**K_4**	**K_6**	**Inverse Distance**	**Contiguity**	**K_4**	**K_6**	**Inverse Distance**
All Industries	0.361 ***	0.356***	0.325***	0.280 ***	0.629 ***	0.579***	0.647***	0.683 ***
	(0.072)	(0.071)	(0.057)	(0.045)	(0.078)	(0.075)	(0.062)	(0.047)
Manufacturing	0.517 ***	0.514***	0.502***	0.443 ***	0.484 ***	0.498***	0.517***	0.564 ***
	(0.073)	(0.073)	(0.060)	(0.046)	(0.078)	(0.076)	(0.064)	(0.049)
Services	0.118 **	0.250***	0.294***	0.092 **	0.819 **	0.674***	0.686***	0.882 **
	(0.067)	(0.073)	(0.060)	(0.043)	(0.089)	(0.077)	(0.063)	(0.054)
Trade	0.336 ***	0.304***	0.317***	0.260 ***	0.655 ***	0.680***	0.700***	0.709 ***
	(0.073)	(0.074)	(0.0610)	(0.044)	(0.080)	(0.078)	(0.065)	(0.048)

Source: own computations

Notes: Standard deviation in ( ), ***, ** represents significance at 1%, 5% respectively.

Empirical pseudo-significance based on 999 random permutations

4.3 Econometric specifications and empirical results

To identify the possible links between remoteness and new firm formation, a number of models are estimated for 2009.[9] y is the standardized new firm formation rates. Remoteness denoted by x, is first defined by looking at the direct motorway distance between each province and Ankara, Istanbul respectively. Second remoteness is controlled by incorporating the market potential index, which is defined in the previous section; giving an idea about the intra and inter province linkages. Z vector that contains the provinces' three major properties: to understand the labor market conditions unemployment rate is included (Storey, 1991), to evaluate the impact of the labor quality share of population with at least 15 years of education is used (Marshall, 1920; Krugman, 1991) and to understand the congestion vs. agglomeration effects population density is preferred (Krugman, 1991).[10]

First a non-spatial Ordinary Least Squares (OLS) model is constructed as a benchmark specification (equation 6); then the impact of spatial links is included via spatial dependent models. Spatial Lag Model (SAR, equation 7) with the assumption of spatial dependency of new firms, Spatial Error Model (SEM, equation 8) with the assumption of spatial dependency of the common shocks.[11] Results are summarized in Tables 2 to 5.

$$y_i = \alpha + \beta x_i + \gamma Z_i + \varepsilon_i \quad (6)$$

$$y_i = \alpha + \beta x_i + \gamma Z_i + \rho W y_i + \varepsilon_i \quad (7)$$

$$y_i = \alpha + \beta x_i + \gamma Z_i + \lambda W u_i + \varepsilon_i \quad (8)$$

[9]Similar models are estimated for the year 2000 giving much or less the same results. These results are not reported to save space yet available upon request,

[10] Data for the control variables is collected from Address Based Population Registration System of TURKSTAT.

[11]The spatial models use the inverse distance weight matrix throughout the whole study. Similar results are obtained by using other weight matrices; these results are also available upon request. Additionally an alternative way of incorporating the spatial links is the Spatial Durbin Model (SDM). SDM models are also estimated yet not reported to save space. Results of the SDM models are available upon request.

Table 2. Distance and new firm start ups: all industries

	OLS	SAR	SEM	OLS	SAR	SEM	OLS	SAR	SEM
Distance to Istanbul	-0.129** (0.060)	-0.107* (0.062)	-0.144** (0.052)	-	-	-	-	-	-
Distance to Ankara	-	-	-	-0.118** (0.055)	-0.104** (0.054)	-0.118** (0.052)	-	-	-
Market Potential	-	-	-	-	-	-	0.398** (0.198)	0.326 (0.216)	0.420** (0.181)
Unemployment Rate	0.004 (0.010)	0.004 (0.010)	0.007 (0.009)	0.001 (0.010)	0.001 (0.010)	0.002 (0.009)	-0.001 (0.010)	-0.001 (0.010)	-0.001 (0.009)
Share of Population with min. BA Degree	0.458*** (0.115)	0.414*** (0.117)	0.524*** (0.102)	0.433*** (0.120)	0.353*** (0.121)	0.457*** (0.114)	0.431*** (0.122)	0.401*** (0.121)	0.462*** (0.115)
Population Density	0.083 (0.073)	0.089 (0.071)	0.053 (0.067)	0.163** (0.062)	0.151** (0.060)	0.161** (0.059)	0.086 (0.074)	0.094 (0.071)	0.073 (0.069)
$\boldsymbol{\rho}$	-	0.147 (0.193)	-	-	0.236 (0.180)	-	-	0.127 (0.205)	-
$\boldsymbol{\lambda}$	-	-	-0.373 (0.275)	-	-	-0.096 (0.263)	-	-	-0.211 (0.270)
# of Observations	81	81	81	81	81	81	81	81	81
$\boldsymbol{R^2}$	0.40	0.40	0.46	0.40	0.41	0.42	0.40	0.40	0.42
AIC	86.959	88.486	85.941	86.980	87.470	86.907	87.418	89.110	87.027
SIC	98.931	102.854	97.913	98.952	101.837	98.879	99.390	103.478	98.999
B-P Test Residuals Heteroscedasticity	6.024 (0.20)	19.209 (0.00)	17.511 (0.00)	5.502 (0.24)	14.627 (0.01)	13.203 (0.01)	6.276 (0.18)	16.268 (0.00)	15.273 (0.00)
Spatial Dependency Test	-0.032 (0.89)	2.592 (0.11)	2.899 (0.09)	-0.009 (0.67)	1.893 (0.17)	4.753 (0.03)	-0.022 (0.92)	1.757 (0.18)	2.088 (0.14)

Source: own computations

Notes: Standard Errors in () for coefficient estimates, P-values () for test statistics, *, **, *** represents significance at 10%, 5% and 1% respectively. AIC and SIC represents the Akaike and Schwartz Information Criterions. B-P test is the Breusch Pagan test for residual heteroscedasticity with the null hypothesis of homoscedastic residuals. Test for Spatial Dependency is the Moran's I for the residuals in the OLS models, Lagrange Multiplier Test for the spatial error and lag dependence in the SAR and SEM models respectively; all with the null hypothesis of spatial random residuals.

Table 3. Distance and new firm start ups: manufacturing

	OLS	SAR	SEM	OLS	SAR	SEM	OLS	SAR	SEM
Distance to Istanbul	-0.214** (0.076)	-0.107 (0.075)	-0.100 (0.086)	-	-	-	-	-	-
Distance to Ankara	-	-	-	-0.173** (0.071)	-0.125** (0.064)	-0.136* (0.077)	-	-	-
Market Potential	-	-	-	-	-	-	1.020*** (0.234)	0.733** (0.265)	1.032*** (0.222)
Unemployment Rate	0.002 (0.013)	-0.001 (0.012)	-0.005 (0.014)	-0.003 (0.013)	-0.003 (0.011)	-0.008 (0.014)	-0.008 (0.012)	-0.007 (0.011)	-0.008 (0.011)
Share of Population with min. BA Degree	0.594*** (0.146)	0.335** (0.140)	0.164 (0.150)	0.573*** (0.153)	0.259* (0.143)	0.072 (0.154)	0.452*** (0.144)	0.325** (0.143)	0.476*** (0.138)
Population Density	0.134 (0.093)	0.162* (0.084)	0.225** (0.089)	0.268*** (0.079)	0.224*** (0.072)	0.264*** (0.077)	0.066 (0.087)	0.098 (0.083)	0.058 (0.084)
ρ	-	0.488**** (0.153)	-	-	0.533*** (0.140)	-	-	0.306* (0.172)	-
λ	-	-	0.697*** (0.139)	-	-	0.740*** (0.125)	-	-	-0.075 (0.262)
# of Observations	81	81	81	81	81	81	81	81	81
R^2	0.47	0.50	0.18	0.46	0.51	0.16	0.53	0.54	0.55
AIC	124.685	118.922	121.824	126.473	117.053	119.859	114.531	114.056	114.497
SIC	136.657	133.288	133.796	138.445	131.420	131.831	126.504	128.422	126.469
B-P Test Residuals Heteroscedasticity	0.258 (0.99)	3.836 (0.43)	1.868 (0.76)	1.045 (0.90)	4.025 (0.40)	1.784 (0.78)	1.546 (0.82)	4.241 (0.37)	2.576 (0.63)
Spatial Dependency Test	0.026 (0.20)	3.078 (0.08)	0.068 (0.79)	0.059 (0.04)	2.327 (0.13)	0.022 (0.88)	-0.005 (0.61)	1.692 (0.19)	5.562 (0.02)

Source: own computations

Notes: Standard Errors in () for coefficient estimates, P-values () for test statistics, *, **, *** represents significance at 10%, 5% and 1% respectively. AIC and SIC represents the Akaike and Schwartz Information Criterions. B-P test is the Breusch Pagan test for residual heteroscedasticity with the null hypothesis of homoscedastic residuals. Test for Spatial Dependency is the Moran's I for the residuals in the OLS models, Lagrange Multiplier Test for the spatial error and lag dependence in the SAR and SEM models respectively; all with the null hypothesis of spatial random residuals.

Table 4. Distance and new firm start ups: services

	OLS	SAR	SEM	OLS	SAR	SEM	OLS	SAR	SEM
Distance to Istanbul	-0.089 (0.147)	-0.044 (0.141)	-0.028 (0.153)	-	-	-	-	-	-
Distance to Ankara	-	-	-	-0.277** (0.131)	-0.246** (0.129)	-0.262** (0.131)	-	-	-
Market Potential	-	-	-	-	-	-	0.611 (0.475)	0.448 (0.462)	0.485 (0.485)
Unemployment Rate	0.001 (0.026)	0.003 (0.024)	0.002 (0.026)	0.001 (0.024)	0.001 (0.024)	0.001 (0.024)	-0.003 (0.025)	-0.001 (0.024)	-0.001 (0.025)
Share of Population with min. BA Degree	0.466 (0.280)	0.407 (0.269)	0.430 (0.283)	0.272 (0.284)	0.243 (0.274)	0.264 (0.281)	0.356 (0.292)	0.330 (0.282)	0.364 (0.286)
Population Density	-0.181 (0.178)	-0.157 (0.170)	-0.145 (0.175)	-0.132 (0.146)	-0.135 (0.141)	-0.136 (0.144)	-0.247 (0.178)	-0.219 (0.171)	-0.221 (0.175)
$\boldsymbol{\rho}$	-	0.297 (0.218)	-	-	0.190 (0.228)	-	-	0.237 (0.225)	-
$\boldsymbol{\lambda}$	-	-	0.285 (0.223)	-	-	0.121 (0.244)	-	-	0.199 (0.235)
# of Observations	81	81	81	81	81	81	81	81	81
$\boldsymbol{R^2}$	0.05	0.06	0.04	0.11	0.11	0.09	0.07	0.08	0.06
AIC	230.462	231.005	229.416	226.272	227.690	226.086	229.106	230.248	228.627
SIC	242.434	245.372	241.388	238.244	242.057	238.058	241.078	244.615	240.600
B-P Test Residuals Heteroscedasticity	1.397 (0.84)	5.365 (0.25)	5.394 (0.25)	1.647 (0.80)	6.768 (0.15)	6.837 (0.14)	2.037 (0.73)	7.669 (0.10)	7.687 (0.10)
Spatial Dependency Test	0.043 (0.09)	0.010 (0.92)	1.610 (0.20)	0.018 (0.26)	0.427 (0.51)	2.172 (0.14)	0.028 (0.17)	0.063 (0.80)	2.129 (0.14)

Source: own computations

Notes: Standard Errors in () for coefficient estimates, P-values () for test statistics, *, **, *** represents significance at 10%, 5% and 1% respectively. AIC and SIC represents the Akaike and Schwartz Information Criterions. B-P test is the Breusch Pagan test for residual heteroscedasticity with the null hypothesis of homoscedastic residuals. Test for Spatial Dependency is the Moran's I for the residuals in the OLS models, Lagrange Multiplier Test for the spatial error and lag dependence in the SAR and SEM models respectively; all with the null hypothesis of spatial random residuals.

Table 5. Distance and new firm start ups: trade

	OLS	SAR	SEM	OLS	SAR	SEM	OLS	SAR	SEM
Distance to Istanbul	-0.079 (0.072)	-0.048 (0.072)	-0.080 (0.070)	-	-	-	-	-	-
Distance to Ankara	-	-	-	-0.130** (0.065)	-0.114* (0.064)	-0.134** (0.060)	-	-	-
Market Potential	-	-	-	-	-	-	0.410* (0.233)	0.330 (0.249)	0.429** (0.218)
Unemployment Rate	-0.006 (0.012)	-0.006 (0.012)	-0.006 (0.012)	-0.008 (0.012)	-0.007 (0.011)	-0.007 (0.011)	-0.010 (0.012)	-0.009 (0.012)	-0.010 (0.011)
Share of Population with min. BA Degree	0.542*** (0.138)	0.460*** (0.139)	0.550*** (0.133)	0.474*** (0.141)	0.400*** (0.142)	0.516*** (0.132)	0.480*** (0.144)	0.443*** (0.143)	0.505*** (0.137)
Population Density	0.110 (0.088)	0.119 (0.084)	0.108 (0.085)	0.157** (0.073)	0.148** (0.071)	0.153** (0.069)	0.078 (0.087)	0.088 (0.084)	0.067 (0.083)
ρ	-	0.228 (0.198)	-	-	0.198 (0.192)	-	-	0.132 (0.211)	-
λ	-	-	-0.027 (0.258)	-	-	-0.163 (0.267)	-	-	-0.137 (0.266)
No of observations	81	81	81	81	81	81	81	81	81
R^2	0.33	0.33	0.33	0.35	0.35	0.38	0.34	0.34	0.36
AIC	116.229	117.072	116.223	113.382	114.407	113.189	114.256	115.929	114.093
SIC	128.201	131.438	128.195	125.354	128.774	125.162	126.229	130.296	126.065
B-P Test Residuals Heteroscedasticity	2.673 (0.61)	10.188 (0.04)	8.340 (0.07)	3.031 (0.55)	8.983 (0.06)	8.047 (0.09)	2.968, (0.56)	9.146 (0.06)	8.518 (0.07)
Spatial Dependency Test	-0.002 (0.55)	1.685 (0.19)	4.117 (0.04)	-0.014 (0.76)	2.060 (0.15)	4.381 (0.04)	-0.014 (0.76)	1.394 (0.24)	2.159 (0.14)

Source: own computations

Notes: Standard Errors in () for coefficient estimates, P-values () for test statistics, *, **, *** represents significance at 10%, 5% and 1% respectively. AIC and SIC represents the Akaike and Schwartz Information Criterions. B-P test is the Breusch Pagan test for residual heteroscedasticity with the null hypothesis of homoscedastic residuals. Test for Spatial Dependency is the Moran's I for the residuals in the OLS models, Lagrange Multiplier Test for the spatial error and lag dependence in the SAR and SEM models respectively; all with the null hypothesis of spatial random residuals.

Models estimated for the whole industry lines indicate that remoteness matters for the location choice of the new firms. Distance to both economics centers is significantly and negatively affecting the new firm formation. Market potential of provinces significantly explains the new firms' dispersion in OLS and SEM models that are superior with respect to the SAR model based on the conventional diagnostic checks. Interestingly in none of the estimated models spatial links are working, emphasizing that remoteness variables, which are all functions of distance are over performing the spatial spillovers that are also defined by the distance in the weight matrix.

Even the first set of findings for all industries in Turkey gives us clues about the importance of being close to markets, the way this relationship behaves across different industries may be also important. For manufacturing industry market potential as well as being close to Ankara increases the new firm formation. For the case of distance to Istanbul a significant effect can only be detected for the benchmark specification. Yet for the models using distance to Istanbul, spatial links are significant giving clues that impact of distance still exists over the spatial links. These spatial links are also present for distance to Ankara but not for the market potential. Meanwhile for the service based new firm formation results indicate that only distance to Ankara matters for the new firm formation. This can be explained by the administrative role played by Ankara and the high share of public oriented services at the capital city of Turkey. Finally for the estimated models for trade based activities, results pin point that distance to Ankara for all specification and market potential for SEM model are significantly explaining the way that new firms are dispersed.

Regarding the regional control variables, findings indicate the positive and significant impact of the education level of the population in all models other than the ones estimated for the services. While the impact of unemployment is ambiguous, population density seems to generate some sort of pull effects only in models that questions the impact of distance to Ankara on new firm formation in all industries, manufacturing and trade based activities.

Table 6. Distance and new firm start ups (IV - 2SLS)

	All Industries			Manufacturing			Services			Trade		
Distance to Istanbul	-0.237* (0.137)	-	-	-0.236 (0.178)	-	-	0.029 (0.210)	-	-	-0.166 (0.134)	-	-
Distance to Ankara	-	-0.398* (0.232)	-	-	-0.474* (0.260)	-	-	-0.405 (0.481)	-	-	-0.344 (0.223)	-
Market Potential	-	-	0.856** (0.446)	-	-	1.009* (0.578)	-	-	0.819 (1.142)	-	-	0.732 (0.463)
Unemployment Rate	0.008 (0.008)	0.002 (0.010)	-0.003 (0.009)	0.003 (0.009)	-0.002 (0.012)	-0.008 (0.011)	-0.001 (0.018)	0.001 (0.014)	-0.004 (0.014)	-0.003 (0.010)	-0.007 (0.011)	-0.012 (0.011)
Share of Population with min. BA Degree	0.388*** (0.149)	0.178 (0.263)	0.306* (0.181)	0.580*** (0.200)	0.300 (0.296)	0.455** (0.226)	0.542 (0.337)	0.155 (0.517)	0.299 (0.433)	0.486*** (0.169)	0.280 (0.256)	0.392** (0.190)
Population Density	0.012 (0.081)	0.154* (0.064)	-0.006 (0.102)	0.120 (0.108)	0.258*** (0.072)	0.068 (0.128)	-0.001 (0.018)	-0.136 (.098)	-0.289 (0.278)	0.053 (0.095)	0.150** (0.061)	0.012 (0.105)
# of Observations	81	81	81	81	81	81	81	81	81	81	81	81
R^2	0.39	0.20	0.35	0.47	0.34	0.53	0.05	0.09	0.07	0.31	0.26	0.32
First Stage Regression F-Stat	13.441 (0.00)	3.513 (0.03)	4.730 (0.01)	13.441 (0.00)	3.513 (0.03)	4.730 (0.01)	13.441 (0.00)	3.513 (0.03)	4.730 (0.01)	13.441 (0.00)	3.513 (0.03)	4.730 (0.01)
Wu Hausman Test Results	1.772 (0.18)	1.611 (0.20)	1.328 (0.25)	0.037 (0.84)	1.141 (0.28)	0.001 (0.98)	0.359 (0.55)	0.077 (0.78)	0.052 (0.82)	0.949 (0.33)	1.075 (0.30)	0.730 (0.39)
SarganOveridentification	0.064 (0.80)	0.492 (0.48)	1.548 (0.21)	0.493 (0.48)	0.070 (0.79)	0.214 (0.64)	1.888 (0.17)	3.951 (0.04)	2.688 (0.11)	0.433 (0.51)	0.045 (0.83)	0.056 (0.81)

Source: own computations

Notes: Standard Errors in () for coefficient estimates, P-values () for test statistics, *, **, *** represents significance at 10%, 5% and 1% respectively. AIC and SIC represents the Akaike and Schwartz Information Criterions. B-P test is the Breusch Pagan test for residual heteroscedasticity with the null hypothesis of homoscedastic residuals. Test for Spatial Dependency is the Moran's I for the residuals in the OLS models, Lagrange Multiplier Test for the spatial error and lag dependence in the SAR and SEM models respectively; all with the null hypothesis of spatial random residuals.

Finally as to discuss the possible endogeneity and the omitted variables bias, estimations carried out for the whole industries as well as the disaggregated industries are re-estimated with the help of Instrumental Variables (IV) approach (see Table 6). Nor for the trade neither for the service firms a significant link between distance and new firm formation is detected. For the whole industries for all remoteness definitions and for the manufacturing industry for the distance to Ankara and market potential a significant association is observed. In general findings of the final set of models validate that, even controlling for the endogeneity and the omitted variables bias remoteness plays significant role in understanding the new firms start up decisions; depending on the type of production and depending on the measurement of distance.

Results contributes to the previous literature for Turkey; while Gaygsız and Köksal (2003) underlined the impact of the domestic demand and labor force, results reported here also pin-point the importance of being close high economy activity centers as well as high market potential areas both of which controls for the backward and forward linkages. Moreover results for the Turkish case are in line with Ghani et al (2014) that underlines the importance of travel time to large cities for the Indian case. Additionally in some specifications results indicate the presence of the spatial spillovers as documented for US by Cheng et al. (2011a). Finally it should also be noted that similar to Ghani et al. (2014) and Cala et al. (2014) this study contributes to the new firm formation literature by investigating a developing country. In this sense it should be kept in mind that regional policy making to promote new firms may have different implications in developing and developed world. Given that previous evidence mostly focuses on the developed countries, findings here should shed additional light on the role played by geography in economies struggling with distinct social and economic problems.

5. Conclusion

The way that new firms influence regional development is important for regional and urban planning. Existence of new firms and policies stimulating the formation of the new comers are counted at the top of the regional policy making scheme. Major channels that will explain the importance of new firms ranges from job creation, knowledge transformation and innovation to rising competition, which is expected to accelerate the incumbents' productivity. Given the important role attributed to the new firms, investigating the way that regional characteristics of locations influence the new firms' formation is essential. This study contributes to the growing literature on new firms' start up decisions by discussing the

importance of remoteness and distance in a developing economy, Turkey. The central hypothesis is that locating at the center, which is defined by the high market potential as well as being close to economic centers, should provide firms advantages over different channels. These channels can range from possible demand to supply based mechanisms. For instance being close to markets will decrease the possible transportation costs which will motivate the new firms as profit maximizers. This view can be augmented by also diverting the attention towards probable link among geographical proximity and innovation. Being close to center should provide some opportunities mostly by benefiting from knowledge spillovers and transformation. That is to say: low transportation rigidities realized by being close to the center will not only favor in terms of backward and forward linkages for firms but also this represents an opportunity for the ease of the knowledge spillovers.

Preliminary observations underline that, regional dispersion of the new firms tend to concentrate in the western geography. Marmara, Aegean and West Anatolia districts seems to act as centripetal areas, whereas eastern territory from the East Black Sea to Middle and South East Anatolia suffers from an environment that excludes the new firms' formation. Constructed framework for Turkey at provincial level validates that; provinces with relatively higher new firm formation are the ones that are close the economic activity centers and that have high market potential. While for the whole industries both direct distance as well as the market potential explains the new firm formation, once the sectoral disaggregation has been done results increase the probability of spatial spillovers. In general over the three classifications preferred; while manufacturing seems to have a similar pattern compared to the whole industries, for the trade and service based production impact of remoteness seems to decrease yet still existent. This becomes more visible especially in the models controlling for the endogeneity and the omitted variable bias.

In general results obtained from the study have a number of vital outcomes. While direct distance to Istanbul and Ankara explains the importance of two economic centers in the western geography, market potential index also captures the overall west and east duality in Turkey; that visualizes the divide among closeness to Europe and Asia. Moreover as an EU candidate economy on her negotiations round with the union over the Regional Policy and the Coordination of Structural Funds, Turkey has to take into account the extent of the geographical proximity as well as spatial duality throughout the regional policy making processes. The central policy making is inevitably going to create different outcomes at the local level, however applicability and the suitability of the policy agendas are subject to some doubts in the absence of a careful interpretation of the networks and connectivity of the

locations with the center. Given the important role attributed to local new firms for regional development, the way they are integrated to the regional as well as the national economic system in Turkey is highly influenced from the geographical proximity, which should underline the undergoing disadvantage of the distant locations at the periphery.

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Appendix

Table A. NUTS classification Turkey

NUTS 1 Regions	NUTS 2 Sub-regions	NUTS 3 Provinces
TRA North East Anatolia	**TRA1** Erzurum	Erzurum, Erzincan, Bayburt
	TRA2 Ağrı	Ağrı, Kars, Iğdır, Ardahan
TRB Middle East Anatolia	**TRB1** Malatya	Malatya, Elazığ, Bingöl, Tunceli
	TRB2 Van	Van, Muş, Bitlis, Hakkari
TRC South East Anatolia	**TRC1** Gaziantep	Gaziantep, Adıyaman, Kilis
	TRC2 Şanlıurfa	Şanlıurfa, Diyarbakır
	TRC3 Mardin	Mardin, Batman, Şırnak, Siirt
TR1 Istanbul	**TR10** İstanbul	Istanbul
TR2 West Marmara	**TR21** Tekirdağ	Tekirdağ, Edirne, Kırklareli
	TR22 Balıkesir	Balıkesir, Çanakkale
TR3 Aegean	**TR31** İzmir	İzmir
	TR32 Aydın	Aydın, Denizli, Muğla
	TR33 Manisa	Manisa, Afyon, Kütahya, Uşak
TR4 East Marmara	**TR41** Bursa	Bursa, Eskişehir, Bilecik
	TR42 Kocaeli	Kocaeli, Sakarya, Düzce, Bolu, Yalova
TR5 West Anatolia	**TR51** Ankara	Ankara
	TR52 Konya	Konya, Karaman
TR6 Mediterranean	**TR61** Antalya	Antalya, Isparta, Burdur
	TR62 Adana	Adana, Mersin
	TR63 Hatay	Hatay, Kahramanmaraş, Osmaniye
TR7 Middle Anatolia	**TR71** Kırıkkale	Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir
	TR72 Kayseri	Kayseri, Sivas, Yozgat
TR8 West Black Sea	**TR81** Zonguldak	Zonguldak, Karabük, Bartın
	TR82 Kastamonu	Kastamonu, Çankırı, Sinop
	TR83 Samsun	Samsun, Tokat, Çorum, Amasya
TR9 East Black Sea	**TR90** Trabzon	Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane

Source: TURKSTAT

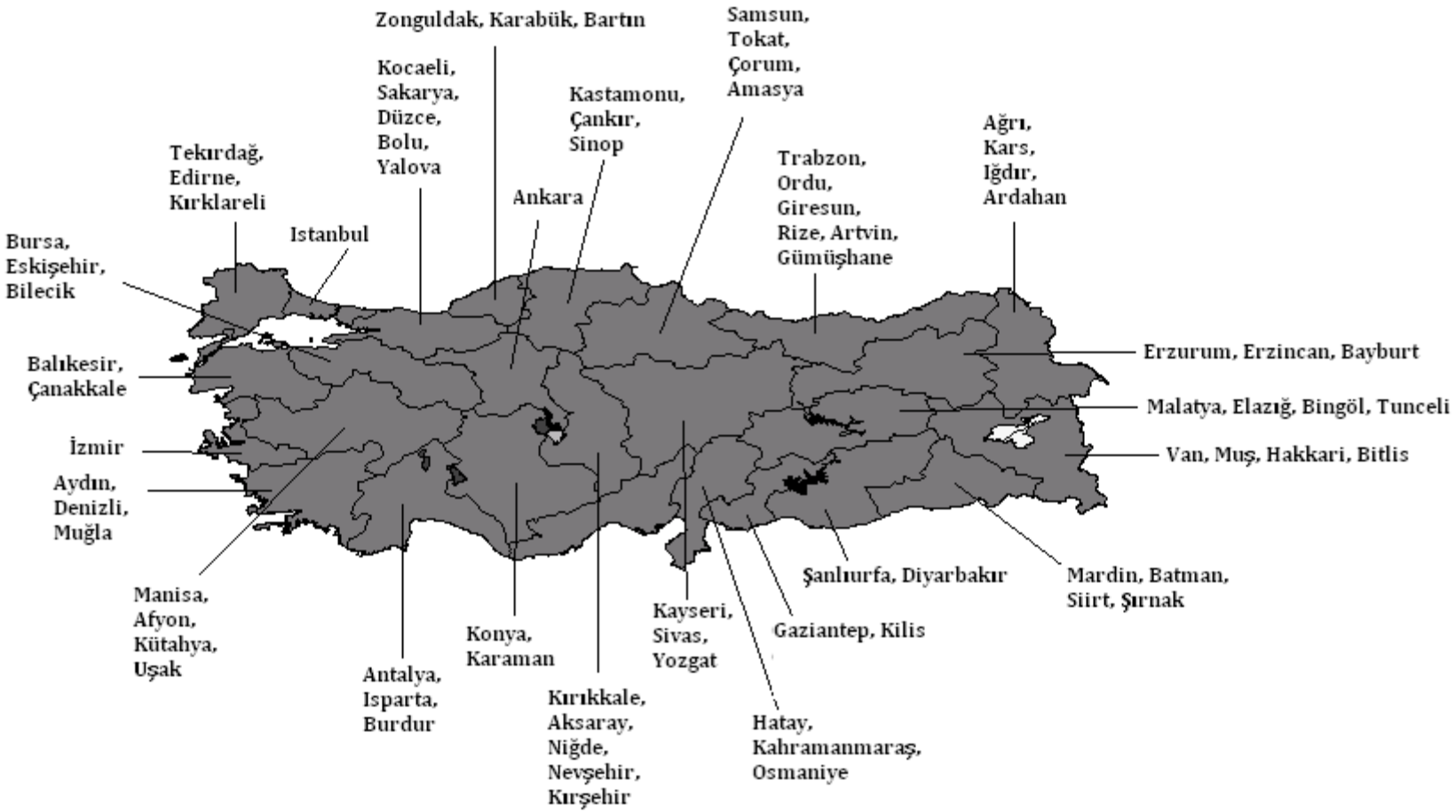

Figure A. NUTS 2 - Sub-Regions of Turkey

Source: TURKSTAT